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Актуальні питання створення нових лікарських засобів : тези доповідей XXIII Міжнародної науково-практичної конференції молодих вчених та студентів (21 квіт. 2016 р.). В 2-х т., Т.2. – Х. : Вид-во НФаУ, 2016. – 418 с.

Збірка містить матеріали науково-практичної конференції молодих вчених та студентів «Актуальні питання створення нових лікарських засобів». Матеріали згруповано за провідними напрямками науково-дослідної та навчальної роботи Національного фармацевтичного університету. Розглянуто теоретичні та практичні аспекти синтезу біологічно-активних сполук і створення на їх основі лікарських субстанцій; стандартизації ліків, фармацевтичного та хіміко-технологічного аналізу; вивчення рослинної сировини та створення фітопрепаратів; сучасної технології ліків та екстемпоральної рецептури; біотехнології у фармації; досягнень сучасної фармацевтичної мікробіології та імунології; доклінічних досліджень нових лікарських засобів; фармацевтичної опіки рецептурних та безрецептурних лікарських препаратів; доказової медицини; сучасної фармакотерапії, соціально-економічних досліджень у фармації, маркетингового менеджменту та фармакоєкономіки на етапах створення, реалізації та використання лікарських засобів; управління якістю у галузі створення, виробництва і обігу лікарських засобів; інформаційних технологій у фармації та медицині; основ педагогіки та психології; суспільствознавства; філології. Для широкого кола наукових і практичних працівників фармації та медицини.

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**Editorial board:** academician of NAS of Ukraine Chernykh V.P., ass. prof. Krutskiyh T.V., Danylchenko S.Yu.  
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Topical issues of new drugs development : Abstracts of XXIII International Scientific And Practical Conference Of Young Scientists And Student (April 21, 2016). In 2 vol. Vol. 2. – Kharkiv : Publishing Office NUPh, 2016. – 418 P.

Book of Abstracts includes materials of Scientific and Practical Conference of Young Scientists and Students «Actual questions of development of new drugs». Materials are grouped according to the main directions of scientific, research and educational work of the National University of Pharmacy. Theoretical and practical aspects of the synthesis of biologically active compounds and development of medicinal substances on their basis; standardization of drugs, pharmaceutical and chemical-technological analysis, the study of raw materials and herbal remedies development, modern drug technology and extemporal recipe; biotechnology in pharmacy, modern advances in pharmaceutical microbiology and immunology, clinical trials of new drugs, pharmaceutical care for prescription and OTC-drugs, evidence-based medicine, modern pharmacotherapy, socio-economic studies in pharmacy, marketing management and pharmacoeconomics during the development, implementation and use of drugs, quality management in development, production and trafficking of drugs; information technologies in pharmacy and medicine; basics of pedagogy and psychology; social science; philology are presented. For a wide audience of scientists and pharmaceutical and medicinal employees.

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Dear colleagues and our talented youth!

The development of science has always been one of the most important tasks for our university. Because we are both the greatest pharmaceutical educational institution in our country, and the developed research structure, we want to provide not only good specialists, but also new and safe medicines. Of course, nowadays we already have powerful scientific basement – well-known scientists, professors and their achievements. Today 371 medicines with wide range of pharmacological activities are in various stages of implementation. But in order to continue the development of current research areas in the future we need you – students and young scientists with a strong desire to make our life better, healthier, happier.

Different Student Scientific Societies have been fruitfully working in every department for 70 years already. Nowadays they unite more than 700 students, among them – students from foreign countries too. Student Scientific Societies are

the first step for students and young scientists on the way of improving their skills. You can choose the most interesting for you research area in pharmacy: from synthesis of new biologically active molecules and their analysis to preclinical and clinical testing, industrial aspects or marketing research. You have brilliant opportunity to test yourself in order to find your own way in science during students' years. And your supervisors will surely help you and lead you on this way to success. Because altogether we are working for our main goal – development of new, safe and efficient medicines.

Thus our Conference «Topical issues of new drugs development» is the first step for you today. The Conference became International five years ago. Nowadays publication of abstracts is carried out entirely in English, as well as our plenary sessions. The Conference is an important part of your scientific work – an interesting and challenging pathway that leads to PhD degree, then to the degree of Doctor of Science, to professorship. And it begins as a rule in our Student Scientific Societies. Almost 90 % of our teaching staff, as well as I'm myself, has started their scientific career the same way.

Someone can say that scientific work isn't always easy and straight, that it needs lots of energy and even money. But we must understand that without the development of national science it's just impossible to make our country strong and independent, as it will be for sure in the nearest future.

That's why the main goal for us is making science fashionable for talented youth and creating all necessary conditions for your scientific work. And I'm proud that so many of our students are deeply interested in it nowadays.

I wish you to achieve all your goals, to become famous and successful. And, of course, I wish everyone good health, happiness and love!

Rector of National University of Pharmacy,  
Academician of NAS of Ukraine,  
prof. Valentyn P.Chernykh

**SECTION № 7**

**GENETIC STUDIES, THE POSSIBILITY OF USING  
IN THE PRACTICE OF MEDICINE AND PHARMACY**

## SMOKING AND IT'S RELATED DISEASES OF GENETIC AND NON-GENETIC ORIGIN

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**Introduction.** Smoking is an act of burning dried tobacco leaves and is inhaled which is easily absorbed into the bloodstream. It is gotten from a tobacco plant, which is dried and folded into cylindrical shapes and called cigarettes. It is also an administration route since combusted substances can easily be absorbed into the bloodstream and work actively in the various parts of the body. Cigarettes have additives substances called Nicotine, it causes aerosol and gases to have deep penetration in the lungs, which can be easily absorbed and causes the addictive character.

**Aim.** The aim of the study was identification of harmful substances in cigarettes and their influence on the human body as activator of genetic and non-genetic conditions.

**Materials and methods.** Scientific literature and publications of last years were used for analysis.

**Results and discussion.** Smoking dates back to 5000BC in shamanistic rituals. Burning incense was also a means of Smoking which was mainly practiced by Babylonians, Chinese and Indians for ritual and religious purposes. Smoking was later introduced for self pleasure in North America and Southern Africa by Arabians mostly Ethiopian who traded coffee. Nowadays smoking is practiced with tobacco, cannabis, weed, heroin etc. Smoking is practiced by about an average of 1.1 billion people and 1/3 of adults. Smoking is means of communication between strangers in places like bars, night club, on streets. It is mostly practiced due to idleness and loitering, also due to adolescence curiosity and to suppress depression. It is proved that offering or sharing cigarettes is proved to cause dopamine. It is also proved that soldiers used and are still using cigarettes for calling down and to tolerate more hardship. It was mainly used in first world war. Smoking can not only be done with tobacco, but weed, cocaine, heroin, and other hard drugs. Smoking related Diseases are the following: lung cancer, emphysema, stroke, asthma, diabetes, kidney diseases, COPD (Chronic Obstructive Pulmonary Disease), infertility etc.

It is should be said that some lung disorders have no relationship to smoking and inhaling compounds which are contained in cigarettes. For example, pneumonoultramicroscopicsilicovolcanoconiosis is a form of the illness pneumoconiosis, caused by the inhalation of ultramicroscopic particles or a fine silica dust found

in most volcanoes. pneumonoultramicroscopicsilicovolcanokoniosis' surpassed 'electrophotomicrographically' as the English language's longest word. There are four types of pneumonoultramicroscopicsilicovolcanokoniosis: chronic, asymptomatic, acute and accelerated. The chronic form is the most common and develops after being exposed to low levels of silica dust for 20 years or more. When the dust is inhaled, it embeds itself in the alveolar sacs and ducts of the lungs, where oxygen and carbon dioxide are exchanged. When white blood cells respond to this infestation, they release a series of cytokines, which stimulate fibroblasts and result in fibrosis. The dust can also create silicon-based radicals, which release compounds that damage surrounding cells, such as hydrogen peroxide, hydroxyl and oxygen radicals. The symptoms of silicosis are similar to those of the common cold, not including those which affect the nose and head. They can include faster breathing, severe coughing, a hoarse throat, loss of appetite, chest pain and increased susceptibility to tuberculosis. There is no cure for the disease and there is no chance of recovering, but there are some things which can alleviate the symptoms:

Prevention is to stop smoking. An experiment with dogs showed that indirect smokers are at more risk than direct smokers, because, direct smokers have filter which allows about 4800 chemicals and 69 carcinogenic chemicals, while indirect smokers are exposed to 7000 chemicals and 70 carcinogenic chemicals. Hence, indirect smokers are more prone to infections.

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There are some interesting facts about smoking: 80% of 1 billion smokers live in low or medium economy state; tobacco kills about 6 million people each year; there are 5 million direct smokers and 600000 in direct smokers; 4800 chemicals and 69 carcinogenic chemicals involved for direct smokers and 7000 chemicals and 70 carcinogenic chemicals for indirect smokers; about 3.7 billion is invested in tobacco; smoking causes quick wrinkling; it causes gum diseases and loss of teeth; US gains a fortune on cigarettes commodity; urea from urine is used to flavor cigarettes; a good amount of male smokers are attracted to female smokers.

**Conclusions.** It was shown that indirect smokers are more prone to infections. The smoking can provoke a lot of disorders, most of which are genetic in origin and belong to multifactorial ones.

## **THE STUDY OF CYP1A2 (rs762551) POLYMORPHISM IN THE UKRAINIAN POPULATION SAMPLE**

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**Introduction.** Cytochrome P450 1A2 (CYP1A2) is a member of the cytochrome P450 family, which participates in the oxidation of many compounds of endogenous and exogenous origin.

The compounds of endogenous origin can be such like fatty acids, steroids, prostaglandins, bile acids etc. Medicines, pesticides, poisons, carcinogens, mutagens are compounds of exogenous origin, otherwise known as xenobiotics. Cytochrome P450 1A2 (CYP1A2) participates in the metabolism of various drugs: theophylline, caffeine, clozapine etc. CYP1A2 plays a role also in the metabolism of caffeine contained in coffee.

It has been established that the carriers of the genotype AA are "rapid" metabolizers, and those who have AC or CC genotype are "rapid" metabolizers.

In this regard, for example, the same amount of caffeine will have a stimulating effect in poor metabolizers CYP1A2 compared with rapid CYP1A2 metabolizers. The prevalence of mutations (rs762551) in the European population is 30-50%.

**Aim.** The aim of the study was to study gene distribution of specific mutation (single nucleotide polymorphism) of CYP1A2 (rs762551) in Ukrainian population.

**Materials and methods.** 100 people, who do not share common genes, participated in the study. All volunteers were residents of Ukraine, and were ethnic Ukrainians and Russians. The biological material for study was buccal epithelium.

Participants genotyping on CYP1A2 (rs762551) was performed using the polymerase chain reaction method (PCR-RFLP), which is based on a certain portion of the multiple doubling of DNA in vitro with enzymes for obtaining DNA in the amount which is sufficient for visual perception.

In this case only the copied portion which satisfies these criteria and only if it is present in the sample was used for analysis. By means of PCR the introduction of mutations, splicing of DNA fragments is possible.

DNA was extracted from buccal epithelial using an ion exchange resin Chelex-100. Determination of CYP1A2 gene allele status at single nucleotide replacement (rs762551) was performed according to the common used methodology. Thermocycler amplifying "Tertsik" (DNA Technology, Russia) was used.

To amplify the CYP1A2 gene fragment that contained the polymorphic site (164A → C) oligonucleotide primers were used: forward is F: CCC AGA AGT GGA AAC TGA GA and reverse is R: GGG TTG AGA TGG AGA CAT TC.



Restriction of the amplification products was performed using endonuclease *ApaI* (MBI Thermo, Lithuania).

Restriction products were analyzed by electrophoresis in 2% agarose gel. As a molecular weight marker DNA pUC19 was used, hydrolyzed with *MspI* endonuclease (MBI Thermo, Lithuania).

The visualization of the amplification products and the restriction was carried out by staining the gel with ethidium bromide and photographing on transilluminatore in ultra-violet light.

Restriction endonuclease fragment of 243 bp corresponded to A allele of CYP1A2 gene, and two restriction fragments of sizes 119 and 124 bp corresponded to C allele in an electrophoregram. The presence of all three bands indicates heterozygous genotype AC. According to the results of genotyping allele frequencies were calculated.

**Results and discussion.** Distribution of genotypes in the appropriate ratio of Hardy-Weinberg equilibrium was tested.

Comparing genotypes was performed using  $\chi^2$  test. Statistical hypothesis testing was conducted at a significance level of 0.05.

This study found the distribution of genotypes in the selected group: 35% AA, 50% AC, CC 15%, which is close to the European distribution. As for genotypes, only rs762551 (AA, homozygotes) was considered to be a genotype of rapid metabolizers. Individuals rs762551 (AC) – heterozygotes or rs762551 (CC) – homozygotes – were both considered to be slow metabolizers.

The frequency of alleles were as following: pA is 0.6 and qC is 0.4. According to the Hardy-Weinberg distribution, theoretically expected number of genotypes was calculated using the formula:  $p^2$  AA:  $2p(1-p)$  AC:  $(1-p)^2$  CC.

Theoretically, the expected number of genotypes was as follows: 36% AA, 48% AC, 16% SS.

Testing the distribution of genotypes in the group for compliance with the Hardy-Weinberg showed that the population structure does not deviate from this equilibrium.

**Conclusions:**

1) as a result of study it was found the distribution of genotypes in the selected group (35% AA, 50% AC 15% CS).

2) the population structure does not deviate from the Hardy-Weinberg equilibrium.

# THE ASSESSMENT OF HERITABILITY OF REACTIONS TO THE FACES OF PEOPLE WITH DIFFERENT BEHAVIORAL TRAITS

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**Introduction.** The relevance is in assuming certain behaviors of human individuals and the propensity to violence and subsequent manifestations (manic-depressive disorders, aggression, etc.), as well as the genetic relationship between relatives in aggressive reactions. Due to the research in this direction it is possible to anticipate many inadequate reactions from childhood, including development of a special education system for people with certain genes.

**Aim.** The aim of this study was to evaluate genetic predisposition of reaction to faces with various mental illnesses.

**Materials and methods.** The study subject is students of Universities and schools of Kharkiv aged from 17 to 22 years. The topic being examined is determination of reactions to the faces with different deviations by L. Szondi test. The research methods applied are a survey using the method of L. Szondi and calculations performed in Microsoft Excel and Biostat software.

The novelty is in the fact that the population of Ukraine has not been studied for familial relationships concerning manifestations of inadequate responses.

**Results and discussion.** The Szondi test has been conducted among the first degree relatives and matrimonial partners. In total, the information about 143 parent-child pairs, 43 sibling-sibling pairs and 45 married couples has been received. The results of the study have shown that actually slight (maximum  $\rho = 0.37$ ), but statistically significant positive correlation coefficients are observed between the first degree relatives (parents, children and siblings) by the majority of the reactions, while between matrimonial partners such relationships are statistically insignificant; therefore, further information about them is not used. For four types of reactions to the faces a rather high genetic determination has been successful. In particular, the heritability coefficient for reactions to the images of people with homosexuality was 72%, with sadism – 94%, with catatonic schizophrenia – 82%. The heritability coefficients for reactions to the faces of people with epilepsy and the manic-depressive syndrome were more than 100%. Since it has no biological meaning, therefore, the maximum possible value – 100% has been given to them.

**Conclusions.** The reactions of individuals to the faces with a variety of deviations by L. Szondi test were tested and heritability coefficients were estimated.

## HEREDITARY BASICS OF INTELLIGENCE (WHAT IS AN IQ?)

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**Introduction.** IQ is a number meant to measure people cognitive abilities (intelligence) in relation to their age group. The many different kinds of IQ tests include a wide variety of item content. Some test items are visual, while many are verbal. Test items vary from being based on abstract-reasoning problems to concentrating on arithmetic, vocabulary, or general knowledge.

**Aim.** The aim of the research was to study different genetic and environmental factors, which determine IQ level.

**Materials and methods.** Scientific literature and publications of last years were used for analysis.

**Results and discussion.** IQ can change to some degree over the course of childhood. However, in one longitudinal study, the mean IQ scores of tests at ages 17 and 18 were correlated at  $r=0.86$  with the mean scores of tests at ages five, six, and seven and at  $r=0.96$  with the mean scores of tests at ages 11, 12, and 13.

For decades practitioners' handbooks and textbooks on IQ testing have reported IQ declines with age after the beginning of adulthood. However, later researchers pointed out this phenomenon is related to the Flynn effect and is in part a cohort effect rather than a true aging effect. A variety of studies of IQ and aging have been conducted since the norming of the first Wechsler Intelligence Scale drew attention to IQ differences in different age groups of

The highest IQ was 228, according to Guinness Book of Records, this score belongs to the 'smartest' person in the world Marilyn vos Savant who scored it when she was 10 year old. This would, according to recent research, correspond to about IQ 185 at adult age. That score is, at least, surpassed by the chess player and champion Bobby Fisher which was 187, and Kim Ung-Yong (S. Korea) with a score over 200.

Well, to answer that we first need to answer one question, what is intelligence? You cannot measure something that you can hardly define.

**Conclusions.** The problem is that the term intelligence has never been defined adequately and therefore nobody knows what an IQ test is supposed to measure. In spite of all this, today the future of thousands of children/ employees is determined by the results of this test, simply because it has its good share of accuracy.

## GENETIC TESTS

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**Introduction.** In order to enjoy life to the full, we need to know enough about their genetic inheritance or predisposition. Given the possibility of the body we can talk about our future and the future of our children. We can learn more about our health with the help of a genetic test. Genetic testing is a type of medical test that identifies changes in chromosomes, genes, or proteins. Genetic testing can provide information about a person's genes and chromosomes.

**Aim.** The aim of the study was to analyze modern methods of genetic diagnostics.

**Materials and methods.** Scientific literature and publications of last years were used for analysis.

**Results and discussion.** Getting screened before you try to get pregnant can give you reassurance (if you or your partner is not a carrier, it's one less thing to worry about when do you get pregnant) or can help you make an informed game plan for pregnancy. Getting tested once you become pregnant (if you hadn't done so ahead of time) can help you and your doctor decide the right prenatal tests for your baby, and what to look for if you choose to have them. If you know that your baby's at an increased risk for having cystic fibrosis or sickle cell disease, for instance, your doctor can look for those conditions specifically through either a CVS (chorionic villi sampling) or amniocentesis. Learning about your genetics enables you to optimize your health. Today we already know what thousands of important genetic differences mean for individuals. We know that genes affect your risk for conditions like cystic fibrosis and breast cancer, and we know how your genes affect your responses to drugs like Warfarin. As genetic testing becomes more affordable, more people can benefit from understanding their genetics and use that understanding to improve their health, help them prevent the harmful side-effects of some drugs and potentially avoid preventable deaths. For example, roughly 8% of people with European ancestry have a genetic variant that puts them at higher than average risk for blood clots. There are a number of easy ways to minimize this risk, ranging from avoiding oral contraceptives to staying hydrated and maintaining mobility during airplane flights.

**Conclusions.** The questions don't end there. The genetic revolution is here. Just as computer technology and the internet created whole new industries and extraordinary benefits for people that extend into almost every realm of human endeavor from education to transportation to medicine, genetics will undoubtedly benefit people everywhere in ways we can't even imagine but know will surely occur.

# **VIRUSES AS PART OF BIOLOGICAL DIVERSITY AND SOME EXAMPLES OF MOST DANGEROUS ONES (HIV/AIDS AND ZIKA VIRUS)**

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**Introduction.** A virus is a small infectious agent that replicates only inside the living cells of other organisms. Viruses can infect all types of life forms, from animals and plants to microorganisms, including bacteria. Virus is made up of genetic material DNA and RNA which it uses to replicate. During the viral replication process, certain virus's DNA or RNA affects the host cell's genes in ways that may cause it to become cancerous. These viruses are known as oncogenic viruses, meaning viruses that cause or give rise to tumors.

**Aim.** The aim of the study was to investigate the role of viruses as non-cellular organism and their medical roles on example of some of them.

**Materials and methods.** Scientific literature and publications of last years were used for analysis.

**Results and discussion.** A viral disease (or viral infection) occurs when an organism's body is invaded by pathogenic viruses, and infectious virus particles (virions) attach to and enter susceptible cells. Viral diseases can also be defined as extremely widespread infections caused by viruses, a type of microorganism. There are many types of viruses that cause a wide variety of viral diseases. The most common type of viral disease is the common cold, which is caused by a viral infection of the upper respiratory tract (nose and throat).

Viral diseases has been among one of the most troubling and dangerous disease in human history. Signs and Symptoms of Viral diseases: Viral infections come with a variety of symptoms ranging from mild to severe. Symptoms may vary depending on what part of the body is affected, type of viruses and overall health of the affected person. These symptoms can include: Fever, Muscle aches, Coughing, Sneezing, Runny nose, Headache, Diarrhoea, Vomiting, Weakness and Rash. More severe symptoms include: Personality changes, Neck stiffness, Dehydration, Paralysis of the limbs, Seizures, Confusion, Back pain, Loss of sensation, Impaired, bladder and bowel function, Sleepiness that can progress into a coma or death.

Treatment of viral infections: Several antiviral drugs that are used to treat viral infections have been developed over the past two decades. Many of these are focussed against HIV. These do not cure HIV infection but stop the virus from multiplying and prevent the progress of the disease. Another notable antiviral drug is

Ribavirin against hepatitis C. Viruses in general are notoriously difficult drug targets as they modify and adapt themselves rapidly.

HIV/AIDS is a spectrum of conditions caused by infection with the human immunodeficiency virus (HIV). Following initial infection, a person may not notice any symptoms or may experience a brief period of influenza-like illness. Typically, this is followed by a prolonged period with no symptoms. As the infection progresses, it interferes more with the immune system, increasing the risk of common infections like tuberculosis, as well as other opportunistic infections, and tumors that rarely affect people who have working immune systems. These late symptoms of infection are referred to as AIDS. This stage is often also associated with weight loss.

**Transmission:** HIV is transmitted by three main routes: sexual contact, significant exposure to infected body fluids or tissues, and from mother to child during pregnancy, delivery, or breastfeeding (known as vertical transmission).

Zika virus is an emerging mosquito-borne virus that was first identified in Uganda in 1947 in rhesus monkeys through a monitoring network of sylvatic yellow fever. It was subsequently identified in humans in 1952 in Uganda and the United Republic of Tanzania. Outbreaks of Zika virus disease have been recorded in Africa, the Americas, Asia and the Pacific.

The incubation period (the time from exposure to symptoms) of Zika virus disease is not clear, but is likely to be a few days. The symptoms are similar to other arbovirus infections such as dengue, and include fever, skin rashes, conjunctivitis, muscle and joint pain, malaise, and headache. Zika virus disease outbreaks were reported for the first time from the Pacific in 2007 and 2013 (Yap and French Polynesia, respectively), and in 2015 from the Americas (Brazil and Colombia) and Africa (Cabo Verde). In addition, more than 13 countries in the Americas have reported sporadic Zika virus infections indicating rapid geographic expansion of Zika virus. Zika virus diagnosis can only be confirmed by laboratory testing for the presence of Zika virus RNA in the blood or other body fluids, such as urine or saliva.

Mosquitoes and their breeding sites pose a significant risk factor for Zika virus infection. Prevention and control relies on reducing mosquitoes through source reduction (removal and modification of breeding sites) and reducing contact between mosquitoes and people. Travellers should take the basic precautions described above to protect themselves from mosquito bites. Zika virus disease is usually relatively mild and requires no specific treatment. People sick with Zika virus should get plenty of rest, drink enough fluids, and treat pain and fever with common medicines. If symptoms worsen, they should seek medical care and advice. There is currently no vaccine available.

**Conclusions.** Viruses play a very important biological and medical role due their world distribution and influence on principal human activities.

## **NON-DRUG ARTERIAL HYPERTENSION TREATMENT FOR YOUNG PEOPLE WITH OVERWEIGHT**

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**Introduction.** Arterial hypertension (AH) treatment is an activation of organism internal reserves. Hypertension is usually asymptomatic until complications develop in target organs. Dizziness, flushed facies, headache, fatigue, epistaxis, and nervousness are not caused by uncomplicated hypertension. Severe hypertension can cause severe cardiovascular, neurologic, renal, and retinal symptoms (eg, symptomatic coronary atherosclerosis, HF, hypertensive encephalopathy, renal failure). The more severe the hypertension and the younger the patient, the more extensive is the evaluation. The majority of patients with AH and overweight need lifestyle modification first.

The basic treatment for these patients is unloading dietary therapy. Dosed fasting has its complex effects on the patients suffering from AH. It restores selfregulation, compliance with the pumping function of the heart and level of peripheral vascular resistance, reduces cardiac output and blood pressure on the myocardium.

**Aim.** To study non-drug arterial hypertension treatment for young people with overweight.

**Materials and methods .** Patients with early stage of AH combined with overweight were prescribed a short absolute "dry fasting" for 3 days with subsequent limitation of taking water at 10-12 ml / kg per day, throughout the whole discharge period. Starting from the first day of fasting drug therapy was revoked.

**Results and discussion.** At the beginning of the third day of blood pressure (BP) was reduced by 10%, and to 10.9 days in 53% of patients blood pressure was close to the norm for this age group already. After the course carried out, if it is necessary to prescribe drugs, the dose of antihypertensive drugs is decreased by 39.5%. It is prescribed infusions and decoctions of herbs (valerian root, motherwort herb, fruit Aronia) as maintenance therapy. It is recommended to follow a vegetarian days, hypocalorie and hyposodium diet, reducing excess weight, avoiding harmful habits, sufficient physical activity of cyclic type (walking, jogging, skiing), that in the presence of contraindications in combination with diet, 58% of patients with early stage hypertension lead to normalization of ABP level.

**Conclusions.** Non-drug treatment for patients with AH combined with a healthy lifestyle have a positive effect, since more than half of the patients had a normalization of ABP level.

# **GREAT PERSONALITIES IN CLASSIC AND MODERN GENETICS AND TOOLS FOR PROCESSING GENETIC DATA**

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**Introduction.** Genetics is a rather young science, but it plays a major role in modern biology. Many persons contributed to this field during the last decades. These great scientists are known by their prominent findings, which are the base of many modern medical applications. Except this one should mention about scientific base of all genetic data processing, namely mathematics and its role in calculating risks etc.

**Aim.** The aim of the study was the search of information about historical personalities, which left prints in genetics.

**Materials and methods.** Scientific literature and publications of last years were used for analysis.

**Results and discussion.** Gregor Mendel is considered to be a father of genetics. By both his professors at University and his colleagues at the monastery, Mendel was inspired to study variance in plants. Mendel often wondered how plants obtained atypical characteristics. He grew their progeny side by side to see if there would be any approximation of the traits passed on to the next generation. He found that the plants' respective offspring retained the essential traits of the parents, and therefore were not influenced by the environment. He saw that the traits were inherited in certain numerical ratios. He then came up with the idea of dominance and segregation of genes and set out to test it in peas. It took seven years to cross and score the plants to the thousand to prove the laws of inheritance!

Charles Darwin was another great scientist in theory of evolution which is related to genetics. He explained the theory of evolution by natural selection. He believed that all of life on earth had descended from a common ancestor. Darwin's Evidence were similarity of related species, Darwin noticed variations in related species living in different locations.

Erwin Chargaff is always very famous molecular geneticist. He is known for Chargaff's rules regarding DNA structure. Chargaff is known mainly for discovering two rules related to the DNA structure and its double helix formation. He found that certain substances within the DNA structure are equal to other substances. He also found that the DNA composition varies from one species to another.



Mathematical and theoretical biology is an interdisciplinary scientific research field with a range of applications in biology, biotechnology, and medicine. The field is also called mathematical biology or biomathematics to stress the mathematical side, or theoretical biology to stress the biological side.

Mathematical biology aims at the mathematical representation, treatment and modeling of biological processes, using a variety of applied mathematical techniques and tools. It has both theoretical and practical applications in biological, biomedical and biotechnology research.

For example, in cell biology, protein interactions are often represented as "cartoon" models, which, although easy to visualize, do not accurately describe the systems studied. This requires precise mathematical models. Describing systems in a quantitative manner means their behavior can be better simulated, and hence properties can be predicted that might not be evident to the experimenter.

Applying mathematics to biology has a long history, but only recently has there been an explosion of interest in the field. Some reasons for this include ; The explosion of data-rich information sets, due to the genomics revolution, which are difficult to understand without the use of analytical tools.

Recent development of mathematical tools such as chaos theory to help understand complex, non-linear mechanisms in biology. An increase in computing power, which facilitates calculations and simulations not previously possible. An increasing interest in in silico experimentation due to ethical considerations, risk, unreliability and other complications involved in human and animal research.

Mathematics can probably continue to help Biology (even at an increasing pace) by focusing, above all, on modelling, computing power and statistical validation. In this way, outstanding scientific results can be obtained, that would eventually contribute to Biology achievements.

This is what happened with what is usually considered as the most significant biological achievement of the XX Century, identifying the structure of DNA. This work was essentially done by Physicists, Chemists and Crystallographers, using the techniques with which they were familiar.

**Conclusions.** Based on our search about great scientists we traced some steps of genetics evolution itself, and we understood that existence and progression of genetics is impossible without supporting by other interdisciplinary areas.

## **FACTORS OF CATARACT PREDISPOSITION**

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**Introduction.** Cataract is a clouding of the lens which lies between the iris and pupil in other word is the opacity of the lens, it reduced the visual activity (V.A) i.e. is the disease of the eye. Lens is a crystalline structure located just behind the iris of the eye –it focuses light onto the retina.

**Aim.** To create awareness of cataract predisposition. To provide information about this case so that we can study it and know how we can prevent and detect this disease at an early stage.

**Materials and methods.** Scientific literature and publications of last years were used for analysis.

**Results and discussion.** Near-patient testing for cataracts comprises instruments for use in detecting cataract are pen touch and slip lamp.

Types of cataract include subcapcular cataract: occurs at the back of the lens and people with diabetes or those taking high doses of steroid medication have greater risk of developing a subcapcular cataract; a nuclear cataract: occurs at the central of the lens. This associated with aging; a cortical cataract: occur in the lens cortex, which is part of the lens that surrounds the central nucleus.

Stages of development are 1) Mature cataract: is when the entire lens becomes opaque; 2) Immature cataract: when few of opaque lens is present; 3) Hyper mature: is when the nucleus is reduced and yellow sinks to the bottom of lens capsule.

Causes of cataracts are: ultraviolet radiation from sunlight, diabetes, hypertension, obesity, smoking, prolonged use of corticosteroid medications, inflammation i.e. previous eye injury, alcohol consumption, high myopia, family history and genetics.

Sign and symptoms are loss of vision and difficulties in reading.

Prevention includes taking antioxidants (vitamin A, C & E), wearing sunglasses outside during the day, eating proper diet, regular exercise, rest and keeping health mode of life.

Treatment of cataract is surgery and it includes its different types, like ECCE: extra capsular cataract extraction, IOL: intra ocular lens implantation and phacoemulsification.

**Conclusions.** It was shown that cataract has multiple causes, both of genetic and non-genetic origin. Keeping healthy mode of life delay cataract onset and ameliorate symptoms of this condition.

## NEW POTENTIAL OF RHEUMATIC DISEASES IMMUNOBIOLOGICAL THERAPY

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**Introduction.** Chronic inflammation in rheumatoid arthritis (RA) and many other systemic diseases of connective tissue extend beyond the joints. Rheumatoid arthritis (RA) is a long lasting autoimmune disorder that primarily affects joints. It typically results in warm, swollen, and painful joints. Pain and stiffness often worsen following rest. Most commonly, the wrist and hands are involved, with the same joints typically involved on both sides of the body. The disease may also affect other parts of the body.

While the cause of rheumatoid arthritis is not clear, it is believed to involve a combination of genetic and environmental factors. The underlying mechanism involves the body's immune system attacking the joints. This results in inflammation and thickening of the joint capsule. Patients with RA have an increased risk of disease development in cardio-vascular system, lungs, eyes, musculoskeletal system. Effective control of inflammation becomes important and is the key to improved outcomes for patients with rapidly progressive RA. Traditional treatments are often ineffective for patients with RA, as they do not completely suppress the inflammation : causes its progression. Thanks to the appearance of biological agents, especially inhibitors of tumor necrosis factor- $\alpha$ , there were alternative effective means obtained, which are characterized by efficiency and ensure rapid and sustained improvement.

**Aim.** To study the state of rheumatic diseases immunobiological treatment.

**Materials and methods.** We have researched the effectiveness of the drug "Rituximab" for patients with an inadequate response to the ongoing complex treatment in serum department 27 GKB Kharkov.

**Results and discussion.** Rituximab application for 22 patients with RA is accompanied clinical improvement of state of the disease with a marked reduction in the inflammatory activity. Rituximab prescription for patients with systemic lupus erythematosus with active lupus nephritis resistant to basic drugs leads to reduction of nephritic syndrome and stabilization of the nephritis course. Rituximab prescription for patients with Sjogren's syndrome, accompanied by high activity, leads to normalization clinical and laboratory parameters of the disease.

**Conclusions.** Thus, the use of new biological agents for the treatment of systemic connective tissue diseases can slow the progression of the disease, and also to achieve long-term remission of it in most cases.

# TOXICITY OF *BUPLEURUM AUREUM* EXTRACTS IN *DROSOPHILA MELANOGASTER* MEIG. STUDY

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**Introduction.** A fruit fly *Drosophila melanogaster* Meig. is a classical genetic research object, which is approved by WHO for pharmacological research. It can be useful in determining toxicity, influence on reproduction and mutagenic effects.

**Aim.** The aim of the research was to assess toxicity of different *Bupleurum aureum* extracts.

**Materials and methods.** An outbred wild type strain *Conton-S (C-S)* was obtained from the collection of the Genetics and Cytology Department of Kharkiv National University named after V.N. Karazin. Flies were grown on standard sugar-yeast medium at  $24 \pm 0.5$  °C in an incubator. *Bupleurum aureum* 50% and 70% alcoholic extracts were added to the culture medium in which *Drosophila* larvae develop at concentrations  $10^{-3}$ ,  $10^{-2}$ ,  $10^{-1}$ , 1 and 10 mg/mL.

**Results and discussion.** One of the most important features that determine the fitness of organisms is the overall performance, i.e. the number of their adult offspring. Its components are parent fertility and offspring vitality at embryonic and postembryonic stages of development. Our data suggest that the magnitude of an overall performance indicator change in *Drosophila* depends on the type of extraction and concentration of the *Bupleurum aureum* extract in culture medium. Thus, it was shown that all concentrations of the *Bupleurum aureum* 70% alcoholic extract under study and its aqueous extract had no significant toxic effect and did not yield a significant impact on adult *Drosophila*. Interesting data was shown as to the effect of the *Bupleurum aureum* 50% alcoholic extract on the overall performance of *Drosophila*. All concentrations under study did not toxic effect, but a pronounced stimulatory effect was observed at concentrations  $10^{-3}$  and  $10^{-1}$  mg/mL. The manifestation of this effect was increasing in the overall productivity of *Drosophila* by 23.67% and 59.22%, respectively, compared to control.

**Conclusions.** Thus, *Drosophila* cultivation in a medium with the *Bupleurum aureum* 70% alcoholic extract and its aqueous extract in concentrations of  $10^{-3}$ ,  $10^{-2}$ ,  $10^{-1}$ , 1 and 10 mg/mL caused no significant reduction in the overall performance of *Drosophila* and had a pronounced toxic effect. *Drosophila* cultivation in a medium with the *Bupleurum aureum* 50% alcoholic extract did not result in toxic effects within all concentrations under study ( $10^{-3}$ ,  $10^{-2}$ ,  $10^{-1}$ , 1, 10, 50 to 100 mg/mL), and the concentrations of  $10^{-3}$  mg/mL and  $10^{-1}$  mg/mL demonstrated a pronounced stimulatory effect of the extract.

# CYTOGENETIC EFFECTS IN PERIPHERAL BLOOD LYMPHOCYTES IN DESCENDANTS OF CHERNOBYL DISASTER LIQUIDATORS UNDER THE IMPACT OF MITOMYCIN C IN VITRO AND FOLIC ACID IN VIVO

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**Introduction.** The evaluation of the genetic consequences of the Chernobyl disaster still remains extremely urgent and is of keen interest for the scientific community all over the world. One of the most important problems is genome instability transferred by irradiated sex cells of fathers to the first generation of their descendants. The genetic consequences of exposure to radiation not only lead to serious disturbances in the development of descendants, but also to an increased risk of cancer, genome instability, and deterioration in the viability of phenotypically normal descendants from irradiated fathers.

**Aim.** All the abovementioned determined the purpose of our study, which is an examination of spontaneous and induced mutagenesis, as well as the influence of FA on the resistance of the chromosomal apparatus in children whose fathers participated in liquidating the consequences of the Chernobyl disaster.

**Materials and methods** Chromosome specimens obtained from a culture of peripheral blood lymphocytes (PBL) have been used as material for cytogenetic analysis. Mitomycin C at a final concentration of 3 µg/mL was added to the culture 67 h after the start of incubation in order to evaluate the influence of the mutagen on the stability of the chromosomal apparatus in children. Colchicine at a final concentration of 7.5 µg/mL was added to the culture of cells 3 h before fixation. Metaphases (80 to 100) of each child were analyzed without test influence and with additional treatment of the cultures with the mutagen in vitro.

**Results and discussion** When comparing the reaction of the chromosome apparatus of peripheral blood lymphocytes to the testing mutagenic in vitro influence after taking FA, a decrease in the total level of chromosomal aberrations from 23.95 to 5.36% ( $p < 0.001$ ) and certain types of chromosomal aberrations was revealed. According to the references in, presence of damage in the enzymic repair system can appear as high sensitivity of the genetic apparatus to various mutagens, including bleomycin. An increased level of sensitivity of lymphocyte chromosomes to mutagenic treatment in vitro is now regarded as a predisposition to oncopathology development

**Conclusion** The obtained data have confirmed the possibility to increase the genetic resistance of children, born to liquidator families, by the use of FA.

# **PHOBIAS: TYPES, GENETIC AND ENVIRONMENT CAUSES, INFLUENCE AND THERAPY**

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**Introduction.** Nowadays almost everyone has some irrational fear, for example, regular medical examination. For most people these fears are not serious problem. But, when fears become so severe that they cause tremendous anxiety and interfere with your normal life, they're called phobias. In our society, this problem is progressive, that is why it needs exploring.

**Aim.** In this research, I identified several goals: to learn the genetic and environment causes of the occurrences of phobias; to determine the major types of phobias; to understand their influence on the body; to identify the methods of treatment.

**Materials and methods.** Scientific literature and publications of last years were used for analysis. Phobias are classified into three categories, according to the Diagnostic and Statistical Manual of Mental Disorders, Fifth Edition (DSM-V), Agoraphobia, Social phobia and Specific phobias.

**Results and discussion.** There are three main reasons that play a significant role in causing anxiety and phobic disorders: genetic factors, social factors, and psychological factors. According to scientists, a connecting link between the presence of phobias and accelerated aging are the telomeres. Scientists suggest that a lot of stress accelerates shortening of chromosome fragments. A shortened telomeres increase the risk of cancer, heart disease and neurodegenerative diseases. However, there is no direct evidence of this phenomenon. Now it is one of the most promising hypotheses. There are two main methods for the treatment of phobias: medical treatment and analytical treatment.

**Conclusions.** A person have a sense of fear, that is normal. Fear is an ordinary protective function, without which it will never work for self-preservation instinct, and this, in turn, can be a reason of tragic consequences. For normal human mental development existence of fear it is absolutely necessary. Phobia is an absurd and inexplicable fear. Such fear is unjustified and is not necessary for survival. In 99.9% of cases, a person with phobia is afraid of certainly safe things. The fear can provide the biological survival of the individual and at the same take pathological forms. In this case, the intervention of the psychologist or psychotherapist is necessary. Scientists should pay more attention to the field of the phobias, their influence on the human body and more effective methods of treatment.

## **ALTERNATIVE METHODS OF REJUVENATING FACIAL SKIN: GENETIC AND OTHER ASPECTS**

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**Introduction.** Human skin is constantly changing from birth and throughout life. In every age it has its own characteristics and susceptibility to certain problems. As you know, the skin is an important organ of cover, so-called protective barrier for the whole body. It first meets the aggressive influence of environmental factors. In addition, the negative impact on the skin is caused by an unhealthy lifestyle. Among the internal factors that influence the skin condition is heredity, metabolic disorders and various diseases of internal organs. All these factors accelerate the skin aging process. As a result, it loses moisture and elasticity, the ability to regenerate. Restoration of these lost functions of the skin is achieved in different ways. Different methods are highly effective, but are expensive and require a lot of time.

**Aim.** To develop and recommend an easy, effective and popular way to prevent skin aging.

**Materials and methods.** To achieve this goal we worked out the literature and found that most meet the requirements rejuvenating facials masks, which are used in home conditions. The principle of action of the rejuvenating masks is that when in contact with skin mask substances moisturize and nourish it, improve microcirculation and, consequently, color, stimulate the regeneration of skin cells. For the experiment, we chose those ingredients that are easily available to all citizens. The study involved eight women aged 25 to 55 years. The recipe was as follows: milled oatmeal mixed with orange juice and a teaspoon of honey. Then we put the mask on previously cleansed face for 15 minutes. To wash it away we used tea based on chamomile. The number of sessions - 10 times every day or every other day.

**Results and discussion.** After the study, all the women were satisfied with the result: improved skin color, decreased or disappeared excessive dryness and flaking, wrinkles became less noticeable, improved overall health, mood. Negative effects, side effects and complications any women were noted, which allows us to use the proposed mask for widespread use.

**Conclusions.** Thus, carrying out the study, we have proved that rejuvenating masks at home are really effective, activate skin rejuvenation processes, inhibit the aging process. Another important advantage of their use is the naturalness, safety and financial affordability. Facial mask is one of the easiest and affordable ways to keep youth.

# GENETIC SOURCES OF CORN OIL WITH A HIGH CONTENT OF OLEIC ACID IDENTIFICATION FOR USE IN PHARMACY, DIETETICS AND NUTRITION

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**Introduction.** Corn oil is attracting the attention of quite a high content of fat-soluble vitamins A and E and a favorable ratio of their different forms. On the other hand, quantitatively predominant component of the fatty acid composition of corn oil is diene linoleic acid which acts as though vitamin F, but is prone to peroxidation series to form intermediate products with extremely undesirable physiological effects. Therefore, among the areas of improvement of maize for special attention to the quality of oil particularly noteworthy increase in the content monoenic oleic acid, which has high thermal stability and significantly increased resistance to peroxidation. And, despite the significant amount of the research, reliable sources of high oleate content in maize has not yet been identified.

**Aim.** Genetic analysis of oleic acid glycerides content in corn lines and hybrids oil and genetic identification of corn oil sources with a high content of oleic acid for pharmaceutical practice using.

**Materials and methods.** The material for the research were presented as a representative samples of kindred origin of the traditional type of maize lines and lines-carrier of endospermic monogenic mutations reliably registered beneficial effect on the seed biochemical composition - o2 (opaque-2), sh1 (shrunken-1), sh2 (shrunken-2) , su1 (sugary-1), su2 (sugary-2), ae (amylose extender) and wx (waxy). Genetic analysis was performed on a series of hybrids which were obtained by cross of lines with identical allelic status of each of the genes in the endosperm structure schemes diallel crosses by Griffings method. The fatty acid composition of the oil was analyzed by modified Peysker gas chromatographic method after transesterification of glycerol esters into methyl one. Identification of fatty acid component composition was carried out at the time of their retention, set to valid standards. The results were subjected to statistical analysis of variance and multivariate diallel analysis using the «OSGE» applied statistical software package. All calculations were carried out for the 95% probability level. Interpreting the results of diallel analysis was performed by Hayman algorithm.



**Results and discussion.** The results showed endospermic mutants high efficiency to improve oil fraction of oleic acid glycerids. Oil carriers of mutations *su1* and *sh2* differed by its highest levels. And if the average levels of oleate in corn lines of the traditional type was 26.3%, then the mutation carrier lines *su1* - 38,1%, and *sh2*- 37,6%. However, these results cannot be considered as evidence of the content of the monogenic regulation of recessive oleate mutant genes *su1* and *sh2* yet. As in the usual corn, as in carriers of mutations of the above oleate content was clearly a quantitative nature and varied rather widely. At the same time the best lines of the traditional type of maize reached levels of oleate 34.6%, the best line - mutation carriers *su1*- 43,7%, and the best line - mutation carriers *sh2*- 44,1%.The results showed that even if the monogenic regulation of oleate content by third and fourth chromosomes locuses occurs, it is carried out not by *su1* and *sh2* genes, but by the linked space with them oleate coding locuses. On the other hand, the results indicate that the effects of monogenic locuses are modified by polygenic complexes that can both strengthen and weaken the level of phenotypic feature manifestation. When the genetic trait analysis was conducted it was found that high level of oleate regulated by polygenic type and system of genetic regulation of oleate content approaches to the additive - dominant Hayman model. The predominant type of high oleate content inheritance was incomplete dominance with a significant contribution to the dispersion of the additive effects. Such type of inheritance creates favorable conditions for the improvement of the genetic trait. At the same time inbreed lines of maize, based on a single mutation, were very differed by the effects of combining ability according to the content of oleate.

**Conclusions.** It has been established that high levels of oleate in corn oil is regulated by the combined effect of the third and fourth chromosomes locuses and modified by chromosomes polygenic complexes. The most promising genetic material for improving the content of oleate are the carriers of endospermic mutations *su1* and *sh2*.

**CORRECTION WITH QUINOLINE-2-CARBOXYLIC ACID  
DERIVATIVES OF WATER-ELECTROLYTE IMBALANCE  
METABOLISM IN EXPERIMENTALLY HYPERTENSIVE RATS**

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**Introduction.** Arterial hypertension is accompanied by severe metabolic disorders of water-electrolyte metabolism. Creatinine and urea are early and most informative markers of disorder of renal functional status in patients with arterial hypertension, and their level characterizes nitrogen-releasing state of renal function.

**Aim.** Aim of research is to study biochemical mechanisms of water-electrolyte imbalance metabolic disorders in experimental hypertensive rats and prospects for their correction with hynokarb, new quinoline-2-carboxylic acid derivative.

**Materials and methods.** Studies were conducted in rats of both sexes. Throughout the experiment, animals were kept in a vivarium at 20-25 °C, humidity not more than 50%, natural light mode "day-night", in standard plastic cages on a standard diet. Effect of hynokarb on a renovascular system state was examined during 7-day administration in rats, by determining level of creatinine, urea and total protein in blood. Comparator drugs were Hydrochlorothiazide granules, which contain 25 mg of hydrochlorothiazide and Berlipril granules, which contain 5 mg of enalapril maleate. Hynokarb and hydrochlorothiazide dose of 10 mg/kg (as active substance) is maximally effective diuretic dose, as has been found in earlier experiments.

**Results and discussion.** Intra-gastric administration of hynokarb had no statistically significant effect on creatinine, urea and total protein content. The change direction of total protein and creatinine in blood of experimentally hypertensive rats had positive nature as a result of the tendency to renew these indicators to the level of physiological norm in healthy normotensive rats. As for changes of the level of urea in blood downward, this trend should be considered as positive in terms of activation of nitrogen-releasing renal function. In the same animals, hydrochlorothiazide caused no significant changes in creatinine, urea and total protein content in the blood compared with untreated control. In experimental rats, intra-gastric administration of enalapril caused a tendency to increase the content of creatinine, urea and a statistically significant increase in total protein content in the blood.

**Conclusions.** Experimentally hypertensive rats developed disorders of fluid and electrolyte homeostasis, which was reflected in increasing of serum creatinine and total protein levels. Indicators of urea in experimentally hypertensive rats did not change. Mechanisms for implementation of antihypertensive response of hynokarb are based on activation of nitrogen-releasing renal function.

**THE SPREAD OF THE MOST IMPORTANT ZOOONOTIC  
DISEASES AMONG PEOPLE IN UKRAINE  
AND GENETIC PREDISPOSITIONS TO PARASITOSIS**

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**Introduction.** Parasitic diseases, caused by helminthes, one-celled and arthropods, are a wide group of illnesses, that largely determine the state of health of the population. According to the official statistics of the WHO 4.5 billion of people suffer from parasitics diseases annually. Every third person is ill in Europe, 85-95% of the population in the USA have helminthes diseases. Today it is proved that 95% of the population is infected with parasites, 99.9% of people, who have pets, including rodents and birds, are carriers of the parasites. The share of parasitic diseases account for 14 million deaths per year, representing 25% of the total Earth mortality – every fourth death. In opinion of the WHO experts, the spread of parasitic diseases is connected with the fact that 25% of the population on the Earth don't have an access to the clean epidemic – safe drinking water, and 66% are denied of the normal sanitary facilities. In Ukraine, the share of parasitosis in a sum of all infectious diseases without influenza and URTI (upper respiratory tract infections) is 59.7%. It is approximately 500 thousand new patients per year.

**Aim.** The aim of the study was to investigate the distribution of the most important parasitic disease of people in Ukraine. Research was conducted by analyzing the literature.

**Materials and methods.** Scientific literature and publications of last years were used for analysis.

**Results and discussion.** Protozoan diseases. A big variety of intestinal forms of the single – celled are the most spread protozoonoses in Ukraine. Giardiasis, Amoebiasis are dominant among them, and cystic protists and Toxoplasma are the most dangerous ones. However, the most topical disease, which is caused by the single-celled, is malaria. About 100 countries are epidemic for malaria. From 300 to 500 million of people suffer from malaria every year, at that time from 1.5 to 2.7 million of world population die because of this disease. 10 Thousands cases of malaria are brought in Europe every year, the mortality reaches 1.1%. More than 180 cases of malaria were brought in Ukraine during the recent years. This disease was registered in most regions of our country.

Helminthoses. According to the WHO, 2.5% of the population are infected with helminths. Intestinal helminthoses take the 3d place in the world among all

infectious diseases. About 2 billion of people suffer from helminthoses worldwide. According to the statistics, every third inhabitant of Europe is affected by at least one helminth. About 30 human helminths were found in Ukraine. From 400 to 600 thousands patients with different helminthoses are officially registered every year.

Nematodosis. Enterobiosis and ascariasis are the most spread representatives of Nematodosis among the inhabitants of Ukraine. Enterobiasis proportion among all detected helminths is 77%. Trichuriasis and Trichinosis remain topical. 5 Outbreaks of trichinosis among people in Kherson, Chernivtsi, and Chernihiv regions were registered during the last 5 years, 11 people became ill there, and at that time trichinosis endemic areas were formed in Vinnytsia, Khmelnytsky and Odessa regions.

Trematodosis. The infection of trematodosis in Ukraine during the last 15 years was 0.7 cases per 100.000 people. Opisthorchiasis is the most spread representative among all trematodosis, which were identified. The second largest focus of opisthorchiasis among the countries of the former Soviet Union is situated in Ukraine. It is the basin of the Dniper with its tributaries (Psyol, Sula, Seym, Vorskla etc). The highest level of the infection is observed in Poltava, Chernihiv and Sumy regions where the percent of disease is accordingly 10%, 15% and 70-80% in Sumy region.

Human toxocariasis is caused by the migrating larve of the canine nematodes – *Toxocara canis*, which provoke the disease «syndrome of the migrating larve – syndrome larva migrans». In recent years human toxocariasis has acquired the global dissemination and stay one of the most topical parasitic problems. The number of people, which were infected by toxocariasis, varies widely in the world. In European countries, from 2% (UK) to 6.1% (Netherlands) of population positively responds to the skin testes with toxocara antigens. Seroinfection index in Asia ranges from 3.6% in Japan to 51.4% in Taiwan. This index in Africa is over 30% and in Columbia exceeds 68%.

According to the Central Sanitary Epidemiological Station of the Ministry of Health of Ukraine the number of toxocariasis cases among people in our country annually increase from 1 in 1998 to 154 in 2007 and more than 2.5 times during the last 8 years.

**Conclusions.** Analysis of the literature has revealed widespread human zoonosis in the world and particular in Ukraine. Parasitic diseases are a major reason of the significant mortality of people, in addition they contribute to morbidity by other infectious diseases, causing the deterioration of immunity of the human body. The study of the spread of parasitic diseases is a topical problem nowadays, that needs its solution.

# HEPATOPROTECTIVE ACTIVITY LIPOPHILIC AND HYDROPHILIC LIME LEAVES EXTRACT RESEARCH

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**Introduction.** Paracetamol is the one of the most used non-prescription drugs in Ukraine. As one of the most effective analgesics and antipyretics, paracetamol is nevertheless a potential hepatotoxic agent.

Not only overdose of paracetamol, but even its long-term use contributes to the development of drug hepatitis, especially for people with hepatitis of various etiologies or patients with diabetes mellitus. The liver synthesizes, concentrates, and secretes bile acids and excretes other toxicants, such as bilirubin. Drug-induced injury to hepatocytes and bile duct cells can lead to cholestasis. Cholestasis, in turn, causes intrahepatic accumulation of toxic bile acids and excretion products, which promotes further hepatic injury.

Paracetamol hepatotoxicity caused not only by the result of covalent binding of its highly reactive metabolite N-acetyl-4-benzohinonimin with macromolecules of hepaocytes, but also by activation processes of free-radical oxidation (FRO) with enzymatu and non-enzymatic dysfunction of antioxidant systems.

**Aim.** Hepatoprotective activity lipophilic and hydrophik. lime leaves extract research.

**Materials and methods .** This work is devoted to the experimental research of the hepatoprotective properties of hydrophilic (PL-1) and lipophilic (PL-2) lime lea. extracts. Investigations have been carried out on the paracetamol hepatitis model of rats. White mongrel male rats with weight 180-220 g have been used in this research.

**Results and discussion.** As a result of these experiments revealed that the use of PL-1 anc PL-2 in drug-induced hepatitis caused by paracetamol reduces the intensity of cytoh: . and free radical processes in the liver, increases the activity of the antioxidant syste- of hepatocytes and contributes to the normalization of carbohydrate, protein and lip metabolism, and recovery processes bile production and secretion.

Efficiency of researched extracts is 20% higher on average than the efficiency of the reference drug silibor in the intensity, of the hepatoprotective action.

**Conclusions.** Conducted research testifies the advisability of further preclinical lime leaves extracts studies to create new domestic plant hepatoprotector on their basis.

# MUTATION ANALYSIS POLYMORPHISMS LEU33PRO, THR145MET, C786T, H1/H2 OF PATIENTS WITH CORONARY HEART DISEASE

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**Introduction.** The cardiovascular disease is one of the first places among causes of death and disability In Kazakhstan. Therefore, a priority for the development of medicine is to improve the prevention of cardiovascular diseases, in particular cardiovascular diseases, especially coronary heart disease. Atherothrombosis is a trigger the development of such threatening cardiac events and myocardial infarction. In is based on genetic disorders that cause an individual predisposition to develop the disease, against which manifest impact of environmental factors. Most of these genetic disorders is represented by point mutations (single nucleotide polymorphism) unextended or deletions. **Aim.** Rate of occurrence frequency of polymorphisms Leu33Pro, Thr145Met, C786T, H1/H2 in patients with coronary heart disease, a mutation that determines the increased risk of thrombosis. **Materials and methods.** We studied 100 patients (80 - men, 20 - women, mean age  $57.6 \pm 2.8$  years). The control group consisted of 100 healthy individuals, matched by sex and age. Genetic studies were conducted to determine polymorphisms: Leu33Pro  $\beta 3$  integrin gene (ITGB3), Thr145Met gene platelet glycoprotein 1b,  $\alpha$ -subunit (GP1BA), C786T mutation synthase gene 3 nitrogen monoxide (NOS3), mutation platelet ADP-receptor (P2RY12, H1/H2). To determine the gene polymorphism used test systems company Liteh, Moscow (Russia) for the PCR amplification, followed by detection of DNA fragments of products of 1-1.5% agarose gel (Gel Doc. BioRad, USA). The result was assessed as normal homozygote, heterozygote, mutant homozygote.

**Results of the study.** The incidence and analysis of genotype frequencies association TGB3, GP1BA, NOS3, P2RY12 in the group of patients with ischemic heart disease and in the control group with statistical significance by Pearson were: presence Leu33Pro mutant alleles were identified 23 (heterozygotes) among 100 healthy subjects and 46 among 100 patients CHD (32 heterozygotes and mutant homozygotes 14), the differences between the groups in the application of statistical criteria were significant ( $\chi^2=19.5$ ;  $p<0.001$ ); the presence of the mutant allele was found Thr145Met 29 (heterozygotes) among 100 healthy subjects and 64 among 100 patients with coronary artery disease (47 heterozygotes and mutant homozygotes 17), the differences were statistically significant ( $\chi^2=26.4$ ;  $p<0.001$ ); the presence of the mutant allele C786T was found 67 (heterozygous and homozygous mutation) among 100 healthy subjects and 85 among 100 patients (42 heterozygotes and mutant homozygotes 43), the differences between the criterion of Pearson groups were statistically significant ( $\chi^2=19.9$ ;  $p<0.001$ ). In the presence of mutant alleles H1/H2 differences between groups of patients with coronary artery disease and healthy individuals were highly significant ( $\chi^2=30.3$ ,  $p<0.05$ ).

**Conclusions.** Revealed very high levels of statistical significance indicates the predominant clinical significance of the mutant gene in the homozygous state in patients with IHD.

**SECTION № 8**

**PHYSIOLOGY OF MEDICINE AND PHARMACY:  
CURRENT PROBLEMS AND MODERN ACHIEVEMENTS**

## THE ANALYSIS OF THERAPEUTIC-PROPHYLACTIC COSMETICS

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**Introduction.** Cosmetic industry offers a wide range of cosmetics. This is quite difficult to choose among the right product. We always expect not only improve the appearance but also to solve certain problems from cosmetics, especially from the "medical cosmetics." Medical cosmetics or cosmeceuticals are intermediate between normal cosmetics and medicines. Medical cosmetics produced in the same forms as cosmetics traditional, cream, lotion, balm, emulsion, gel, shampoos, lipsticks, pencils and so on., but differs containing medicines, so has the indications and contraindications for use, the recommended dose and duration of use. Unlike conventional cosmetics, medical cosmetics destroys the protective sheath retains fluid and mineral balance of the skin covering its surface with a thin protective film protects the skin from harmful environmental influences. Since cosmeceuticals designed with properties for sensitive or diseased skin, it contains a minimal amount of preservatives and fragrances. Today cosmeceuticals considered the main source of growth of pharmaceutical market in Ukraine, as it has a wide demand among the population.

**Aim.** The aim of the study was to analyze the composition of some health care cosmetics foreign and domestic production. Identify active ingredients of cosmetics with therapeutic effect and to identify their impact.

**Materials and methods.** The study was conducted in the form of a survey of women of all ages who use cosmetics at least 1 time per week. The objects of our study were shampoo VICHY (French company) and shampoo BIOCON (Ukrainian company).

**Results and discussion.** Based on the analysis the medical cosmetics include amino acids, unsaturated fatty acids, micro- and macronutrients, vitamins, providing full power skin, zinc oxide, Panthenol, calcium gluconate, hyaluronic acid, collagen, urea, plant extracts, thermal water, as well as special components, patented. Thus, comparing the shampoo VICHY and BIOCON we found that 30% of surveyed people use shampoo VICHY, 40% – BIOCON, 30% other companies. After the 1st application shampoo BIOCON (anti-dandruff shampoo) dandruff disappears and do not return two months after using. After using the shampoo many persons noted active hair growth.

**Conclusions.** Medical cosmetics must not only eliminate defects. It must treat. Shampoo BIOCON (Ukrainian company) is more popular and effective than other investigated shampoos.



## HOMEOPATHY TODAY

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**Introduction.** Homeopathy (from the Greek “homoio” – like, similar, of the same kind; and “pathos” – suffering ) is the method of treating disease by drugs, given in minute doses, that would produce in a healthy person symptoms similar to those of the disease. Homeopathy was founded by German doctor S. Hahnemann in the early 19th century.

**Aim.** The aim of this research is to explore homeopathy as a science. Study all of its statements, principles, characteristics, properties, followed by application in practice.

**Materials and methods.** To complete the research the method of comparative analysis has been used. Having studied literature, the following principles of homeopathy were taken for the basis of study.

1. The principle of similarity.
2. The principle of use of small doses.
3. Population principle (that is individualization of treatment).
4. The principle of dynamism (potentiation) of drugs.

These principles are equal, and none is more important than another.

According to Hahnemann the first principle is: *similia similibus curentur*, which is translated from Latin as "like cures like". Hahnemann came to the conclusion that all medicines tend to produce disease state in a healthy person and at the same time, eliminate a similar condition in a patient.

The next principle of homeopathy is a reduction of the dose of the drug. The difference between homeopathy and conventional treatments is that if you pick up medicines on the basis of similarity, the dose of medication can be reduced to minimum and it will still work, but we'll forget the side effects forever.

The third principle proclaims the need to individualize treatment.

A lot of related conditions, up to the traits of the patient, influence the choice of drugs. Homeopathist should spend a lot of time learning these nuances. Of course, it is difficult compared with the choice of drugs depending on the diagnosis of the disease, but the advantages are a better result and the absence of harmful side effects.

**Results and discussion.** The influence of several homeopathic remedies on a healthy person and their effect on the disease in small doses was studied.

**Apis or bee venom**

In homeopathy apis based medications are recommended for various acute swellings, including genitals, throat, tongue and lips. They are also good at treating angina, when the swelling bites resemble bees in different places. They heal skin and hive.

### **Tabacum**

In homeopathy tabacum is used mainly for treating dizziness, a symptom of which is pallor and vomiting caused by pregnancy. The drug helps in case of seasickness, which is also accompanied by vomiting and headache.

As a result of studies conducted on the basis of homeopathic pharmacy in Kharkiv in October 2015 the main segment of patients who buy homeopathic medicinal preparations was identified. The following signs of segmentation of consumers were selected: sex, age, education, social status, income level and nature of the disease, the treatment of which homeopathic medicine is bought for.

Most of the consumers of homeopathic medicines is made up of patients aged 21 - 30 years (over 30%). Consumers aged 60 and 20 years are to a lesser extent. More than 60% of purchases are carried by employees and workers with the average monthly income. About 25% of consumers belong to an indigent category of the population: pensioners and students, and the unemployed.

Comparison of the segmentation data suggested that consumer education has a significant impact on consumption of homeopathic medicines, as only 3.7% of customers have secondary education. The rest have higher, incomplete higher and specialized secondary.

**Conclusions.** Homeopathy differs from classical medical science the absence of ready-made solutions. Only a talented and skillful doctor may prescribe ideally suiting to the patient medicines that will cure all diseases.

There is no need to think that homeopathy is no more than self-hypnosis. That is wrong. Means and methods of science (which is really a science with its own rules and laws) are effective in any case. Only faithful adherence to treatment regimens is needed from a patient.

## **MOTOR ACTIVITY - CONSTITUTES A HEALTHY STUDENTS OF NUPh**

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**Introduction.** Modern students are marked negative trends in health status, only 2-3% of young people have a high level of somatic health, most of the students are experiencing emotional stress, do not comply with the basic foundations of a healthy lifestyle. Development of physical activity is necessary for the body to prevent age-related muscle atrophy, however, not all students understand it.

**Aim.** We have to study the attitude of students 1-5 courses NUPh to motor activity as a component of health.

**Materials and methods.** Drawing up the questionnaire, conducted a straw poll among domestic and foreign students NUPh.

**Results and discussion.** The survey showed that the vast majority of domestic students in their spare time practicing passive leisure activities: spend a lot of time on the computer, listening to music, chatting on the Internet. Only 6% of the students do exercises, 63% do not regularly attend classes in physical education, but 27% to 43% of domestic students of 1-2 courses are regularly engaged in sports sections NUPh. From the 3rd year, this figure is reduced. The girls prefer to dance (33%), boys - football and gyms (37%). Among foreign students: boys actively attend gyms, football section - up to 67% of girls in this respect passive. Formed levels of physical activity among students: low (system physical activity manifested on physical training), medium (active students in the classroom with an interest in healthy lifestyles) and the highest (active students in the classroom, visit the section).

**Conclusions.** The results of the survey of domestic and foreign students. The level of physical activity of domestic students from course to course decreases, foreign students remains at the same level. Based on the survey data compiled recommendations to encourage and increase motor activity of students in the learning process at the university.

## PHARMACOLOGICAL ACTIVITY OF DENTAL GEL “DENTAVIR-PHYTO” ON THE MODEL OF EXPERIMENTAL STOMATITIS

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**Introduction.** The different factors – those that impact directly on the mucous membrane of the mouth (injury, chemical, thermal, radiation effects, when on the mucosa occur redness, erosions, ulcers), and systemic diseases of the body – gastrointestinal tract diseases, cardiovascular system diseases, weakening of the immune system, allergies, metabolic diseases, etc. can cause stomatitis. Stomatitis (from the Greek “stoma” – a mouth) – is the most common lesions of the oral mucosa. The structure of drugs for the treatment of stomatitis should include components that affect different symptoms and have antibacterial, antifungal, antiviral and reparative effects.

**Aim.** The aim of the work – is to study the pharmacological activity of the dental gel “Dentavir-phyto”, which contains dry extract of licorice root and essential oils of peppermint and sage, on the model of experimental stomatitis caused by 10% sodium hydroxide solution.

**Materials and methods.** Stomatitis caused by single application of 10% sodium hydroxide solution for 10 seconds. Treatment of animals was carried out for 14 days. As a comparison drug was used dental gel “Kamident-Zdorovje”, which consists of lidocaine hydrochloride, infusion of chamomile flowers and thymol.

**Results and discussion.** After applying for experimental animals application of 10% sodium hydroxide solution on the second day of the experiment in its place were developed a large swelling, redness, abundant plaque on the lower incisors of rats. On the background of the dental gel “Dentavir-phyto” and dental gel “Kamident-Zdorovje”, starting from the 3-rd day, there was a decrease of intensity of inflammation of the oral mucosa of rats, which was characterized by a decrease in edema and hyperemia. In the group of animals treated with dental gel “Dentavir-phyto” complete healing of the oral mucosa of experimental animals occurred on the 9-th day of the experiment, and in the group of animals treated with dental gel “Kamident-Zdorovje” – on the 7-th day of the experiment. These data suggest that in experimental model of stomatitis, dental gel “Dentavir-phyto” is pronounced therapeutic effect with expression almost equal dental gel “Kamident-Zdorovje”.

**Conclusions.** Thus, the investigated dental gel is promising for use as a medicine for the treatment of inflammatory diseases of the oral cavity. And because of its natural plant origin, it can also be a drug of choice for the local treatment of stomatitis in children and at the need for long-term treatment.

# GENERAL NOTIONS ABOUT REPRODUCTIVE HEALTH AMONG YOUTH

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**Introduction.** The main component of human health is its reproductive health. Studies of specialists from many areas devoted to different aspects of reproductive health: prevention of sexually transmitted diseases; reproductive sexual behavior; motives and settings of adolescents and youth about reproductive health.

**Aim.** The aim of our work was to analyze the overall notion about the main protection methods for reproductive health among young people.

**Materials and methods.** The survey research method was used for investigation. The study was conducted among first-year students. 55 people (17 - 21 years old) were interviewed, including 47 males and 8 females. Questionnaire included questions about factors and methods that destroy and preserve the reproductive health.

**Results and discussion.** On the question "What are the sexually transmitted infections (STIs) you know?" answers "I don't know" were not given, but 50% of respondents said only 2 diseases, only 13% of respondents noted more than 4 disease. Almost all respondents (87%) understand the relationship of STIs with disabilities to have children. 93% of respondents noted the unconditional detrimental effects of parents' STIs on the child health. As the most effective way to protect against STIs and unwanted pregnancies most respondents (76%) considered condoms, 22% indicated other means, and only 2% of respondents called abstinence and avoiding promiscuous as the most effective method. Abortion is negative and unacceptable phenomena for the majority of respondents (95%), 5% of respondents allowed abortion on medical and non-medical reasons. 2 children in their own family would like to have 60% of respondents, 1 - 13%, 3 - 18%, 4 or 5 - 5%. 4% of respondents answer "We don't want to have children". The majority of respondents are responsible for the appearance of children in their own family and would like to have children after 22 years old (79%), near 17 - 21 years old - 21% of respondents. Most of the students, who participated in the survey, understand the need to prepare for the birth of a child.

**Conclusions.** As a result of the survey were provided data, which show a satisfactory level of students' knowledges about the basic forms and methods of reproductive health. Respondents are aware of the seriousness of such event as the birth of the child and their own responsibility to it.

**SECTION № 9**

**PRE-CLINICAL PHARMACOLOGICAL STUDY OF DRUGS**

# STUDY OF ANTI-INFLAMMATORY ACTIVITY OF DICLOFENAC SODIUM LIPOSOMAL GELS

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**Introduction.** It is known that diclofenac sodium being a nonsteroidal anti-inflammatory drugs that inhibit cyclooxygenase (COX-1 and COX-2) reduces PG synthesis, causing the outbreak of inflammation in the development of pain, fever and an increase in tissue permeability. The drug causes a weakening or disappearance of rheumatic and rheumatic pain, including pain in the joints at rest and during movement, reduces morning stiffness and swelling of joints, increases range of motion; inflammatory processes that occur after operations and traumas, quickly facilitates both the spontaneous pain, and pain on motion, reduces the inflammatory swelling at the wound site. Diclofenac sodium gel is applied topically due to traumatic inflammation of tendons, ligaments, muscles and joints (due to strains, sprains, and bruises after a load), with localized forms of soft tissue inflammation, including tenosynovitis, tendinitis, "shoulder-arm" syndrome, bursitis, myalgia; radiculitis (sciatica, lumbago), inflammatory and degenerative diseases of the musculoskeletal system (deforming osteoarthritis, rheumatoid arthritis, psoriatic arthritis, rheumatoid arthritis, frozen shoulder, ankylosing spondylitis, low back pain with radicular syndrome). **Purpose of the study.** The aim of this study was to investigate the anti-inflammatory activity of diclofenac sodium liposomal gel. **Materials and methods.** Anti-inflammatory effects of diclofenac sodium gel and liposomal gel of diclofenac sodium was performed on dextran paw edema model in rats. Acute inflammatory edema was caused by subplantar introduction into the right hind paw of rats, 0.1 ml of 6% dextran solution. Intensity of edema was assessed by measuring the volume of paws using a water plethysmometer before injection of flagogenic agent and every hour during three hours. On the anti-inflammatory activity of drugs was judged by the amount of the difference between the legs before the beginning of the experiments, as well as at the moment of maximum development of edema and expressed as a percentage inhibition of edema. Both drugs were plastered with 1 hour before the induction of inflammation. Experiments were carried out on white mongrel male rats weighing 160-180 g body, divided into 3 groups. Results are statistically processed with Student's t test determination using the software package Excel.

**Results.** The results showed that both drugs tested in have reliable anti-inflammatory activity. Prophylactic use of drugs has shown that the drugs have the ability to reduce the severity of acute exudative inflammation in the rat paw. Antiinflammatory effect measured every hour during three hours was 34.0%; 37.4% and 31.1% in the group of animals to which diclofenac sodium gel was applied. The group of animals to that has been applied liposomal form gels inflammatory effect of diclofenac sodium, measured every hour during three hours was 45.1%; 46.2% and 40.4%. **Conclusions.** The obtained results indicate that the liposomal form of diclofenac sodium gel has a more pronounced compared with diclofenac sodium gel anti-inflammatory efficacy.

# CURRENT APPROACHES IN BIOTHERAPY OF ONCOLOGICAL DISEASES

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**Introduction.** Oncological diseases are responsible for the failure of the body to produce a complete immune response against the tumor due to its lack of immunogenicity. Most of the currently available methods of cancer treatment (surgery, chemotherapy, radiation therapy) also induce cell immunosuppression, which contributes to recurrence of cancer. Understanding the role of oncogenes and their products in the malignant transformation of cells, the mechanisms underlying the anti-tumor immunity failure, the biological nature of drug resistance necessitates the implementation of methods that can strengthen endogenous mechanisms of antineoplastic defense.

**Aim.** Carry out an analytical review of the most promising methods of biotherapy of oncological diseases.

**Materials and methods.** Data analysis of literature and Internet sources.

**Results and discussion.** Immune system is the main point of biotherapy application, which is based on the activation of protective mechanisms or introduction of natural polymer molecules (cytokines, growth factors, etc.). Currently, the main hope of biotherapy in cancer is associated with vaccine therapy, gene therapy, virotherapy (oncolytic viruses), the use of cytokines and monoclonal antibodies. At that the use of viruses as anticancer agents is considered to be a highly promising method. Scientists discovered a new facet of biological features of viruses, which have always been regarded as disease-causing agents, namely their vector, immunomodulating and anti-tumor functions. Researchers suggest mainly natural attenuated strains of viruses as therapeutic agents against cancer, such as viruses of influenza, Newcastle disease, herpes and various recombinant viruses, derived from natural ones by genetic engineering.

**Conclusions.** Such manifestations of viral infections as cytolytic activity, induction of new or modifications of existing antigens of the tumor cells, viral immunogenesis reproduction of viruses by budding (transfer of tumor antigen), interferonogenesis, increase in the sensitivity of tumor cells to therapeutic effects and endogenous antitumor mechanisms that allow us to consider the use of virotherapy a promising approach to immunotherapeutic effect on tumor growth.



# STUDY OF THE LEVEL OF THE OXIDATIVE MODIFICATION OF PROTEINS IN RATS WITH BURN WOUNDS DURING THE TREATMENT BY GEL WITH NANOPARTICLES OF SILVER AND GLUCOSAMINE

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**Introduction.** Burns ranks third in the overall structure of injuries. It is known that one of the universal elements of tissue injury during pathological processes is oxidative stress. The use of antioxidants for the treatment of wound healing, ensures prevention of secondary necrosis and stimulate regeneration

**Aim.** The aim of this study was to investigate the intensity of peroxidation protein in rats with burn wounds in the treatment of gel containing silver nanoparticles stabilized polyvinylpyrrolidone, that corresponding 0.1% Ag and glucosamine (1.0%)

**Materials and methods.** Nanocomposite of silver, that experimental gel contained, obtained at the Institute of Electric them. E.O. Paton NAS of Ukraine by electron beam evaporation. The comparator was cream "Dermazyn" (producer Germany, series SR0680) containing 1% silver sulfadiazine. Thermal burn injury II degree was reproduced using a special device heated to a temperature of 200 °C. Exposure time by contact plate was 4 seconds. Drugs were applied to the affected areas daily. Blood sampling for analysis performed in two periods: 7 days of treatment, when the scabs began to withdraw and for 21 days (complete healing of all animals). The level of oxidative modification of proteins (OMB) was determined by spectrophotometer reaction of oxidized amino acid residues of proteins with 2,4-aldehyde phenylhydrazon. The concentration of the oxidation products that formed (aldehyde- (APH) and ketodinitrophenylhydrazines (KPH)) is proportional to the optical density. Results processed using program "Statistica", used for nonparametric data the criterion Mann-Whitney ( $p > 0.05$ ).

**Results and discussion.** During treatment animals were observed accelerate healing of burn wounds, and appropriate normalization of OMP. At The 7 day level APH and KFH exceeded intact control in group control pathology (KP), animals which applied gel with silver nanoparticles and glucosamine and comparator in the 2.0 and 3.4 times; 1.9 and 2.1 times; 1.9 and 2.3 times ( $p < 0.05$ ). After 21 days the contents of OMP at KP group exceeded the norm by 1.5 and 2.1 times (APH and KPH respectively) (processes in the wound, not impeding the process of tissue regeneration. Compared with a group of KP the level of APH at the 21 day was below in animals treated with gel with nanoparticles of silver and glucosamine and cream "Dermazyn" 1.2 times ( $p < 0.05$ ). A level of KPH at the 7 day - 1.6 times and 1.5 ( $p < 0.05$ ); at the 21 day - 1.7 and 1.6 times ( $p < 0.05$ ) respectively.

**Conclusions.** The treatment of burns animals by gel with silver nanoparticles and glucosamine there was probable decrease intensity of OMP, which reduces the consequences of oxidative stress and promotes healing process of damaged tissues.

## THE ROLE OF VITAMIN D DEFICIENCY IN THE DEVELOPMENT OF DIABETES

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**Introduction.** In recent years it was accumulated a considerable amount of material on the relationship of various deficiency of certain micronutrient with diabetes risk – first of all it is chromium, magnesium, zinc, vitamin A and vitamin D. Today, vitamin D deficiency is associated with obesity, high body mass index, insulin resistance, adverse effects on insulin secretion and with glucose tolerance.

**Aim.** Theoretical studying the role of vitamin D deficiency in the development of diabetes. **Materials and methods.** Data analysis of literature and Internet sources.

**Results and discussion.** Experimental and clinical studies proved that at vitamin D deficiency there is an increase of risk for diabetes mellitus (DM) development in healthy patients. In patients, which suffer from diabetes mellitus and metabolic syndrome, indices of insulin resistance are growing. Thus, depressed level of 25-hydroxycholecalciferol (25(OH)D) in blood serum correlates with simultaneous presence of cardio-metabolic risk factors at diabetes mellitus. Among patients with low concentrations of 25(OH)D in serum there is increased risk of metabolic syndrome on 70 %. Insufficiency of 25(OH)D also correlates with increased waist circumference, increased systolic pressure and reduced level of cholesterol LDLP.

Level of vitamin D in plasma influence on concentration of glycosylated hemoglobin (HbA1c) – long-term index of glucose tolerance. In elderly people (70-74 years) levels of 25(OH)D – less than 50 nmol/k – increased risk of diagnosed DM type 2 in two times. At the same time at higher concentrations of 25(OH)D the decrease of HbA1c was observed. There is an opinion that formation and accumulation of final products of glycosylation affects on metabolism in bone and its solidity. Especially, diabetic neuropathy can lead to exacerbation of bone resorption process, and macro- and microangiopathies –can disturb blood inflow to bones.

It is proven that pharmacological doses of 1,25-dihydroxycholecalciferol prevent DM type 1 in obesity in mice, and cause immunomodulating effect, therefore directly influencing on pancreatic  $\beta$ -cells. On pancreatic  $\beta$ -cells, as well as on cells of immune system special vitamin D and vitamin D-binding protein receptors are present. In studies on rats with induced diabetes the decrease of vitamin D-binding protein level on 62% comparing to healthy animals was established. Likewise, it is considered that vitamin D can contribute to maintenance and stimulation of insulin secretion. At DM type 2 vitamin D raises susceptibility of cells to insulin and decrease inflammation in pancreatic tissue.

**Conclusions.** Thuswise, shown data specifies the necessity of vitamin D use in DM and metabolic syndrome therapy.

# THE SEARCH OF HARMLESS ANALEPTICAL SUBSTANCE OF DERIVATES SULFUR AND NITROGEN-CONTAINING HETEROCYCLIC

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**Introduction.** From analeptics depends on a person's life that needs urgent help with shock, asphyxia, hypoxia, bacterial intoxication collaptoid states, poisoning chemicals, alcohol overdose of drugs, which suppress the respiratory and vasomotor centers of the central nervous system. Particularly important role they play in anesthesiology, surgery and intensive care as antagonists of narcotic drugs, helping out with the patient's anesthesia. However tropism existing analeptics, varying degrees of influence on specific brain structures, a narrow range of therapeutic effects, toxicity narrows the scope of their application.

The analysis of the pharmaceutical market in the last 50 years has shown that the amount of analeptic drugs has not changed and has less than a dozen, which makes creation of original domestic analeptic perepativ actual problem of modern pharmacy and medicine.

**The aim** – focused search of the original substance with analeptic and anti anesthesial action.

**Object and methods.** To optimize search of analeptic substances were used methods of descriptive and statistical computer modeling. Assessment and analeptic and anti anesthesial action promising substances was conducted on mice in accordance with accepted standards. The initial screening of original pharmacological substances for the analeptic action performed on the model of ketamin anesthesia, after which was set optimal effective dose and acute toxicity (intravenously intraperitoneally and oral) of substances leader. Study features analeptic action of the given substance scheduled in comparison with caffeine niketamid, sulfokamfokayin and other substances in various models of anesthesia (viadril, tiopental, hexenal) and the model of alcohol intoxication. Further experiments include determining the best mode of application, installation dose dependency, regimen in a single system and use the most effective substance.

**Results.** The research helped to choose the leader of the substance with a pronounced awakening effect.

**Conclusions.** Derivatives of sulfur and nitrogen-containing heterocyclic were looking to find new analeptics.

# THE INFLUENCE OF NOWEL NEUROPEPTIDES, HOMOLOGOUS OF ACTH<sub>15-18</sub> AMINO ACIDS PRIMARY SEQUENCE, ON THE MEMORY STAGES IN THE MICE

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**Introduction.** For correction of the mnemonic disorders in patients with the acute ischemic stroke (AIS) many medicines is used. But efficacy of these drugs is insufficient. Therefore, this therapy needs an improvement. The class of peptidergic neuroprotector and nootropic drugs attracts particular attention. The series of tetrapeptides, homologues of ACTH<sub>15-18</sub> amino acids primary sequence, have been synthesized at the State Research Institute of Highly Pure Biopreparations (Saint-Petersburg). Previous research allowed to reveal their neuroprotective and nootropic properties. Particularly, they improve the memory. But their influence on the memory stages is unknown. The study is aimed to found the influence of neuropeptides on the 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> memory stages in mice.

**Material and methods.** The white male mice weighing 18-22 g were used. The animals into groups of 5-8 were divided. Amnesia has been reproduced by scopolamine intraperitoneal injection at a dose of 1.5 mg per kg. The influence of the neuropeptides (laboratory codes KK-1, KK-2, KK-3, KK-5 and KK-10) on the memory stages was evaluated by the latent time of entry into dark sector at condition of conditioned reflex of passive avoidance (CRPA) test, changing the time of peptides administration regarding procedures training and testing CRPA. The anti-amnestic activity (AaA) of neuropeptides was calculated with the Battler formula. The peptides was injected intranasally (i/n) as aqueous solutions at a dose of 0.02 mg per kg. Reference drug is semax. It is chemical and pharmacological analog of investigated neuropeptides. It was injected intranasally at a dose of 0.02 mg per kg.

**Results.** All neuropeptides and reference drug semax show statistically significant influence on the amnesia caused by scopolamine administration. It appear in the improving of memory encoding (1<sup>st</sup> memory stage), storage (2<sup>nd</sup> memory stage) and retrieval (3<sup>rd</sup> memory stage).

The ability of neuropeptides to stimulate of 1<sup>st</sup> memory stage increase in the sequence semax < KK-3 < KK-1 < KK-2 < KK-5 < KK-10. Their AaA fluctuates at the level 93%-111% and prevail semax activity in 1.5-1.7 times.

According to the influence on 2<sup>nd</sup> memory stage the neuropeptides are in next order KK-10 < KK-2 < semax < KK-3 < KK-1 < KK-5. The AaA is 63.1%–100.3%.

At the conditions of scopolamine-induced amnesia investigated neuropeptides stimulates 3<sup>rd</sup> memory stage too. This activity increases in the sequence semax < KK-10 = KK-1 < KK-2 < KK-3 = KK-5. The AaA of investigated neuropeptides is 85.0%-95.6%, semax – 67.4%.

The statistical analysis indicates a lack of significant difference between anti-amnestic activity of neuropeptides. However, all of them statistically significant prevail semax by this mark.

**Conclusions.** The ability of investigated neuropeptides to stimulate of mice's mnemonic functions at conditions of m-cholinoblocker scopolamine-induced amnesia witness about their expressive nootropic properties. The mechanism of it perhaps consist in a positive influence on the brain cholinergic transmission. The obtained results demonstrate absent of peculiarity of investigated neuropeptides influence on the memory stages. This justify expediency of their use in many cases of memory disorders. It different the neuropeptides from known nootropic drugs as well as piracetam, which influences only on the memory encoding (1<sup>st</sup> memory stage) and used in higher doses.

In according to expressive neuroprotector properties of neuropeptides the obtained results witness about availability of it using aimed to improve the therapy of cognitive disorders of patients with AIS and many others CNS disorders.

# THE STATE OF MELATONIN-POSITIVE-LABELED CELLS OF THE GASTRIC MUCOSA IN RATS OF DIFFERENT SEX AND AGE

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**Introduction.** In recent years, the role of melatonin in the human body attracts attention of doctors and scientists. This is due to multiple effects of melatonin in the normal functioning of the body: antioxidant, immunomodulatory, and influence at the reproductive system. In mammals the epiphysis is a source of melatonin, the so-called pineal melatonin. It is synthesized from essential for human's amino acids – tryptophan. The rhythm of the production of melatonin by the pineal gland is the circadian character. It is known that in the first years of life synthesis of melatonin in apps increases, and then throughout life is gradually and slowly reduced. The rate of decrease concentration of melatonin in the body is directly correlated with indicators of longevity. It is known that the elderly with deficiency of melatonin have more disease of cardiovascular, nervous, endocrine and other systems with severe course. The content of melatonin in the body caused not only by the secretion pinealocytes, but extra pineal sources of its synthesis, namely: apudocytes of the gastrointestinal tract and lungs, liver, kidney, adrenals. Functionally, all of the cells that produce melatonin belong to the diffuse neuroendocrine system, the universal system of adaptation and maintenance of homeostasis. One of the main sources extra pineal melatonin is enterochromaffin cells of the gastrointestinal tract. There is an assumption that extra pineal melatonin can play a leading role as a signaling molecule paracrine interaction of cells and local coordination of cellular functions, however, the final role of his by this time determined.

The **aim of this work** was to study the number of melatonin-positive-labeled cells (MPLC) of the gastric mucosa in rats of different sex and age.

**Materials and methods.** The work done on sections of the mucosa of the pyloric stomach of rats of different sex at the age 9 and 20 months, and it corresponds to the human age of 29-30 and 55-56 years. The analysis made by the method of immunohistochemical staining with a primary antibody against melatonin (Biorbyt, UK) and secondary Alexa Fluor 488 conjugated antibodies (Abcam, UK). Nucleus were stained propidium iodide (Sigma, USA). Fluorescence observed on a fluorescence microscope Olympus IX-71 (Japan) at the wavelength for Alexa Fluor 488-519 nm, propidium iodide – 617 nm. Cell count in the samples was carried out with the magnification: ocular lens 10, field lens 40. Analysis of serial sections was performed using software for analysis and image processing ImageJ 1.48a and counted to 1mm<sup>2</sup>. All the interventions and euthanasia of animals were performed in

accordance with the requirements of the bioethics Commission of NUPh and "General ethical principles of experiments on animals" that are consistent with the provisions of "European Convention for the protection of vertebrate animals used for experimental and other scientific purposes" (Strasbourg, 1986) and the Fifth National Congress on bioethics (Kyiv, 2013). The statistical validity was using one-way analysis authentic felt the difference at  $p \leq 0.05$ . Computer program Statistica 7.0 and Excel was used.

**Results and discussion.** During the work it was found that MPLC is predominately located in the basal and middle sections of the tubular glands of the coolant and is represented by three types of cells: type 1 – a small cell with a diameter of 3.8-7.6 mcIU, mainly located in the basal area of gastric glands, type 2 – large cells with a diameter from 11 to 17 mcIU without granules in the cytoplasm and type 3 – large cells with granules in the cytoplasm, which occupy the basal and middle part of the gland.

According to the results of counting the number of cells in rats at the age of 9 months found that the number MPLC in the mucosa of males is  $720.8 \pm 49.4$ , females –  $828.1 \pm 44.5$  per  $1 \text{ mm}^2$  ( $p \geq 0.05$ ). In the ratio of different cell types cells predominate in type 1 and 2 – 40 and 47% for males and 51 and 35% in females, respectively. With age, changes occur both in the number and ratio of different cell types. In male rats the number of MPLC decreased by 30%, females 26% related to young rats ( $p \leq 0.05$ ). Thus, in males there was an increase of 3 types of cells from 13% to 43%, while females were predominant cell type 2 – 52%.

The presence of cells differing in morphological structure suggests the possibility of different functions in the protection of the in the gastric mucosa damage of various etiologies. Their redistribution with age indicates susceptibility to other diseases associated with aging. The decrease in the number of cells with age is an indicator of atrophic changes in the gastric mucosa over time. The data obtained suggest that the decrease in reparative and antioxidant effects of melatonin, therefore, associated not only with physiological atrophy of the bone, and his extra pineal sources. While the females number MPLC is reduced less in comparison with males, with the difference in the number of cells of different type, which requires further research and analysis.

**Conclusions.** During the work established that between levels MPLC there are ages and sex difference. Higher level MPLC present in young females. MPLC represented by cells different types which have a different number and ratio in rats of different sex and change with age.

# “FATE” OF NANOPARTICLES AFTER MACROPHAGES

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**Introduction.** Over the last decade nanoparticles (NPs) have been used in numerous fields of biomedicine. An urgent problem is the study of the mechanisms of NPs interaction with cells, the understanding of which is necessary for the development of drugs with targeted delivery to the cell level, as well as to assess the possible negative effects of NPs on the body. Cells of the immune system are the first at the border of NPs penetration into the tissues and cells.

**Aim.** It is essential to investigate the interaction of NPs with phagocytic cells, mechanisms of intracellular penetration and the response of immune cells to NPs penetration. **Materials and methods.** Data analysis of literature and Internet sources.

**Results and discussion.** A number of researchers suggest preferred macrophage response to corpuscular antigens as opposed to soluble ones. Application of NPs in medical practice requires monitoring of the absence of lipopolysaccharides on their surface. Penetration of gold NPs into dendritic cells results in an increase in the level of gamma-interferon and an activation of specific immune response by cytotoxic T-cells. Furthermore, there is evidence that gold nanorods and nanorods coated with SiO<sub>2</sub> penetrated into macrophages cause a release of inflammatory mediators (cytokines, prostaglandins) and activate immune response genes. Internalization of gold NPs conjugated with antigen into dendritic cells conditions an increase in immune response as compared with the native antigen, which is manifested in enhanced lymphocyte proliferation and extended expression of immunostimulatory CD86 molecules. Macrophages, endothelial and immature dendritic cells were found to possess the highest capacity for the absorption of gold NPs. One of the effects of gold NPs penetration into the immune system cells is the production of pro-inflammatory cytokines and inhibition of macrophage proliferation, which is indicative of their direct immunostimulatory effects. Activation of immune cells by gold NPs can serve as a basis for the development of new vaccine adjuvants. Aerosol application of metal and carbon NPs on primary cultures of alveolar macrophages was found to influence macrophage function: the production of active oxygen species, the activity of enzymes involved in the “oxidative burst”, the ability of monocytes to differentiate into mature macrophages and the level of synthesis of proinflammatory cytokines.

**Conclusions.** Thus, further development of nanotechnologies requires a clear understanding of both the properties of nanomaterials and the mechanisms of their interaction with biological objects.



## **PROGERY – ORPHAN DISEASE**

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**Introduction.** Rare (orphan) diseases (the translation of this term from the Latin - "Orphan") affect a small group of the population. There is no Common international definition of orphan disease, as well as there is no common to all countries "rarity" criterion of disease.

**Aim.** Theoretical studying the orphan disease.

**Materials and methods.** Data analysis of literature and Internet sources.

**Results and discussion.** In the US, carriers of rare diseases are considered about 200 thousand citizens. The main condition is that their disease occurs at a frequency of 1 in 1,500. In Europe, it is considered a rare disease, when the disease occurs in 1 in 2,000 people. In Japan, the government acknowledged as carriers of rare diseases 50 thousand citizens. Frequency threshold is increased and is 1 case per 2,500 people. In Russia it is determined at the level of not more than 10 episodes per 100 thousand citizens. That is, the disease is considered an orphan drug if it occurs 1 in 10 000 people. According to statistics, 50% of patients with rare diseases - children; 10% of patients survive only up to five years; 12% - up to fifteen years; 50% of rare diseases lead to disability; every fifth patient suffers from pain; every third - can not lead an independent life.

In Ukraine, orphan diseases are considered diseases, the prevalence of which is not more than 1: 2000, among which the most common: phenylketonuria, Gaucher's disease, pituitary dwarfism, cystic fibrosis, hemophilia, congenital coagulopathies, mucopolysaccharidosis, Fabry disease, gomotsisteinuriya, progeria. These diseases are not just a little expanded, but - chronic, severe or life-threatening illnesses, which may lead to disability, reduce life expectancy.

Progeria (from an.-gr. - old) is an extremely rare genetic disease in which there are irreversible changes in the body that lead to premature aging. There are children's Progeria, called syndrome Hutchinson-Gilford and progeria of adults, known as Werner's syndrome.

Molecular genetic cause Hutchinson-Gilford progeria is a mutation of the LMNA gene, localized in 1q21.1 segment and which encodes prelamin A, which is a precursor to the mature forms of lamins A and C, formed during complex post-translational modification. Lamins A and C form a super twisted parallel dimers that polymerising form a fibrous network on nucleoplasmic side of the inner nuclear membrane. Thus, they participate in the creation of the "inner core" of the cell nuclei. In the cells of patients with progeria nuclear shell shrivel, nucleus become irregularly

shaped. The main diagnostic feature of diseased cells is sharply reduced the number of divisions, which cells are able to pass in culture, the so-called limit or Hayflick number. As a result, the body does not just stop growing, but also loses its ability to replace dying cells with new, which leads to accelerated aging.

At birth, children with the syndrome, externally and physically appear healthy. The disease begins to appear at the age of 1.5-2 years. The phenotype of patients is extremely characteristic: small stature, "bird person" with beak profile, the prevalence of brain the size of the skull on the front, alopecia. Observed defects in shape and number of teeth, dry, thinning skin, the almost complete absence of subcutaneous fat, developmental delays, especially physical.

The average life expectancy of carriers described syndrome - 13.4 years. Negative processes are accompanied by the complications inherent to more elderly people: stroke, cardiovascular disease, osteoporosis, joint stiffness, generalized atherosclerosis. The cause of death is usually myocardial infarction with detection at autopsy generalized atherosclerosis and myocardial fibrosis, as well as concretion of lipid in in the brain tissue and parenchyma organs.

Werner's syndrome - a rare autosomal recessive disorder characterized by symptoms of premature aging that occur after the end of puberty and is characterized by a gradual progression. There is a wide range of pathology that accompanies normal aging: canities, alopecia, atherosclerosis, osteoporosis, cataracts, diabetes, cancer, geratic skin changes, infertility, impotence.

Molecular-genetic cause of the disease is a mutation in the WRN gene, which is responsible for the production of a protein of the same name, which supports genomic stability. Therefore, there is genetically determined instability of chromosomes, which is expressed in changing of the structure of chromosomes, that arise spontaneously or under the influence of some agents.

Histological examination reveals atrophy of the epidermis and appendages of skin, dermis is thickened, collagen fibers are hyalinized, glucosamine contents is increased, the nerve fibers and blood vessels prone to degradation. Subcutaneous adipose tissue and muscle are atrophic.

**Conclusions.** Today, in the world it is recorded 42 cases of the disease progeria, in Ukraine - only 2. All methods of treatment used today, unfortunately, are not effective and pursued a single goal - to "freeze" the disease to the best of the possibilities of modern medicine. The minimal dose of aspirin is being used – in order to prevent heart attack, statins reduce cholesterol, anticoagulants inhibit the formation of clots, growth hormone increases height and weight, physiotherapy and exercises allow you to develop joints.

# **CARBOXYTHERAPY IS A SUBSTANTIATION OF APPLICATION IN PATHOLOGIES OF THE MUSCULOSKELETAL SYSTEM**

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**Introduction.** Carboxytherapy is a method of treating diseases of different etiologies in the application of carbon dioxide. More than 30 years for the treatment and prevention of these diseases carboxytherapy used to eliminate inflammation, chronic articular and muscular pain.

**Aim.** Explore a new method of treatment of the musculoskeletal system.

**Relevance.** Until today, it was impossible to find a single universal method for the majority of diseases. Carboxytherapy is effective in the treatment of many pathologies. According to pharmacological effects, the carbon dioxide can improve all the body systems, to improve the delivery of oxygen and nutrients, break down fats, eliminate toxins, regenerate tissue and contributing to the widening of capillary network. Also, carboxytherapy eliminate muscular and vascular spasms, relieves myofascial pain syndrome, eliminate venous stasis limfaticheskty that contributes to the improvement of health, improving health and quality of life.

The topicality of this topic is that the traditional treatment of diseases associated with the musculoskeletal system, unfortunately, is not always effective. Carboxytherapy in combined administration with drugs widely used therapy at a pathology of the musculoskeletal system. In particular, when polyarthrosis, rheumatism, osteoarthritis in combination with non-steroidal anti-inflammatory carboxytherapy with drugs that helps to reduce the doses of NSAIDs.

**Conclusion.** Thus carboxytherapy through physiological mechanisms carbon action provides a number of therapeutic effects: antihypoxic, anti-inflammatory, antihypertensive, cardiogenic, metabolic, reparative and regenerative, antianginal, antispasmodic, analgesic, lipolytic and therefore primenenietsya not only in the treatment of pathologies of joints, but also in other diseases.

# THE EXPERIMENTAL DETERMINATION OF TOXICOLOGICAL PROPERTIES AND ULCERATIVE EFFECT OF THE THICK BEAN EXTRACT

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**Introduction.** Besides a high pharmacological activity, one of the most important requirements for medications is their safety.

**Aim** – studying of acute toxicity of LD<sub>50</sub> of the thick bean extract (TBE) at intragastric introduction to mice and intra – abdominal introduction to rats, and also possible ulcero-genic action of TBE.

**Materials and methods.** The study of the TBE acute toxicity has been conducted by the method of Shtabskii B.M. Investigations of a possible damaging effect of the TBE (at doses – 10 mg/kg, 40 mg/kg and 100 mg/kg) on the gastric mucosa and 12 duodenal ulcer have been performed on Wistar rats by the method of J. Marazzi-Uberti. An investigation of the effect of TBE and acetylsalicylic acid (at doses of 40 mg/kg and 100 mg/kg) on the stomach and intestines of the animals has been performed on Wistar rats for 14 days under conditions when ethanol induced gastric ulcers. Ulcers of the gastric mucosa have been caused by the intragastric administration of 5 ml/kg of absolute alcohol to the animals fasted for 24 hours.

**Results and discussion.** The study outcome of acute toxicity at intragastric and intra-abdominal introduction of TBE have shown that the expressed intoxication and death of experimental animals in no one group it isn't established. Prolonged use of TBE in ED<sub>50</sub> – 40 mg/kg, hasn't shown ulcero-genic action on a mucous membrane of a digestive tract of animals, and on model of ethanol ulcers at rats of GEK in doses of 40 mg/kg and 100 mg/kg has shown insignificant damaging influence on a mucous membrane of a digestive tract – by 1,8 times and 1,5 times less, than at use of acetylsalicylic acid in doses of 40 mg/kg and 100 mg/kg.

**Conclusions.** While studying the acute toxicity of the TBE by intragastrically administration to the mice (at doses of 500 mg/kg, 5000 mg/kg, 10000 mg/kg and 15000 mg/kg) and intraperitoneal administration to the rats (at doses of 10 mg/kg, 100 mg/kg, 1000 mg/kg, 3000 mg/kg and 5000 mg/kg) we have established that the death of the experimental animals have not occurred. The TBE refers to the V toxicity class of the substances i.e. practically non-toxic ones, according to the toxicity classification of substances by Sidorov K.K. The TBE shows no ulcerogenic effect at doses of 20 mg/kg and 40 mg/kg. A minor ulcerogenic action of the TBE has been revealed only at a dose of 100 mg/kg on the gastric mucosa of the rats. The TBE has not potentiated ulcerogenic activity of ethanol on the model of ethanol gastric ulcers.

# PHARMACOLOGICAL RESEARCH OF GEL WITH GLUCOSAMINE 1% AND ITS COMBINATIONS WITH NANOPARTICLES OF SILVER ON MODEL THERMAL INJURY IN ANIMALS

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**Introduction.** In the period from 2012 to 2015 every year growing number of victims of burn injuries, among them about 60% are subcutaneous skin burns I-II degree. To ensure effective treatment of burns the medicines of local action should identify antioxidant, anti-inflammatory, antimicrobial, reparative activity. But despite the wide range of other medicines on the pharmaceutical market of Ukraine actuality it's the development of more effective treatments that extend the range of local medicines.

Thermal burn is burn, which obtained by contact with a liquid, solid or gaseous heat source. The first place in the statistics occupy flame burns (about 84% of all thermal burns).

Second-degree burns are superficial burns, since their depth is not sprout affects the skin layer, thus in places such skin burns itself is able to recover. At the time of a burn is determined hyperemia and edema of the skin. It is characteristic for second-degree burn blister with clear liquid. This is accompanied by burning pain that can persist for two - three days.

In previous researches have revealed the presence of wound healing activity gel with glucosamine 1% and gel with nanoparticles of silver and glucosamine (NPS + G). Gels were developed under the guidance of prof. Ruban O. A. at the department of Industrial technology NPhU.

**Purpose of the study.** The stabilization of membrane antioxidants in the 1st phase of wound healing ensures prevention of secondary necrosis, and in the 2nd is stimulate regeneration processes, so the purpose of the study was to investigate the intensity lipid and protein peroxidation in rats with burn wounds in the treatment of study medicines.

**Materials and methods.** Second-degree burn modeled in rats under tiopental anesthesia on the dehaired skin of back. To simulate second-degree burn using a special device with a metal plate with a diameter of 2.5 cm. Contact with skin plate heated to 200<sup>0</sup> C was 4 seconds. The experiment used 90 white rats divided into 5 groups of 18 animals each. Each day gel applied to the affected skin at a dose of 50 mg per cm<sup>2</sup>. Blood sampling for analysis performed in two periods: the early discharge of crusts (7th days) and 21th days. Were decapitated 6 rats from each group. Biochemical studies of blood serum conducted on the basis KhNMU in

cooperation with assoc. Gorbach T.V. on indicators: the level of oxidative modification of proteins (OMP), lipid peroxidation (LPO), free SH-group.

In the experiment stick "General ethical animal experimentation" (Ukraine, 2001) harmonized with the "European Convention for the Protection of vertebrate animals used for experimental and other scientific purposes" (Strasbourg, 1985). Results processed using Statistica 7.

**Results.** In the treatment of animals studied gels observed activation of healing burn wounds. Complete epithelization was held for 15th day (gel with glucosamine and glucosamine with nanoparticles of silver) in the group treated with cream "Dermazin" - for 17th day, the control group pathology - in 21th day.

When treating animals with burns observed reduction OMP. This indicates termination of destructive processes in the wound and does not prevent the process of tissue regeneration. Compared with the group of CP in animals treated with glucosamine gel level APH for 21th days was below 1.8 times and in animals treated with the gel NPS + G and cream "Dermazyn" 1.2 times ( $p < 0, 05$ ). Level KPH – 7th day in 2.5 times, 1.6 times and 1.5 ( $p < 0.05$ ) at 21th days - 2.5, 1.7 and 1.6 times ( $p < 0.05$ ) respectively.

Availability membrane stabilizing effect in the studied gels suggest a probable reduction of TBA-P and DC in animal blood during treatment. After 21th day in the group that was treated with the gel HPS + G data rates significantly normalized, the group, which was applied mono gel, cream "Dermazyn" and KP exceeded the norm by 1.4 times, 1.7 times, 2.2 times and 1.2 times, 1.4 times, 1.3 times ( $p < 0.05$ ), respectively.

During prolonged inflammatory process may increasing the level of SH-groups. On 21th day in group, which was treated gel with glucosamine content of SH-groups reached the level of intact values, while in groups of the gel with NPS+G, cream "Dermazin" and the group CP in 1.3 times, 1.4 times, 1.1 times and 1.6 times respectively were significantly higher than normal. However, compared with group CP content of SH-groups in rat blood, causing gel with glucosamine, gel with NPS+G and the reference drug was below 1.5 times, 1.3 and 1.4 times ( $p < 0.05$ ) on 7th day, and 1.6 times, 1.2 and 1.4 ( $p < 0.05$ ) time for 21th days.

**Conclusion.** Thus, biochemical blood serum tests of animals with burn wounds in the treatment of experimental gels demonstrate the presence membrane stabilizing and antioxidant effect of nanoparticles of silver and glucosamine. So perspective is further pharmacological researches the properties of nanoparticles of silver and glucosamine to create local healing medicines a new generation and efficiency improvements treatment wound healing.

**A STUDY OF N,N'-(ETHANE-1,2-DIYIL)BIS(QUINOLINE-2-CARBOXAMIDE), DIAKAMPH, AND METFORMIN INFLUENCE ON THE HISTOLOGICAL STRUCTURE OF THE LIVER IN THE ACUTE PERIOD OF ALLOXAN-INDUCED DIABETES IN RATS**

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**Introduction.** Diabetes mellitus (DM) is the most acute medical and social problem relating to the priorities of the national health systems of all countries. DM is the third place most common cause of morbidity and the most common endocrine disease. The rapid increase in the prevalence, heterogeneity of patients, and continuous progression of DM determine the need in the development of new effective drugs. On the way of these drugs search, our attention is attracted by N,N'-(ethane-1,2-diyil)bis(quinoline-2-carboxamide) – a compound with an original mechanism of action, which, according to our data, involves I<sub>1</sub> and I<sub>2</sub> imidazoline receptors stimulation. Another approach consists in drugs development on the basis of water-soluble diacamph derivative (diacamph hydrochloride), which combines antihyperglycemic and cerebroprotective properties. As the liver plays a crucial role in the mechanisms of DM development, it is expedient to determine the influence of the investigated drugs on its functional state and morphological structure.

**Aim.** The objective of this study is to investigate the effect of N,N'-(ethane-1,2-diyil)bis(quinoline-2-carboxamide) and diacamph hydrochloride in comparison with the reference drug metformin on the histological structure of the liver and its glycogen content in the acute period of alloxan-induced diabetes in rats.

**Materials and methods.** White random-bred male rats with the body mass equal to 0.20±0.02 kg were divided into the groups of intact control, untreated (diabetic animals), and three groups of diabetic animals receiving the aforementioned drugs. DM was modeled by subcutaneous alloxan monohydrate (Sigma, USA) administration once at a dose of 150 mg/kg as a 5% solution in acetate buffer, pH 4.5. The animals previously were deprived of food for 24 h, but had free access to water. N,N'-(ethane-1,2-diyil)bis(quinoline-2-carboxamide) was administered intragastrically at a daily dose of 11.64 mg/kg (ED<sub>50</sub> for hypoglycemic effect) as an aqueous suspension stabilized by polysorbate-80. Diacamph hydrochloride and metformin were administered intragastrically at daily doses of 25 mg/kg and 100 mg/kg respectively, for three days after alloxan injection. Animals of the intact control and the untreated group received an equivalent amount of drinking water. The animals were taken out of the experiment under anesthesia and liver samples for further light microscopy studies were collected at the beginning of the fourth day after alloxan injection, at which time β-cell destruction is considered to reach its

maximal level. Liver samples were taken for the determination of glycogen content with anthrone reagent. Fragments of the liver were fixed in 10% formalin solution, dehydrated in increasing concentrations of ethanol, and embedded in paraffin. The sections were stained with hematoxylin and eosin. The microscope "Granum" and the digital video camera "Granum DCM 310" were used, and the photographs were processed using computer Pentium 2,4GHz through a ToupView program.

**Results and discussion.** The histological structure of the liver of intact animals remained normal. Hepatocytes were arranged in radiating cords. The cells retained their characteristic shape and size, the cytoplasm was evenly painted and optically dense, it contained no inclusions visible under light microscopy. The nuclei of hepatocytes were normochromatic, centrally located, containing one, and sometimes two nucleoli. Pool of binuclear cells was sufficient. The boundaries of the lobules were determined by triads. Triades zones were narrow. The normal state of epithelium of triads and other vessels was registered. Intralobular sinusoidal hemocapillaries were moderately dilated and contained moderate number of lymphoid cells. Kupffer cells (stellate reticuloendotheliocytes) demonstrated normal structure. No disorders of beam-lobule structure were seen in the liver samples of the untreated group. In certain animals, fibrinoid swelling of arterial vessel wall and protein effusion in whole triad zone were observed. Increase in apoptosis of hepatocytes, mild mononuclear cell infiltration of the bile ducts in some of the triads. The histological structure of the liver of diabetic animals receiving N,N'-(ethane-1,2-diyil)bis (quinoline-2-carboxamide), was not changed, still moderate edema, fibrinoid swelling of arterial vessel wall in some of the triads were present. The histological structure of the liver of diabetic animals treated with diacamph hydrochloride was not changed. Slight focal vacuolation of the cytoplasm of hepatocytes was observed in one sample. In some of the triads fibrinoid swelling of the arterial vessel wall was seen. In the liver of rats receiving metformin the changes of histological structure of hepatocytes and vessel wall in the triads, visible under light microscopy, were practically absent, a very fine droplet vacuolization of hepatocytes was observed in one sample. Glycogen content in the liver of the untreated diabetic rats reduced almost 3 times. Diacamph hydrochloride and metformin did not change this value, while it even tended towards increase against a background of N,N'-(ethane-1,2-dyyil)bis (quinoline-2-carboxamide).

**Conclusions.** N,N'-(ethane-1,2-dyyil)bis (quinoline-2-carboxamide) reduces the toxic effect of alloxan on the liver in rats, that is evidenced by the absence of hepatocyte apoptosis, the decrease in morphological signs of the degenerative changes of the vascular wall, and prevention of glycogen depletion. This drug, as well as diacamph hydrochloride, is almost as effective as the well-known drug metformin.



## OFF-LABEL USE OF DRUGS IN CHILDREN

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**Introduction.** For the pediatric population, gold standard clinical trials are often not available, so practitioners must rely on either less definitive information, such as expert opinion for the age group that they are treating, or use evidence from a different population to guide practice. Studies throughout Europe have shown that at least one-third of children in hospital and up to 90% of neonates in a neonatal intensive care unit receive off-label drugs. The medicines that are most frequently used off-label include analgesics, antibiotics and bronchodilators. The off-label use style – it's the appointment of drugs, without the express guidance in the instruction for applying. A common approach has been to use data from adults and adjust the dose according to a child's weight. But this trial-and-error approach has also resulted in tragedy, indicating that adult experiences with a drug aren't always a reliable predictor of how children will react.

**Aim.** To emphasize the importance of clinical researches off-label use of drugs in children.

**Materials and methods.** The FDA mandates that almost all new drugs and certain approved drugs must be studied if there is potential for use of that drug in children and that the application for new drug approval include the results of adequate pediatric studies. Linkages between the FDA, NICHD, AAP, and other organizations have been important for building a foundation for pediatric research, and children are getting more and better drugs by keeping pediatric drug research a high priority.

**Results and discussion.** The passage of the Best Pharmaceuticals for Children Act 2 (BPCA) and the Pediatric Research Equity Act 3 (PREA) has resulted in more than 500 pediatric labeling changes. Legislation of Ukraine does not contain any legal norms for off-label use of drugs. Art. 4, n. 3 “On Protection of Consumers” Rights Law of Ukraine said that it is necessary to use the product for its end use, and to adhere to the conditions (requirements, norms, rules), set by the manufacturer in the maintenance documentation. The problem that may be particularly acute in the near future, with the transition the health care system of Ukraine to medical insurance, introduction of modern quality control mechanisms for health care, including prescribing.

**Conclusions.** Off-label drug use remains an important public health issue for infants, children, and adolescents, because an overwhelming number of drugs still have no information in the labeling for use in pediatrics.

## APPLICATION OF INDIRECT IMMUNOFLUORESCENCE REACTION FOR DIAGNOSIS OF BABESIOSIS

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**Introduction.** Babesiosis as a relatively new and little-studied present-day haemoparasitic infection requires use of innovative methods of diagnosis, where the leading place is taken by indirect immunofluorescence reaction (IIR). **Materials and methods.** In the process of development of the technique of IIR for revealing the level of antiBabesia antibodies in blood serum we used three types of complete combined cell antigens (CCCA) of *Babesia* species: *B. microti*, *B. divergens* and *B. canis*. IIR was tested by examination of 130 blood serum samples (BSS) of different origin: from patients with Lyme disease (n = 30), seropositive rheumatoid arthritis (n = 10), toxoplasmosis (n = 15), clinically healthy donors (n = 60); animals (n = 20). IIR results were visually assessed under a luminescence microscope with a 4-cross positional system (400x; 1,000x). **Results and discussion.** It was found out that testing of 130 BSS (in 1:8 dilution) produced 10 (2.7 %) positive results of the reaction. *B. canis* was not revealed in any case of reaction with CCCA. A relatively higher number of positive results of IIR with CCCA were observed with *B. divergens* (5.4%); *B. microti* was found in 2.3%. The level of antibodies against *Babesia* species in BSS from patients with Lyme disease reached 16.7%. In cases of samples from cattle the above indices were equal to 20.0%. Diagnostically significant titres of antiBabesia IgG ( $\geq 1:128$ ) were revealed in 13.3% of BSS from patients with Lyme disease and in 1.7% of BSS from blood donors, whereas specific IgM were only in 13.3% of BSS from the above patients. In 16.7% of BSS from patients with Lyme disease, who on the whole revealed diagnostically significant titres of Babesia infection antibodies, the latter were represented in 60% of these BSS with both classes of Ig (IgG and IgM = 0.63), while in 40% a diagnostically significant titre was reached only by one of them (IgG or IgM), thereby necessitating simultaneous determination of specific IgG and IgM or total Ig during immunological diagnosis of babesiosis. **Conclusions.** Advantages of using the method of IIR for diagnosis of babesiosis are combined with certain disadvantages (the subjective principle of assessment of results, a relatively low sensitivity at the initial stage of the disease, probable false positive results owing to immunological cross reactions, absence of validated test systems and protocols of investigations for diagnosing diseases, caused by *B. divergens*, etc.). Consequently, reasonable is the tactics of its limited use: for diagnosis of the acute phase of babesiosis only in cases with negative results of investigations, conducted by other methods (microscopy, polymerase chain reaction), and in the presence of a strong suspicion that the patient may have haemoparasitosis.

## **SUBSTANTIATION OF THE SEARCH FOR NEW DRUGS FOR THE TREATMENT OF BENIGN PROSTATE HYPERPLASIA**

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**Introduction.** Common knowledge that benign prostatic hyperplasia (BPH) is a benign (noncancerous) increase in size of the prostate. BPH involves hyperplasia of prostatic stromal and epithelial cells, resulting in the formation of large, fairly discrete nodules in the transition zone of the prostate. One of the methods of treatment of BPH is a drug therapy. Drug therapy compared with surgical treatment is safer and with better compliance that determines its relevance.

**Aim.** The aim of this work is to theoretically justify the prospects for the search and development of new drugs for the treatment of BPH.

**Materials and methods.** Therefore, the analysis of epidemiological data on the prevalence of BPH and the Ukrainian pharmaceutical market of drugs for the treatment of BPH was conducted.

**Results and discussion.** Today according to epidemiological studies BPH affects about 210 million males as of 2010 (6% of the population). The prostate gets larger in most men as they get older. For a symptom-free man of 46 years, the risk of developing BPH over the next 30 years is 45%. Incidence rates increase from 3 cases per 1000 man-years at age 45–49 years, to 38 cases per 1000 man-years by the age of 75–79 years. While the prevalence rate is 2.7% for men aged 45–49, it increases to 24% by the age of 80 years. A number of scientists found that the 50% of men aged more than 50 years are suffering from BPH. There is an increase in the prevalence of BPH among men aged 40–49 years from 11.3% to 81.4% men aged 80 years.

Analysis of the ATC classification of medicines Ukrainian pharmaceutical market showed that drugs group for treat BPH (G04C) divided into such groups: G04CA -  $\alpha$ -Adrenoceptor antagonists (4 international names and 33 trade names), G04CB - Inhibitors of testosterone 5- $\alpha$ -reductase (2 international names and 12 trade names), G04C X02 – drugs of *Sabalisa Serrulatae* fruit (4 trade names) and G04C X10\*\* - other drugs (20 trade names). These drugs affect the individual links in the pathogenesis of BPH, which contributes to polypharmacy in their therapy.

**Conclusions.** Medicines that may simultaneously exert anti-inflammatory effects, inhibit 5- $\alpha$ -reductase (the enzyme that converts testosterone into a more active dihydrotestosterone, sposobstvuschy prostate growth), to restore the activity of sperm, inhibiting dysuria and pain, increases the potency, eliminate symptoms of voiding, is absent in the Ukrainian pharmaceutical market. Therefore, the search and creation of new drugs for the treatment of BPH, which can affect the entire pathogenesis of this disease, is promising.

## TERM OF OFF-LABEL USE IN MEDICINE

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**Introduction.** Off-label use of drugs is relatively common in medical practice, even if it's often not supported by strong scientific evidence. The term “off-label drug use” refers to drugs that have not yet acquired “approved” status or drugs that have acquired “approved” status but are used with a different dosage, route, or administration method other than that for which the drug has been approved. Some off-label prescribing should be permitted to allow physicians to take good care of patients and offer them some therapeutic options, but such prescriptions must remain the exception to the rule and should be scrutinized and controlled by regulatory agencies using well-defined frameworks. No comprehensive studies, however, exist that analyse in full all prescriptions for all dispensed drugs, especially in view of the recent intervention by the European Medicine Agency to tackle this issue. So far, several prospective and retrospective studies have been conducted in various healthcare contexts (general medical and surgical wards, neonatal and pediatric intensive care units) in the USA, Europe and Australia . These studies have brought to light a high proportion of unlicensed and off-label use, reaching up to 72% of all prescriptions and 93% of all pediatric patients.

**Aim.** Several studies have documented the high prevalence of off-label use in medicine.

**Materials and methods.** A leading example of how regulatory agencies approach off-label use is provided by the United States Food and Drug Administration (FDA)'s Center for Drug Evaluation and Research, which reviews a company's New Drug Application (NDA) for clinical trial data to see if the results support the drug for a specific use or indication.

**Results and discussion.** If satisfied that the drug is safe and effective, the drug's manufacturer and the FDA agree on specific language describing dosage, route of administration, and other information to be included on the drug's label. Pharmaceutical companies are not allowed to promote a drug for any other purpose without formal FDA approval.

**Conclusion.** However, once a drug has been approved for sale for one purpose, physicians are free to prescribe it for any other purpose that in their professional judgment is both safe and effective, and are not limited to official, FDA-approved indications. This off-label prescribing is most commonly done with older, generic medications that have found new uses but have not had the formal (and often costly).

## PHARMACOLOGICAL RESEARCH OF NEW SUNSCREEN WITH NANOPARTICLES OF CERIUM DIOXIDE

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**Introduction.** The skin protecting from ultraviolet radiation is a very important measure for the prevention of solar burn and other kinds of solar damage like dermatitis, erythema, skin aging and cancer. Unfortunately, today on the national market there is no photoprotectors able to compete with foreign developments. On the other hand, the climate and environmental situation in Ukraine requires the development of new effective photoprotectors. Especially photoprotectors are useful for the people having more than 4 birthmarks, military who serve in solar regions, people with the genetic predisposition to skin cancer, the patients receiving phototherapy. Also there are many substances reinforcing the negative impact of ultraviolet radiation on the skin, including drugs (sulfanilamidums, GCS, antibiotics, COCs, hypoglycaemic drugs, neuroleptics).

**Aim.** The main task in this research was the study of efficiency of new sunscreen with nanoparticles of cerium dioxide in comparison with popular cosmetic sunscreen Biokon SPF 40.

**Materials and methods.** In this research we use the model of UV-erythema modified with phototoxic reaction at guinea pigs divided by 7 groups (10 animals in everyone). All animal were shaved on identical sites along a back ( $S=3\text{cm}^2$ ). Irradiation was done by UV-lamp at the distance 10 cm from animals, a radiation time was 10 minutes, UV-range was 240-320 nm. We used solution for external application «Ammifurin» 0.3% as a photosensitogen (1 ml in 1 hour before radiation). The sunscreens were put in 20 min. before to radiation.

**Results and discussion.** The results show that the cream with nanoparticles of cerium dioxide was more effective than sunscreen Biokon SPF 40 by 10%. It could reduce negative consequences of UV-radiation by 43%, and in terms of photosensitivity – by 31%. The experimental data prove that the cream with nanoparticles of cerium dioxide has photoprotective, antioxidant and anti-inflammatory properties.

**Conclusions.** Corollary, sunscreen with nanoparticles of cerium dioxide is more effective than the reference-agent Biokon SPF 40. This research still needs advanced preclinical and clinical studies, but now it is possible to say that this cream can be new perspective development of domestic photopharmacology, and can become a perspective commodity for the import substitution.

# THE RESEARCH OF EFFICIENCY OF LIPOSOMAL MEDICAL FORMS FOR CREATION OF ANTIHELMINTHIC DRUGS

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**Introduction.** More than the one-third of population is infected by parasitogenic helminthes that often leads to chronic diseases and death of patients. In Ukraine the annual index of morbidity on helminthosis is 1333 cases per each 100 thousand of population. As helminthosis usually are difficult for differentiation, a lot of antihelminthic drugs have the wide spectrum of action. These facilities are very toxic for an organism, that will allow to decrease its toxic action and to promote efficiency of medicinal preparations.

**Aim** is studying of therapeutic action of liposomal forms of antihelminthic medical facilities on experimental models of opisthorchiasis, ascaridosis, trichinosis, hymenolepiasis and toxocariasis.

**Materials and methods:** experimental opisthorchiasis (infection of hamsters by metacercaria), ascaridosis and trichinosis (infection of mice by eggs), hymenolepiasis (the larval stage of cysticercosis of *Hymenolepis nana* in the fibres of thin department of mice intestine), toxocariasis (toxocara spp. in the lungs of mice on the stage of migration larvae). We studied negatively charged liposoms, that was got from mixture of polar lipids (phosphatidylethanolamine, phosphatidylcholine, phosphatidylserine, sulfatcerebroside, sphingomyelin) (author development of N. N. Ivanova). We rated the antihelmithic action of liposomal form of Phensal and Albendazole.

**Results and discussion.** Liposomal medical forms purposefully transport substances to the organs of the reticuloendothelial system, have high bioavailability, does not evince cytotoxicity action and are simple to prepare. In addition, the medical substance, placed into liposome, become more effective, thanks to absence of decay by enzymes. The liposomal forms of antihelminthic drugs act considerably less doses, increase the amount of leucocytes, promote the indexes of alkaline phosphatase, that is the marker of T-cells.

**Conclusions.** One-time insertion of negatively charged liposoms, that is got on the basis of polar lipids and contain antihelminthic drugs (Phensal and Albendazole) show more expressed therapeutic efficiency in reduced doses, that reduces their toxicity accordingly. The liposomal form of Fensal and Albendazole shows the expressed effect on intracellular infections.

# EXPERIMENTAL STUDY OF ANTIDIABETIC PROPERTIES OF RECOMBINANT INTERLEUKIN-1 RECEPTOR ANTAGONIST

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**Introduction.** Diabetes mellitus (DM) has an important place in the structure of mortality and among the causes of disability violations and the deterioration of the quality of life. According to the International Diabetes Federation today the number of diabetes patients has reached 366 million in the world, and in 2030 will reach up to 552 million. Therefore, optimizing diabetes care is one of the most actual health problems.

According to modern concepts of the pathogenesis of diabetes, one of the leading roles in the deaths of beta-cells is played by the pro-inflammatory cytokines, one of which - the interleukin-1 (IL-1). IL-1 inhibits the production of insulin by  $\beta$ -cells and stimulates their apoptosis. Due to activation of IL-1 nitric oxide increases in  $\beta$ -cells, which induces NO-synthetase activity and eventually leads to  $\beta$ -cell destruction.

**Aim.** The aim of this work was the experimental study of the IL-1 raleukin original recombinant antagonist receptors effect, got by St. Peterburg Research Institute of Pure Biochemicals, on the development of alloxan diabetes in rats.

**Materials and methods.** The absolute insulin deficiency of the direct  $\beta$ -cytotoxic genesis was induced with help of the single subcutaneous injection of alloxan in a dose of 150 mg / kg of white mongrel rats weighing 160-220 g, which were kept at a pre-day starvation diet.

As a comparison, formulations synthetic hypoglycemic drug metformin, which is included in the CD standards of both types of treatment, and anakinra, IL-1 recombinant antagonist receptors with proven hypoglycemic activity, which is a structural analog of the test drug. Drugs were administered in a treatment regime four times - after 40-50 min. after administration of alloxan, and 24, 48 and 72 hours: raleykin in dose of 7 mg / kg anakinra and 8 mg / kg - subcutaneously, metformin 100 mg / kg - intraperitoneally. After 40-60 min. after the last administration of study drugs the animals were anesthetized with sodium thiopental, and taken out of the experiment. When decapitation, blood was collected and liver isolated for biochemical studies.

Insulin levels of hemoglobin (Hb), glycated hemoglobin (HbA1c) and C-reactive protein (CRP); in liver homogenates - the level of diene conjugates (DC), TBA-reactants (TBA-P) and reduced glutathione (WG) were detected in the blood serum.

**Results and discussion.** Raleukin and anakinra unlike metformin significantly increased insulin levels in the blood serum of animals in 2,2-2,4 times. Under the influence of raleukin Hb content in blood serum of rats was significantly increased by 1.3 times, HbA1c - decreased by 1.5 times in comparison with the indicators in the control group pathology. Against the background of metformin Hb content was significantly increased in 1,1 times, HbA1c - decreased by 1.2 times. Introduction anakinra contributed to the significant increase Hb content 1.2 times, reduction in HbA1c - 1.4 times. Under the action of interleukin the level of CRP in the serum of rats significantly decreased in 1.9 times compared with that in the control group of diseases under the action of metformin - in 1.5 times, against the backdrop of anakinra - 1.7 times.

The use of studied drugs contributed to the normalization of lipid peroxidation product levels in rat liver homogenates. Against the background of raleukin and anakinra content DK decreased by 1.6 times, under the influence of metformin - in 1,3 times. In groups of raleukin and anakinra level of TBA-P in liver homogenates of rats significantly decreased by 1.4 times, the content of SH increased by 1.6 times compared with the corresponding figures in the blood of animal disease control group. The increase of the SH shows the protective effect of the studied drugs regarding the free radicals that accumulate near the  $\beta$ -cells during insulinitis.

**Conclusions.** Thus, on the model of alloxan diabetes in rats original antagonist recombinant IL-1 receptor exhibits an antidiabetic effect on the severity of which is not inferior to anakinra and superior to metformin.

It can be assumed that the positive effect of raleukin is the result of the IL-1 receptors blockade in the pancreas and in the following protection of  $\beta$ -cells from the damaging effect of alloxan as well as it is associated with the ability of the drug to increase the insulin-producing ability of  $\beta$ -cells, to inhibit the reaction of non-enzymatic glycosylation, inhibit the development of inflammatory processes in the  $\beta$ -cells and reduce the severity of oxidative stress in the body of experimental animals.

The results of these studies indicate the prospects of further experimental study of the anti-diabetic properties of raleukin for subsequent inclusion of the drug in the complex of type I diabetes therapy.



# THE POSSIBILITIES OF METFORMIN EFFICACY INCREASE BY HERBAL PREPARATIONS ON THE EXPERIMENTAL MODELS OF METABOLIC DISORDERS

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**Introduction.** Diabetes mellitus and metabolic syndrome are widely-spread problems of the modern society. As the patients are becoming more interested in traditional herbal medicines, the verification of their effects is needed. Phytotherapy in the most cases is supplementary, but it may augment the efficacy of the commonly used antihyperglycemic drugs. Goutweed is a perennial herb of the Apiaceae family that has been used in folk medicine for a long time. Our work is focused on the pharmacological study of goutweed preparations. Goutweed tincture renders protective activity in alloxan-induced diabetic mice, the tincture shows hypoglycemic properties under the conditions of metabolic disorders induced by fructose and hydrochlorothiazide in rats.

**Aim.** The aim of this work is to determine the efficacy of *Aegopodium podagraria* L. tincture and its combination with metformin in animals with the disorders of carbohydrate and lipid metabolism.

**Materials and methods.** Dexamethasone-induced model of the metabolic disorders was used. Oral glucose tolerance test was performed after the treatment of the animals with metformin, goutweed tincture or their combination. Glucose was measured in blood plasma samples using glucose oxidase method. The total area under the blood glucose curve was calculated using the trapezoidal method, the average glycemia value was also calculated. Given that glucose and lipid metabolism disorders are interrelated in the pathogenesis of metabolic syndrome and other “disease of civilization,” the same test was also performed in dyslipidemic animals.

**Results and discussion.** In dexamethasone treated rats, goutweed tincture combined with the respectively low dose of metformin increased the effect on the latter on the basal glycemia. In the oral glucose tolerance test the lowest area under glucose curve and average glycemia value were seen in these group. The efficacy of the investigated combination was also partially manifested in dyslipidemic animals (the reduction in area under glucose curve).

**Conclusion.** Goutweed tincture is able to partially increase the efficacy of metformin in dexamethasone treated and dyslipidemic rats. Further research is needed to establish the mechanisms of interaction.

**TRANSITION METAL DIAMINE COMPLEXES A NEW GROUP  
OF DRUGS FOR THE TREATMENT OF INFECTIOUS DISEASES CAUSED  
BY S.AUREUS AND MRSA**

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**Introduction.** Nosocomial infections involving *Staphylococcus aureus* and methicillin-resistant *S. aureus* (MRSA) continue to present major challenges in the whole world. While both *S. aureus* and MRSA infections occur more frequently amongst persons with weakened defences against infection in hospitals and healthcare facilities. But recently in the United States and Canada have been increasingly recorded cases of community-acquired infection MRSA. One strategy to combat these infections is to develop novel and effective anti-infective agents.

**Aim.** To explore potential new antibiotic group for treatment of purulent infections caused by MRSA.

**Materials and Methods.** The data from the literature search and study of new antibiotics, clinical trial information. ( но мне не нравится как это написано)

**Results and discussion.** A new group of drugs was discovered recently: Pentaalkylcyclopentadienyl ( $Cp^*R$ ) of 1,2-diamine complexes of transition metals. Investigated compounds containing Co, Ir. There were synthesized a series of compounds differing in the structure of the radical in the ligand. The transition metal–diamine complexes were measured by broth microdilution and reported as the MIC and MBC. Hemolytic activities of the transition metal-complexes as well as toxicity toward Vero cells were also measured. . The transition metal complex of  $Cp^*R$  Ir with cis-1,2-diaminocyclohexane, had strong antibiotic activity against *S. aureus* and MRSA (MIC = 4  $\mu\text{g mL}^{-1}$  , MBC = 8  $\mu\text{g mL}^{-1}$  ) strains and killed 99% of *S. aureus* cells in 6 hours. A cyclopentadienylcobalt complex of cis-1,2-diaminocyclohexane also showed significant anti-microbial activity against both *S. aureus* and MRSA strains.

**Conclusions:** The transition metal complexes described here show specific activity against *S. aureus* strains and lack activity against other microorganisms.

In addition, the specificity of the complexes that show activity indicates that there are specific structure/activity relationships that must be met.

The combination of high and specific activity for certain complexes, the low cytotoxicity as tested with Vero cells and the low hemolytic activity all suggest that this transition metal platform may prove to be useful in overcoming antibiotic resistance in *S. aureus*.

# THE STUDY OF THE IMIDAZOLE DERIVATIVES FUNCTIONALIZED WITH THE CARBOXYMETHYLTHIOL FRAGMENT ANTIOXIDANT ACTIVITY

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**Introduction.** The imidazole nucleus is a known structural fragment of many natural physiologically active compounds and effective synthetic medicinal products, which are characterized by a wide range of pharmacological properties, among which the antioxidant activity deserves special attention. But despite the considerable synthetic and biological potential of the imidazole nucleus the methods of synthesis and the properties of this heterocyclic type had not been adequately studied yet.

**Aim of the study.** The search of new biologically active compounds with antioxidant activity among the imidazole derivatives functionalized with the carboxymethylthiol fragment.

**Materials and methods.** Previously in the department of medical and pharmaceutical chemistry we synthesized a number of imidazole derivatives functionalized in the position 4 with carboxymethylthiol fragment, and in the position 5 – with the formyl group, [(1-aryl-5-formyl-1*H*-imidazole-4-yl)thio]acetic(propanoic) acids and [(1-arylimidazole-5-yl)methylthio]alkane carboxylic acids in particular. The antioxidant activity of the synthesized compounds was studied in the *in vitro* system by the value of inhibition of the rate of Fe<sup>2+</sup>-ascorbate dependent free radical oxidation of endogenous lipids of the rats' liver (by the decrease of malonaldehyde content in the studied samples – one of the final products of lipid peroxidation). The content of malonaldehyde in the samples was determined by the reaction with the thiobarbituric acid.

**The results of the study** have shown that in the *in vitro* system all of the studied original compounds in the range of concentrations 10<sup>-1</sup>-10<sup>-3</sup> mol/L inhibit the Fe<sup>2+</sup>-ascorbate induced free radical oxidation of lipids and demonstrate a pronounced antioxidant activity. The highest antioxidant activity *in vitro* was shown by the [(1-phenyl-5-formyl-1*H*-imidazole-4-yl)thio]acetic acid. At the same time it was determined that the increase of methylene groups' quantity in the carboxyalkylthiol fragment does not significantly influence the antioxidant activity of the synthesized compounds.

**Conclusions.** The [(1-phenyl-5-formyl-1*H*-imidazole-4-yl)thio]acetic acid is the most promising compound for the further research of antioxidant activity in the wider range of concentrations *in vitro* and in the *in vivo* system.

## MENTAL AND PHYCOSOCIAL STRESS

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**Introduction.** Stress is the attempt of organism to regenerate the balance, to recover from unusual events, to keep stability of organism internal parameters (homeostasis) against the influence of bad agents. Nowadays the amount of information is increasing, the temp of life is speeding up, long intellectual and mental load has a big influence on people. All these facts are factors which cause psychoemotional and phycosocial stress. Using modern complicated technology and machinery very often causes small and big catastrophes, traffic delays, electric power breaks, connection cessations. It is known that 72-80% of car crashes and 70% air crashes happen because of guiltiness of human.

**Aim.** The aim of our research was to analyse the cause and sequence of psychoemotional and phycosocial stress by using literature sources.

Negative emotional reactions are caused by long conflict situations, difference between expectation and reality, sometimes by responsibility of making a decision. Psychological multiple manifestations can be low self-appraisal, which in future can overgrow into depression, state of anxiety and terror. Anxiety is the psychological state as a result of stress. It appears because of internal conflict. This is a complicated emotional state, important component of neural and psychical changings. Women have this general mental disorder more often than men. Neurosis is the neuropsychic dysfunction which appears as the attempt of organism to go round stressful situation instead of comprehension of the problem and finding the solution. Genetic predisposition is the main factor which causes neurosis. Women have a depression more frequently. At the same time men oftener find way out in abuse the alcohol, drugs, absence from work. There are two types of depression: reactive (as manifestation of heavy psychoemotional stress and it is curable) and endogenic (depends on psyche asthenia and sometimes cannot be treated). Symptoms of depression are loss of energy, weight, interest for life. The heaviest sign is mental retardation.

Physical and behaviour manifestations of psychoemotional stress are headache (migraine), backache, insomnia, muscle contraction, stomach dysfunctions (diarrhea), dysmenorrhea, amenorrhea, perspirations, tachycardia, raised arterial tension, overeating (bulimia) or anorexia (absence of appetite).

In the second World War in blockade Leningrad frequency of hypertonic decease grew up in five times compere to pre-war times mainly because of psychical

stress. Ulcer of stomach almost disappeared among inhabitants of Leningrad during the blockade.

**Results and discussion.** According to preset analysis of American scientists stress at work is one of the heaviest. It is less only than stress which is caused by the death of close relative. In table 1 it is presented information which shows the degree of stress in provisional units due to the influence of psychoemotional and phycosocial stress in different situations.

**Tab. 1**

Occurrence	Degree
Death of wife (husband)	100
Divorce	73
Separate living	65
Imprisonment	63
Death of close relative	63
Personal trauma or disease	53
Discharge	50
Reconciliation of married couple	47
Loneliness	45
Relatives disease	44
Pregnancy	40
Sexual problems	39
Change of financial status	38
Death of close friend	37
Change in work conditions	36

**Conclusions.** It was analysed the cause and sequence of psychoemotional and phycosocial stress by using literature sources and discovered that character and stage of organism reactions for influence of external facts depend on the nature and power of factors, original functionary stage of organism, level of its reserve abilities, daily and season variation of functionary stage. The heaviness psychoemotional and phycosocial stress appears not only because of external conditions, but because of internal human particularity, neuropsychic individual and typological characteristics of individuality.

# DICLOCOR SHOWS SUPERIOR CHONDROPROTECTION COMPARED TO DICLOFENAC SODIUM IN A MORPHOLOGICAL STUDY ON THE MODEL OF STERIOD OSTEOARTHRITIS IN RATS

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**Introduction.** Safety of nonsteroidal anti-inflammatory drugs (NSAIDs) remains a troublesome problem justifying research of new pharmaceutical compositions. Diclocor (D) is a combination of diclofenac sodium (DS) and a flavonol quercetin (Q). Since one of the indications for its use may be osteoarthritis, it was crucial to see how D influences joint cartilage on the model of this pathology.

**Materials and methods.** 50 rats, divided into 5 groups, were used for the experiment. Steroid osteoarthritis was induced in 40 of them by triple intramuscular injection of dexamethasone at a dose of 7 mg/kg with one-week intervals between the injections. Three groups were treated with D, DS, and Q for 4 weeks accordingly; one group was left untreated; and one group comprised of intact animals. After the treatment course, we performed microscopy, morphometric calculations, and semiquantative assessment.

## Results and discussion.

Study group	Dose, mg/kg	Cartilage thickness, conv. units	Cell density on a conv. area unit	Sum of points (semiquantative assessment)	Occurrence of pathological changes, %
Intact	—	15.33±1.15	42.40±5.64	24.46±0.22	—
Control pathology	—	12.62±0.58	28.63±1.85	12.68±0.85	100.0
D	17.8	15.73±0.59	35.83±4.31	20.19±0.93	50.0
Q	11.0	15.66±1.35	32.67±2.48	18.09±0.94	60.0
DS	6.8	13.77±0.52	32.20±3.02	14.66±0.95	80.0

The preparations from the D group were the closest to the intact with 50% of the samples almost with no pathological changes and other 50% with only mild decrease in cell density, loss of zoning, enhanced chondrocyte proliferation, usuras, focal cartilage destruction, and pathological vascularization. In the DS group, same types of pathological changes occurred in 80% of the samples and had a more profound character; moreover, unlike in the D group, the examination showed degenerative and dystrophic cell abnormalities. The Q group samples were in-between the two above mentioned groups.

**Conclusions.** D has advantages over DS in normalizing cartilage structure on the model of steroid osteoarthritis in rats owing to the presence of Q in its compound. D is a promising pharmaceutical combination and is apt for further evaluation.

## ROLE ADRENAL ANDROGENS IN HUMAN

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**Introduction.** Dehydroepiandrosterone (DHEA) and its sulfated analog (DHEAS) are steroid hormones (adrenal androgens) made in the adrenal cortex in zona fasciculata. DHEA is the major secretory product of the fetal adrenal, leading to high circulating DHEAS levels at birth. In parallel with the postpartal involution of the fetal zone of the adrenals, DHEAS serum concentrations decrease to almost undetectable levels during the first year of life. Levels remain low until they gradually increase again between the sixth and tenth years of age, owing to increasing DHEA production in the adrenal zona reticularis (innermost steroidogenic zone), a phenomenon termed «adrenarche».

**Aim.** To establish the basic biological effects and applications of DHEA.

Peak DHEAS concentrations are reached in early adulthood, followed by a steady decline throughout adult life, so that at 70–80 years of age, peak concentrations are only 10–20% of those in young adults. The age-related decline in DHEAS concentrations shows high interindividual variability, and is accompanied by a reduction in the size of the zona reticularis. DHEA exerts its action either indirectly in peripheral target tissues of sex steroid action (following its conversion to androgens, estrogens or both) or directly, as a neurosteroid (via interaction with neurotransmitter receptors in the brain). Numerous animal experiments suggesting that DHEA is a multifunctional hormone with anti-cancer, immune-enhancing, neurotropic and general anti-aging effects.

Low levels of DHEA are associated with aging and cardiovascular disease in men, and an increased risk of premenopausal breast and ovarian cancer in women, impaired cognitive function, and compromised immune function. With this decline

may also come a concurrent reduction in protein formation, a decrease in muscle mass, and an increase in body fat.

**Result.** Potential benefits from DHEA supplementation: supporting immune function, maintaining cognitive function, elevating mood and sense of well-being, reducing fat mass and maintaining lean body mass, maintaining healthy lipid levels and overall cardiovascular health, normalizing glucose metabolism, sexual interest and satisfaction with both mental and physical aspects of sexuality.

**Conclusions.** DHEA is a steroid hormone that plays an important role as an indirect intermediate to androgens and estrogens in the body. DHEA supplementation may be beneficial for older individuals or those with endocrine deficiencies.

## **PROSTATE PROTECTIVE ACTIVITY OF BROCCOLI EXTRACT**

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**Introduction.** Chronic prostatitis (CP) is still quite common and poorly understood pathology. It is most often affects middle, reproductive age men causing violations copulative and generative functions, and in the late reproductive and postreproductive periods combined with benign prostatic hyperplasia (BHP) and may be the cause of prostate cancer (PC) pathology. Common approaches to the treatment CP are still not generated, and the drugs used for its treatment, have a wide range of side effects. Considering anatomical location of the prostate, rectal dosage forms shows better results. This is due to the greater bioavailability by "directional" administration of the drug to effector organs. Violation of local blood flow is one of the main pathogenic mechanisms of prostate diseases. Rectal form less susceptible to this factor and therefore are optimal for long-term treatment.

In view of the foregoing is proceed active search for modern, efficient and safe medicines for the treatment of CP and BHP. Such means may be a suppository with extract of broccoli (*Brassica oleracea*). The main active agent of broccoli extract is indole-3-carbinol; it increases the efficiency of the detoxification system and slowing the aging process. Also, the effectiveness of the using herbal remedies from broccoli has been shown experimentally in the treatment of BHP and PC.

The **aim** of our investigation is development of new effective means for the treatment of CP and protective prostate activity.

**Materials and methods.** We studied the acute toxicity of the broccoli extract and suppository mass. In the experiment we used male white rats WT 200-250 g. We divided it over 5 groups. According to the experiment plan, first group of animals intragastrically administered broccoli extract in a dose of 5000 mg/kg, second - intraperitoneally, broccoli extract in a dose of 1000 mg/kg, third - rectal suppository mass in a dose of 5000 mg/kg, fourth - oral, suppository mass at a dose of 5000 mg/kg and fifth group - intact control. Within 14 days was carried out daily monitoring of animal body weight. At the end of the period we made the macroscopic morphological assessment of the substances influence and determine mass coefficients of internal organs.

**Results and discussion.** The experiment found that the broccoli extract and suppository mass does not have the toxic effects of in a single administration. Internal organs mass coefficients of animals in groups 1-4 were not different from intact control group. All animals in all groups were alive. In this regard, the determination of the LD50 dose has no relevance.

**Conclusion.** Thus, the broccoli extract refers to class 4 toxicity and a promising pre-clinical studies of prostate protective activity.



# NANOCHROMIUM CITRATE EFFECT ON THE ACTIVITY OF THE HEART AND SYSTEMIC HEMODYNAMICS

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**Introduction.** Chromium as a trace element plays an important role in the metabolism and functioning of organs. Nanoparticles of chromium may be prospective to be used in medicine.

**Aim.** To examine the effect of nanochromium citrate on the indices of heart activity and systemic hemodynamics in an acute experiment.

**Materials and methods.** The study has been conducted on 12 chinchillas of both sexes with their body weight of  $3.2 \pm 0.2$  kg. Catheterization of the left ventricle of the heart and femoral artery was carried out, the electrodes in three standard leads were applied, ECG and cardiohemodynamic parameters such as maximal pressure in the left ventricle, systolic arterial pressure (AP), heart rate (HR), blood volume per minute, were registered by means of the device HP Viridia Component Monitoring System («Hewlett Packard», USA) against urethane narcosis. Stroke blood volume, cardiac index, general peripheral vascular resistance, systolic index, heart discharge, working index of the left ventricle, working stroke index of the left ventricle were calculated. Registration and calculation of cardiohemodynamic indices were performed every 15, 30, 60 minute after injecting nanochromium citrate (NCC, 900 mg/L, Ltd «Nanomaterials and Nanotechnologies, Kyiv»).

**Results and discussion.** The analysis of cardiohemodynamic indices in the process of successive fractional intravenous injecting of NCC evidenced that NCC in the doses of 0.9 mg/kg and 2.7 mg/kg does not cause any considerable disorders in the activity of the heart and systemic hemodynamics. In case of repeated, 30 minutes later, injection of NCC in a similar dose (2.7 mg/kg) which constituted total 6.3 mg/kg from the first injection, systolic AP dropped on 6.1% in 15 minutes, and in 60 minutes – on 10% as compared with the initial level. 30 minutes later blood volume per minute decreased on 7.2%, cardiac index and heart discharge – on 6.8%. Working and stroke index of the left ventricle decreased on 12-13%, which is indicative of reduced pumping function of the heart. Although, reduction of these indices appeared to be statistically invalid in comparison with the indices of the control animals that were injected with the equivalent by its volume 0.9% NaCl solution at the same time.

**Conclusion.** Nanochromium citrate under conditions of an acute experiment against urethane narcosis does not cause reliable changes of the indices of the systemic and cardiohemodynamics as compared with the initial level of the experimental animals and appropriate indices of the control narcotized animals.

# THE PHARMACOLOGICAL STUDY OF CARBONE DIOXYDE ACTION ON THE MODEL OF TURNEPTINE DERMATITIS IN RATS

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**Introduction.** Dermatitis is inflammation of the skin that develops on the site of the direct effects of physical and chemical environmental factors. Carboxytherapy is a real breakthrough in modern dermatology. CO<sub>2</sub> is very important product of an exchange which is necessary for normal organism's activity. Throughout the world, this technique is becoming the most popular way to rejuvenate the skin.

The **aim** of that research was pharmacological study of carbon dioxide action on the model of non-allergic contact dermatitis.

**Materials and methods.** Research was carried out on 18 rats Wistar breed, 150-180 g weigh. Rats were divided into 3 groups: the first – positive control, the second – the animals injected by CO<sub>2</sub> at a dose of 0.6 ml on a background of the model pathologies, the third – animals who is obtained combined treatment (CO<sub>2</sub>-injection (in a dose 0.6 ml) and applied ointment with ethonium (20 mg/cm) on the background of the model pathology. Pathology model reproduced by the application turpentine on pre depilated skin of rats during 10 days. As a result developed dermatitis, accompanied with expressive inflammation (hyperemia, swelling and peeling) with the formation of ulcers at the site of turpentine application. At 11<sup>th</sup> day of experiment was started treatment by CO<sub>2</sub> and the ointment of ethonium. Activity of researched substances was evaluated by the ability to reduce the skin fold thickness (SFT) and intensity of inflammation.

**Results and discussion.** On the peak of disease (10<sup>th</sup> day of the experiment) SFT increased by 4.5 times compared with the original data. On the 13<sup>th</sup> day of the experiment in the second group of animals SFT decreased in 1.7 times, and in the third – in 1.9 times relative to the peak of disease, which exceeded the spontaneous healing in group positive control in 2 times. On the 15<sup>th</sup> day of experiment it was observed reduction of SFT in 2,5 time in a group of animals treated with CO<sub>2</sub>, and in 3 times in the group of rats treated with a combination of CO<sub>2</sub> and ointment with ethonium. Complete healing of animals was observed on 16<sup>th</sup> days of research in the third group, 17<sup>th</sup> – in the second, and in the first – 20<sup>th</sup> day, which testifies about a decrease of intensity of the inflammatory process.

**Conclusions.** Thus, this study established CO<sub>2</sub> anti-inflammatory activity as monotherapy agents, or the combined use of it with ethonium ointment, which is making carboxytherapy perspective method of treatment of inflammatory skin diseases.

## STUDY OF ANTIPHLOGISTIC ACTIVITY OF THE LIQUID EXTRACT "HEMOSTAT"

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**Introduction.** According to the literature of folk medicine herbs of knotweed (*Polygonum aviculare* L.), smartweed (*Polygonum hydropiper* L.) and nettle (*Urtica dioica* L.) have long been widely used with astringent, diuretic, antiphlogistic and antimicrobial, styptic effects, as well as in renal diseases. Preparations of knotweed, smartweed and nettle contain flavonoid compounds (avicularin, quercetin, isorhamnetin, myricetin, cempferol, luteolin) flavonoids derivatives (ramnazin, giperozid), tannins, phylloquinone, vitamin B<sub>2</sub>, B<sub>6</sub>, C, E, K, carotene, pantothenic acid, coumarins, chlorophyll and essential oils, mucus, fat, sugars, compounds of silicic acid, significant quantities of trace elements iron, copper, vanadium, calcium, magnesium and silver. Taking into consideration above mentioned data we studied the antiphlogistic activity of the liquid extract obtained from herbs knotweed, smartweed and nettle under code-name "Hemostat".

**Aim.** The aim of research is to investigate the anti-inflammatory activity of certain liquid extract.

**Materials and methods.** In the first series of experiments the effect of the liquid extract "Hemostat" on the course of inflammation caused by a variety of releasing stimulants, as well as on the individual phases of inflammation was studied.

The study of antiphlogistic activity was experimented on mice weighing 19-21g and rats weighing 160-198 g of both sexes according to F.P.Trinusa's method on the aseptic arthritis models induced by injecting 2% formalin solution in the amount of 0.15ml in the dorsum ankle of rats. Antiphlogistic activity of studying drug "hemostat" was judged according to the methodology used for the size of the volume of the legs of control and experimental animals, which were measured by oncometric mode. The liquid extract was administered orally at a dose of 4 mg/kg as a suspension. For comparison, a well-known antiphlogistic drug of herbal origin glycyram 50 mg/kg. (50 glycyram mg. №50, producer: Vifiteh Company; №10024773) was taken.

In the first series of experiments on rats the effect of the liquid extract "Hemostat" on inflammation caused by formalin is studied. Experiments were performed on 24 rats weighing 160-172 g of both sexes. In this group of animals liquid extract in a dose of 4 mg/kg was orally input, consequently the comparable formulation of glycyram - 50 mg/kg.

**Results and discussion.** If the rats of the control group the average increase in the volume of paws relative to the baseline level at a height of formalin inflammation is 100%, the test groups influenced by the collecting the liquid extract "Hemostat" in dose of 2 mg/kg, this figure is 66.4%, and 4 mg/kg - 68.1%. Hence, the antiphlogistic effect is equal to respectively 34.6% and 32.9%. Under similar conditions, a well-known drug in the studied doses glycyram reduces the swelling of rats' legs to 63.5%. In this antiphlogistic effect glycyram was 38.5%. Therefore, studied medication "hemostat" at indicated doses approximately in equal level influences on the inflammation caused by formalin. The obtained experimental results are shown in Table 1.

**Table 1**

Influence of the liquid extract "hemostat" on inflammation caused by formalin

№	Investigated medications	Doses mg / kg	Average volume of rat paw		The increase of rats' paws volume relative to the control group		anti-inflammative effect in%
			Exodus data	After 4h as formalin was input	In ml	In%	
1.	The control group distilled water	1 ml	0.75	1.51	0.76±0.03	100	---
2.	Studied drug	2	0.76	1.26	0.49±0.02*	66.4	34.6
3.	Studied drug	4	0.75	1.26	0.51±0.03*	68.1	32.9
4.	Glycyram	50	0.76	1.05	0.29±0.02*	63.5	38.5

Note: \* Reliable data relative to the control when P < 0.05

Designed by Saydalieva F. A.

As can be seen from the table №1 liquid extract from the collection of knotweed, smartweed and nettle has an essential antiphlogistic impact, and in this respect it is not inferior to the known drug glycyram.

**Conclusions.** The antiphlogistic effect of liquid extract is equal to respectively 34.6% and 32.9%. Thus, we can conclude that the studied liquid extract "Hemostat" has pronounced antiphlogistic effects in models of inflammation caused by formalin. Antiphlogistic effect of the drug is inhibition of proliferation stage of exudation and inflammation.

# THE INFLUENCE OF COMPLEX SUBSTANCE OF NICKEL WITH PYRIDOXINE AND NICOTINAMIDE ON BLOOD SUGAR LEVEL AND PERIPHERAL BLOOD STATE, AS WELL AS TOXICITY OF COMPLEX

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**Introduction.** The research of new therapeutic agents that include organic compounds still remains the main focus of modern pharmacology. Recent studies have shown the prospects of creating original drugs based on metal complexes. It is known that in many cases the set of trace elements and biological active ligands in complex compounds lead to a reduction of toxicity and increment of pharmacological activity of drugs.

**Aim.** The main target of our research is to study the impact of complex substance on blood sugar level and peripheral blood state, consequently the toxicity of complex.

**Materials and methods.** The effect of complex on the blood sugar level was studied in the experimental conditions. Experiments were carried out on the rats of both sexes weighing 160-187 g. The hypoglycemic activity of the preparation was investigated by the method of experimental hyperglycemia induced by the injection of a hypertonic glucose solution at a dose of 4.5 g/kg. The complex substance was administered orally, 45 minutes before the administration of glucose at the dosage of 25 and 50 mg/kg. After that, the level of blood sugar was determined by the enzymatic method at 60 and 120 minutes. The impact of the drug to the number of reticulocytes in peripheral blood and hematopoiesis were studied in laboratorial conditions. The complex matter was given orally at a dose of 15 and 25 mg/kg during the 10 and 21 days. The general effect and toxicity of the complex were studied in laboratory mice of both sexes weighing 18-22 grams and contained in the normal diet of the vivarium. The drug was administered orally by a metal probe in doses of 50-100 mg/kg and 250-1000 mg/kg.

**Results and discussion.** It was found that the drug has a significant hypoglycemic effect. After the administration of the drug at a dose of 25 mg/kg the blood sugar level reduced by 32.1% (Table 1).

It was established that the drug given orally at a dose of 15 and 25 mg/kg increased the amount of reticulocyte in peripheral blood to 155-171%. It was revealed that studied the drug in doses of 25 and 50 mg/kg significantly stimulates hematopoiesis. On the 10's day of the drug administration the number of red blood cells and white blood cells in peripheral blood increased markedly, but the amount of hemoglobin remained stable at the level of the physiological norm (Table 2).

**Table 1**

## The influence of drug to the blood sugar level of rats

№	Group of animals	Initial rate of sugar on blood, in		Dose of preparation	The amount of animals in group	The rate of sugar in blood after			
						60 minutes, in		120 minutes, in	
		mmole/l	%			mmole/l	%	mmole/l	%
1	Control	4.2±0.5	100	1ml dist. water	7	7.6±0.63	180.9	5.3±0.35	126.2
2	Preparation	4.2±0.5	100	25 mg/kg	7	6.25±0.33	148.8	4.55±0.3	108.3

Table 1. Designed by Shamshiddinova M.

**Table 2**

## The impact of preparation to the peripheral blood condition

№	Blood rate	Initial data	The peripheral blood condition after the drug administration, in			
			10 days		21 days	
			Control	25 mg/kg	Control	25 mg/kg
1	Hemoglobin in %	12.6±0.25	12.5±0.25	12.7±0.40	11.9±0.35	12.5±0.51
2	Erythrocyte in mln.	5.5±0.31	5.6±0.25	6.7±0.45	5.3±0.35	6.75±0.35
3	Leukocyte in thous.	8.6±1.2	9.0±1.1	12.0±0.90	8.8±0.85	12.3±1.0

Table 2. Designed by Shamshiddinova M.

Studies have shown that there weren't induced any kind of adverse reactions when the drug administrated to mice in doses of 50-100 mg/kg. With increment of drug dosage to 250-1000 mg/kg there were occurred tachycardia, a slight decrease in motor activity of heart and a slight acceleration of the frequency of breathing. Some of mice died after 2.5-3 hours after the administration of the drug.

As a data of statistical processing of the results found that the LD<sub>50</sub> of this complex compound is equaled to 799.5 (673.4 ÷ 948.7) mg/kg.

**Conclusions.** The results of our research reveal that the drug significantly reduces the blood sugar level in hyperglycemia induced by hypertonic glucose solution. Moreover, the drug markedly increases the number of red blood cells and white blood cells in the peripheral blood.

# INVESTIGATION OF PSYCHOTROPIC (ANXIOLYTIC) ACTIVITY OF VAGINAL GEL WITH HOP EXTRACT AND LACTIC ACID IN FEMALE RATS WITH ESTROGEN DEFICIENCY

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**Introduction.** The significant place in the menopausal syndrome takes psycho-emotional disorders from 50 to 70% - according to literature. Psychosomatic disorders, difficulty of adequate evaluation and correction in menopausal women evidence the fact that this issue is important today. Severe symptoms of menopausal syndrome at violation of psycho-vegetative sphere appear in the early post-menopause, due to final termination of ovarian function and sharply deficiency of estrogens during this period.

The leading role in the adaptive behaviour of the woman's body belongs to the autonomic nervous system, which under restrictions of endocrine alteration and deficiency of sex hormones is experiencing severe strain, which depend to anatomical and functional proximity of higher vegetative centers, structures of psycho-emotional responsibility and centers of reproductive function regulation. Taking into account the wide range of contraindications to substitutive menopausal hormone-therapy and cautious attitude to it, especially in light of recent WHI (Women Health Investigation), there is a need for continue research of non-hormonal therapy of psychosomatic disorders in menopausal disorders.

Relative contraindications to hormone replacement therapy, which require in-depth examination of patients is hypertension, cholecystitis, cholelithiasis, pancreatitis, pronounced swelling of cardiac and renal origin, and allergy to specific estrogenic drugs. In this regard, the use of preparations containing phytoestrogens, is very relevant. Phytoestrogens have similar to the endogenous estradiol-17- $\beta$  molecular weight and chemical structure, therefore they interact with the estrogen receptors.

**Aim.** The objective of this study is to examine the anxiolytic properties of new vaginal gel with hop extract and lactic acid in female rats with hypo-estrogenism.

**Materials and methods.** Simulation of estrogen deficient state in animals, which are close to such in women in menopause period, was reproduced in bilateral spayed rats with a mass of 190-260 g according Kirshenblat Ya. D. Sham operated animals have been subjected to laparotomy and wound suturing without removal of ovaries.

The animals were divided into 5 groups: intact control; sham operated female; control pathology; spayed rats treated with vaginal gel with hop extract and lactic

acid; spayed animals treated with the comparator agent - vaginal suppositories "Ovestin" containing estriol. Studying drugs were being administered during 28 days after spaying: studying gel in a dose of 0.06 mg/kg, suppositories "Ovestin" - 0.03 mg/kg. The tested combined gel, the main active ingredients of which are hop extract, lactic acid and auxiliary substances, has been developed at D.P. Salo pharmacy drug processing department of the National University of Pharmacy with the lead of Professor L.I. Vishnevskaya.

On the basis of "elevated plus maze" test influence of preparations by vaginal administration on the manifestation of anxiety in the animals was studied. The animal was placed in the center of the maze and its movement was being registered for 5 minutes. Anxiolytic properties were estimated by factors of: the latent period of entry into dark sleeve (s), the length of stay in light sleeves (s), the length of stay in dark sleeves (s) and the number of transitions. Obtained results were processed by the method of variation statistics with using of standard package program "Statistica 6.0", inter-groups differences was estimated by Student t-test. Differences at  $p < 0.05$  were considered as statistically significant.

The studies were conducted in compliance with the rules of the "European Convention for the protection of vertebrate animals used for experimental and scientific purposes" (Strasbourg, 1986).

**Results and discussion.** The received data show the lack of statistically significant differences between the results of investigations in animals of the intact control groups and sham operated female rats. Spayed rats of control pathology group had aggravating anxiety state and sharply decreased exploratory activity. Thus, input parameters of the latent period of entry into dark sleeve were 5 times less, and length of stay in light sleeve was 2 times higher than of intact animals. The increased anxiety was indicated with 3.5 times less transitions between sleeves of maze compared to the control intact group.

Vaginal administration of the gel with hop phytoestrogen and lactic acid resulted in recovery of mental and emotional condition of the animals and appearance of moderate anxiolytic activity. Duration of stay of rats in dark and light sleeves of the maze and the lack of differences between these indicators in comparison with healthy animals indicated the normalization of their estimated research reflexes. At the same time, the most complete reduction of anxiety state and restoration of research activity were observed in rats, treated with the comparator agent – "Ovestin" vaginal suppositories.

**Conclusions.** The studied drugs showed almost the same degree of severity of anxiolytic action and normalizing effect on orienting-exploratory activity of animals against the background of the experimental spaying rats.



## **APPLIED USE OF CARBON DIOXIDE IN COSMETOLOGY**

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**Introduction.** Striae are a specific form of scar tissue that is formed as a result of damage (breaks) of collagen and elastin fibers. Striae hardly respond to treatment by any method of correction. Popular retinoid therapy or microdermabrasion or laser skin resurfacing have no significant effect. In addition, laser therapy is unsafe for people with dark skin or with a predisposition to cancer.

**The aim** of that work is familiarization with a new method of therapy. Invasive and non-invasive carboxytherapy is the available, effective and safe (for all skin types) treatment of a new and old of striae by restoring collagen fibers.

The mechanism of action of carboxytherapy in striae treating includes several biochemical processes. Carbon dioxide stimulates blood circulation and increases the release of oxygen by means of oxyhemoglobin, tissues has a powerful incentive to regeneration. The subcutaneous tissues after a few sessions of carboxytherapy are restructured: fibrous commissures are destroyed, homogeneity of supporting tissues are achieved. In addition, carboxytherapy activates the synthesis of collagenase, elastin and hyaluronic acid by stimulating of fibroblast function. On this mechanism it is based most pronounced aesthetic result of carboxytherapy increase of skin elasticity.

Opinions about carboxytherapy of patients with striae are positive in 98% of cases. Carboxytherapy improves the state of various types of scars after 1-2 procedures: acne, less traumatic and postoperative. CO<sub>2</sub> improve the local vascularization, promotes oxygenation and softening striae.

Regime of administration: for fresh striae requires from 2 to 4 sessions of carboxytherapy with a break for a week; for striae, that more than a year, it takes 3-4 sessions carried in a month, the course of 8-12 sessions, the depth of administration is 5-6 mm.

Carbon dioxide is non-toxic natural metabolite of our body. Therefore, in the application of CO<sub>2</sub> have not been identified serious side effects. The first few seconds after a session is possible burning and heat sensation, itchiness in the place of injection. Treatment of striae is relatively painless because it has no nerve endings. A person can feel the pressure in the CO<sub>2</sub> injection field.

In **conclusions** carboxytherapy is a method of aesthetic treatment based on an effective and non-toxic naturally occurring metabolite of the body which is becoming popular day by day and used for the treatment of striae and other skin diseases.

# PLACENTAL FACTORS PROTECTS NEURAL CELLS FROM GLUTAMATE-INDUCED TOXICITY

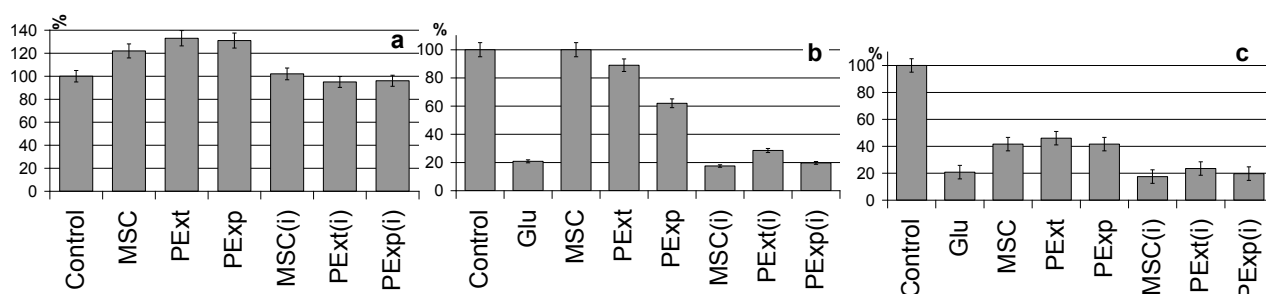
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**Introduction.** Age-related diseases of the nervous system, including Alzheimer's disease is predicted to double every 20 years, affecting more than 80 million people worldwide by 2040. In women, a sharp increasing of morbidity is associated with menopause. Neuroprotective and geroprotective effects of estrogen, mesenchymal stem cells, adipose tissue, placental extract were shown.

**Aim.** The aim of study was to investigate the neuroprotective effect of placental factors.

**Materials and methods.** A model of glutamate-induced neurotoxicity in rats fetal neural cells was used. Cells were damaged by 10mM glutamate (Glu) for 24 h. Cells were treated by placenta derived mesenchymal stem cells conditioned media (MSC), placental explants conditioned media (PExp), 10% placental extract (PExt). Viability was measured by MTT test. In different experiments cells were treated before glutamate, after glutamate. Thermal inactivated (i) substance was used as control.

**Results and discussion.** Native, but not inactivated MSC, PExp, PExt increase the viability of neural cells (fig. a). MSC, PExp, PExt, used before glutamate shows significant neuroprotective effect (fig. b). MSC, PExp, PExt, used after glutamate shows less effect (fig. c). Inactivated MSC, PExp, PExt have not effect on cells. To correctly compare the effectiveness of the test substances is necessary to select suitable concentrations.



**Conclusions.** Placenta derived MSC, explants and extract have neuroprotective effect, caused by thermolabile substances, likely proteins or peptides.

## STUDY OF MEMBRANOSTABILIZING ACTIONS OF HERB OF BIDENS TRIPARTITE

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**Introduction.** According to modern data search for new medicines in plant materials is actually because a herbal medicines have fewer side effects and equal synthetic drug activity. Most modern drugs are synthetic origin and may cause and positive pharmacological effects and side effects. Herb of bidens tripartite take up an important place in traditional medicine and scientific research confirmed properties about their use as alternative therapy. Evaluation of the chemical composition of this plant has revealed the presence of flavonoids, xanthophylls, volatile oil, acetylene and polyacetylene, sterols, aurones, chalcones, caffeine and tannins. Tannins of bidens tripartite, of which 66% are polyphenols, may contribute to membrane stabilizing properties. Therefore it was expedient to study the membranestabilizing action of powder from herbs and the stems and tincture of herb of bidens tripartite.

So, the **aim** of this work is studying of membranestabilizing action of powder from herbs of bidens tripartite (PHBT) in doses 50 mg/kg and 150 mg/kg, of powder from stems of bidens tripartite (PSBT) in doses 50 mg/kg and 150 mg/kg and of tincture of herb of bidens tripartite (THBT) in doses 0,1 ml/kg and 0,2 ml/kg after 2 week administration in laboratory animals. Known that damage cell membranes of tissues and organs causes a disturbance of their functions and development of the disease. So, was studied membrane stabilizing effect of PHBT, PSBT and THBT in method of erythrocyte hemolysis (Jager F. C.).

**Results and discussion.** It was found that PHBT in doses 50 mg/kg and 150 mg/kg have membrane stabilizing effect in 29% and 54% respectively which increases with grows of the dose values. Membrane stabilizing activity of PSBT in doses 50 mg/kg and 150 mg/kg is 22% and 28% respectively. Membrane stabilizing activity of THBT in doses 0.1 ml/kg and 0.2 ml/kg is 5% and 16% respectively. Analysis of these data showed that the most powerful and meaningful membrane stabilizing activity in 54% demonstrated the PHBT in a dose of 150 mg/kg. It shows that only the PHBT may be effective for the treatment of diseases pathogenesis of which is have damage to cell membranes (inflammatory diseases of the respiratory and GI tract, liver, kidney, hart, skin, metabolic disorders and others).

**Conclusion.** So, the powder of herbs of bidens tripartite is promising for further study in order to create a new effective and safe drugs for use in medical practice.

# THE STUDY OF FETOPROTECTIVE ACTIVITY OF CHOPHYTOL ON THE MODEL OF THE SEROTONINE-INDUCED PLACENTAL DYSFUNCTION

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**Introduction.** Most pregnancy complications accompanied by the development of placental dysfunction (PD), has a multifactor nature, and can lead to perinatal loss and fetal growth retardation. Gravidoprotectors are used for the prevention and treatment that normalize fetogenesis and save a pregnancy. Study of the new safe and effective fetoprotectors are actual issues of the modern reproductive pharmacology.

**Aim.** The study of Chophytol fetoprotective action on the model of the placental dysfunction caused by serotonin hydrochloride. Materials and methods. Placental dysfunction caused by subcutaneous administration of serotonin hydrochloride (SHh) on pregnant female rats in dose of 2.5 mg / kg from the 13th to the 17th day of gestation. Chophytol (Lab. Rosa-Phytopharm, France) was injected into health care regime intragastric 50 mg / kg from the 11th to the 19th day of gestation. The effectiveness of Chophytol fetoprotective action on fetogenesis has been evaluated: the number of viable fetuses, the rate of the postimplantation fetal death (PIFD), weights of the fetus and placenta, fetus cranio-caudal size (CDS). Statistical analysis of the results was performed using parametric (Student's criterion adjusted Bonferoni), non-parametric methods (Mann-Whitney criterion), Fisher's exact method using «Statistica 5.0».

**Results and discussion.** It was established that after the SHh administration, there was 10 times increase PIFD, reduction of the viable fetus number, their weight and CDS, and the masses of the placenta in the pathological.

The application of Chophytol reduced the rate of PIFD in 6.6 times, leading to an increase in the number of viable fetuses in 2.5 times. It normalized the biometric indicators of physical development and increased the fetuses weight, increasing their CDS and placentas mass.

**Conclusions.** It has been established that the fetoprotective properties of Chophytol on the model of placental dysfunction is caused by the introduction of serotonin.

## IN VITRO STUDY OF ANTIMICROBIAL ACTIVITY OF SOME SALVIA OFFICINALIS EXTRACTS

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**Introduction:** Infectious diseases are the second on mortality worldwide according to World Health Organisation data. The improvement of the treatment of infectious diseases is an urgent medical and pharmaceutical problem. From year to year, the number of antibiotic-resistant strains of the main agents of these diseases is growing. Representatives of the genus *Salvia* are known to have good antiseptic and anti-inflammatory qualities.

**Aim:** The aim of the present work was to investigate antimicrobial activity of water dry *Salvia* extract, 50% and 96% ethanol *Salvia* extracts.

**Materials and methods:** The study of the antibacterial activity was performed by the method of diffusion into the agar. According to the WHO recommendations for assessing the activity of drugs, the reference strains of *Staphylococcus aureus* ATCC 25923, 6538 *Staphylococcus aureus* ATCC, *Escherichia coli* ATCC 25922, *Proteus vulgaris* NSTS 4636, *Pseudomonas aeruginosa* ATCC 27853, *Pseudomonas aeruginosa* 9027 ATCC, *Bacillus subtilis* ATCC 6633, *Streptococcus pyogenes* 2432, and *Candida albicans* 885/653 ATCC were used, 1% water solutions of extracts were used.

**Results and discussions:** All the extracts from leaves of *Salvia officinalis* showed activity in relation to the museum strains of *Staphylococcus aureus* and *Escherichia coli*. The lowest activity was in the water dry extract (zone of delay in growth of organism at a level of 14-16 mm), and the highest - in the dry extract, which produced using 96% ethanol (25-26 mm, respectively). Extracts that have been produced using 50% and 96% ethanol also showed activity against *Bacillus subtilis* and *Streptococcus pyogenes*, while the extract obtained using 96% ethanol was more active (15-16 mm, respectively). The water extract did not restrain the growth of microorganisms. Thus the greatest antimicrobial activity showed an extract obtained using 96% ethanol, it is the most promising substance for making antimicrobial drugs.

**Conclusions:** In search of effective anti-infection means three kinds of *Salvia* extracts' antimicrobial activity has been studied. The results of studies have shown *Salvia officinalis* extract obtained using 96% ethanol is the most promising substance for making antimicrobial drugs in comparison to the 50% ethanol extract and the extract obtained using water.

### 3D BIOPRINTING IN MEDICINE

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**Introduction.** The primary purpose of printable organs is in transplantation. Research is currently being conducted on artificial heart, kidney, and liver structures, as well as other major organs. For more complicated organs, such as the heart, smaller constructs such as heart valves have also been the subject of research. Some printed organs have already reached clinical implementation, and primarily include hollow structures such as the bladder, as well as vascular structures such as urine tubes. 3D printing allows for the layer-by-layer construction of a particular organ structure to form a cell scaffold. This can be followed by the process of cell seeding, in which cells of interest are pipetted directly onto the scaffold structure. Additionally, the process of integrating cells into the printable material itself, instead of performing seeding afterwards, has been explored. Modified inkjet printers have been used to produce three-dimensional biological tissue. Printer cartridges are filled with a suspension of living cells and a smart gel, the latter used for providing structure. Alternating patterns of the smart gel and living cells are printed using a standard print nozzle, with cells eventually fusing together to form tissue. 3D printing for producing a cellular construct was first introduced in 2003. Since Boland's initial findings, the 3D printing of biological structures, also known as bioprinting, has been further developed to encompass the production of tissue and organ structures, as opposed to cell matrices. Additionally, more techniques for printing, such as extrusion bioprinting, have been researched and subsequently introduced as a means of production. Organ printing has been approached as a potential solution for the global shortage of donor organs. Organs that have been successfully printed and implemented in a clinical setting are either flat, such as skin, vascular, such as blood vessels, or hollow, such as the bladder. When artificial organs are prepared for transplantation, they are often produced with the recipient's own cells. More complex organs, namely those that consist of solid cellular structures, are undergoing research; these organs include the heart, pancreas, and kidneys. Estimates for when such organs can be introduced as a viable medical treatment vary. The company Organovo produced a human liver using 3D bioprinting, though it is not suitable for transplantation, and has primarily been used as a medium for drug testing.

**Aim.** It is essential to investigate the using and mechanisms of 3D printing techniques. **Materials and methods.** Data analysis of literature and Internet sources.

**Results and discussion.** 3D printing for the manufacturing of artificial organs has been a major topic of study in biological engineering. As the rapid

manufacturing techniques entailed by 3D printing become increasingly efficient, their applicability in artificial organ synthesis has grown more evident. Some of the primary benefits of 3D printing lie in its capability of mass-producing scaffold structures, as well as the high degree of anatomical precision in scaffold products. This allows for the creation of constructs that more effectively resemble the microstructure of a natural organ or tissue structure. Organ printing using 3D printing can be conducted using a variety of techniques, each of which confers specific advantages that can be suited to particular types of organ production. Two of the most prominent types of organ printing are drop-based bioprinting and extrusion bioprinting. Numerous other ones do exist, though are not as commonly used, or are still in development. Drop-based bioprinting creates cellular constructs using individual droplets of a designated material, which has oftentimes been combined with a cell line. Polymerization is instigated by the presence of calcium ions on the substrate, which diffuse into the liquified bioink and allow for the formation of a solid gel. Drop-based bioprinting is commonly used due to its efficient speed, though this aspect makes it less suitable for more complicated organ structures. Extrusion bioprinting involves the constant deposition of a particular printing material and cell line from an extruder, a type of mobile print head. This tends to be a more controlled and gentler process for material or cell deposition, and allows for greater cell densities to be used in the construction of 3D tissue or organ structures. Such benefits are set back by the slower printing speeds entailed by this technique. Extrusion bioprinting is often coupled with UV light, which photopolymerizes the printed material to form a more stable, integrated construct.

Materials for 3D printing usually consist of alginate or fibrin polymers that have been integrated with cellular adhesion molecules, which support the physical attachment of cells. Such polymers are specifically designed to maintain structural stability and be receptive to cellular integration. The term "bioink" has been used as a broad classification of materials that are compatible with 3D bioprinting. Printing materials must fit a broad spectrum of criteria, one of the foremost being biocompatibility. The resulting scaffolds formed by 3D printed materials should be physically and chemically appropriate for cell proliferation. Biodegradability is another important factor, and insures that the artificially formed structure can be broken down upon successful transplantation, to be replaced by a completely natural cellular structure. Hydrogel alginates have emerged as one of the most commonly used materials in organ printing research, as they are highly customizable, and can be fine-tuned to simulate certain mechanical and biological properties characteristic of natural tissue.

**Conclusions.** A printable organ is an artificially constructed device designed for organ replacement, produced using 3D printing techniques.

**SECTION № 10**

**LABORATORY RESEARCHES IN CLINICAL MEDICINE**



## A STUDY IN CHINOLINEDIPARON EFFECT ON LYMPH SYSTEM COAGULATION ACTIVITY UNDER CARDIAC INFARCTION

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**Introduction.** Violation of lymph outflow from cardiac muscle damage area leads to development of interstitial edema, aggravates microcirculation disturbance in coronary vessel obliteration area.

**Aim.** The object of work is to study the effect of chinolinediparon (chinoline derivative of carboxylic acids) on lymph circulation wrapping activity and lymph drainage function of cardiac muscle under acute cardiac infarction.

**Materials and methods** Experiments were performed on 49 rats with weight of 180 – 200 g. In 7 rats the lymph coagulation condition and lymph outflow rate (lymphorrhagic syndrome) was studied in intact condition.

In the rest of animals acute cardiac infarction was imitated by tying upper third of anterior interventricular artery. The dynamics of acute cardiac infarction progress was monitored by ECG registration and determination of creatine phosphokinase (CPK) in blood serum by spectrophotometry using Chemaiol standard reagent set. The blood was taken from auricular limbic vein. ECG was registered in intact condition and within 30 days, CPK at the beginning of experiment as well as within 6 days after imitation of infarction. Statistical calculations were carried out using Student's t-test in an Excel application and SPSS Statistics 17.0.

**Results and discussion** In animals of Group 2 after administration of chinolinediparon substance the course of infarction was more favorable. Alterations of lymph coagulation were marked by reduction of heparin tolerance by 69%, more than 1.6 times decrease of prothrombin index as compared with control group, substantial increase of heparins and thrombin time (22.1 and 23.3% respectively), fibrinogen concentration was reduced 2.5 times. Lymph outflow velocity increased more than 4 times as compared with controls ( $0.139 \pm 0.014$  mL / min) which was indicative of intensified lymph drainage, thus, better removal of cardiac metabolism toxic products.

**Conclusion** It must be noted that within the following periods of study heparin and thrombin time values were higher than initial ones, whereas prothrombin index and fibrinogen concentration remained reduced up to the end of observation. Consequently, we may state that chinolinediparon administration has an expressed hypocoagulation effect and stimulated lymph anti-coagulation activity. Chinoline Diparon showed an expressed hypocoagulation effect in experiment as well as assisted in acceleration of cardiac lymph draining function.

**SECTION № 11**

**MODERN ASPECTS OF PHARMACEUTICAL  
MICROBIOLOGY AND IMMUNOLOGY**

## EPIDEMIOLOGICAL FEATURES OF THE WEST AFRICAN REGIONS

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**Introduction.** The epidemiological situation in the countries of West Africa for some infectious diseases, including infections, which may be an emergency situation in the field of public health and to have international significance continues to be dysfunctional. The top three leaders in the incidence of infectious diseases include the following Ebola virus disease, malaria, meningitis.

**Aim.** Analyze common infection in West Africa and the presence medicines for specific prevention of these infections.

**Results and discussion.** Ebola virus disease (EVD), formerly known as Ebola hemorrhagic fever, is a severe, often fatal illness in humans. The virus is transmitted to people from wild animals and spreads in the human population through human-to-human transmission. The first symptoms are sudden onset of fever, muscle pain, headache and sore throat. Providing support for early treatment and symptomatic rehydration therapy improves survival of patients. Currently there is no licensed vaccine for Ebola, but 2 potential vaccine candidate are being evaluated.

Malaria is a serious infectious disease, mainly transmitted to man by mosquitoes of Anopheles species. The disease runs in cycles. The first symptoms - fever, headache, chills and vomiting – may be mild, making it difficult to identify malaria. Malaria is treated with antimalarial medications; the ones used depend on the type and severity of the disease. An effective vaccine is not yet available for malaria, although several are under development.

Meningitis is an infection of the coverings of the brain, and is most commonly caused by bacteria. One type, cerebrospinal meningitis (CSM), caused by Neisseria meningitidis, is common in the Northern and Upper regions of Ghana, and usually occurs in epidemics during the harmattan season. This type is contagious. Symptoms include fever, neck pains, severe headache, convulsion, vomiting, etc. Immunization protects against the most serious form of bacterial meningitis, and the tetravalent vaccine ACWY is recommended for Ghana.

**Conclusions.** Infection prevention should be carried out in several directions, such as, the prevention of transmission of infection, reducing the risk of human infection, in the absence of a vaccine the only way to reduce the number of infections among men is to increase awareness of the risk factors and educating people about the measures they can take to reduce exposure to the pathogen, vector control, and the prevention of infections in hospitals.

## ASPECTS OF GRANTING OF TUBERCULOSIS CARE IN KHARKIV REGION

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**Introduction.** Currently, the indicators of morbidity of tuberculosis around the world remains high. Tuberculosis specialists notes the following main reasons for the deterioration of the epidemiological situation: lower living standards, increase stress, reduced immunity, deteriorating state of the environment.

**Aim.** Analyz the providing of TB care to residents of Kharkiv region.

**Materials and methods.** Analysis of statistical reporting forms of service tuberculosis of region.

**Results and discussion.** Manages of many medical establishments at all levels are responsible to the problem of tuberculosis and they developed and adopted the Local protocols of care and routes of patient. Collaboration of medical institutions of general network under designed protocols contributed to increased detection of infectious forms of tuberculosis in outpatient.

Indicator of detection of micobacteria by sputum smear in microscopy result in medical laboratories increased from 1.4% to 2.3%. However, the indicator targets not achieved. In 2012-2013 to improve the early detection of tuberculosis were purchased 9 mobile digital X-ray and X-ray equipment updated in all central district hospitals in the Kharkiv region. It should be noted that in 2015 the observed increase in morbidity of 3.3% or 42 people more compared to last year.

In the laboratory of the Regional Tuberculosis Dispensary №1 functioning equipment for molecular genetic diagnosis of tuberculosis (GeneXpert) and for fast determine the sensitivity to antimycobacterial drugs (MTB DRplus). According to the registry, 7% of registered patients first diagnosed of tuberculosis will not chekced out by this assay. All health care establishments in 100% provided with necessary drugs to treat and diagnosis TB, that was received of state budget and the Global Fund. However, the effectiveness of treatment is at not sufficient level. Monitoring visits to health care institutions of the region with the support of USAID «Strengthening TB Control in Ukraine" are doing in order to monitor the implementation of TB care program. Only 40.6% of patients receiving outpatient treatment with social support.

**Conclusions.** Despite the progress achieved in combating tuberculosis, does still exist number of important problem in region. Requires giving attention to the targeted selection of contingents to the survey, primarily bacteriological. Number of cases of the combined pathology - TB / HIV infection increasing, and tuberculosis remains one of the main causes of mortality of patients with HIV.

## **VIRUS Zika - NEW TARGET OF PHARMACEUTICAL MICROBIOLOGY**

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**Introduction.** Zika virus - a type of virus carried by Aedes mosquitoes.

**Target.** Explore the features and structure of the Zika virus and its differences from other viruses Flaviviridae family, ways of transmission, the mechanisms of effect in the body of adults and children, diagnostic methods, perspectives of creation of specific drugs and vaccines.

**Materials and Methods.** analysis of the scientific literature and the results of new research in the domain of Virology.

**Results and discussion.** For the first time the virus found at monkeys - rhesus Zika forest (Uganda) in 1947 in the framework of the monitoring network for forest form of Yellow fever.

The main symptoms: mild headache, rash, fever, malaise, conjunctivitis, pain in the joints, may be nausea, vomiting, and stomach problems.

More dangerous this virus for pregnant women - they are born children – invalid, with microcephaly (underdeveloped brain).

Outbreaks caused by Zika virus, registered in Africa, North America, Asia and the Pacific. In 2015 the VOZ gave its outbreak in South America: the illness began to spread rapidly around the world, and in February reached Europe, then Zika virus was declared a global problem. In periods of mass outbreaks Disease Zika virus fix possible evolution complications, including autoimmune and neurological disorders. Dangerous Zika virus that swept of half world, selected closer to Ukraine: it was reported that the first case of infection recorded in Russia.

Zika virus infection can be suspected based on symptoms in the recent past (eg, residence or a trip to a region with a known presence of virus Zika). Zika virus can confirm only through laboratory testing for the presence of DNA Zika virus in blood or other body fluid such as urine or saliva. Explore serum allocated during the acute phase of the disease, using PCR - tests.

**Conclusions.** Zika virus is spreading rapidly across the planet: to date the disease was registered in 33 countries. Installed and a new source of infection: the virus can transmit not only mosquitoes, but they ill people (in 2009 there were cases of sexually transmitted infection). Specific drugs and vaccines of virus we dont have now. In theory, the creation of vaccines possible. However, testing and test the effectiveness of the drug will take years and will cost hundreds of millions of dollars. In India, claim to have developed a cure for the dangerous virus, but VOZ believe that the test of a vaccine can only be expected in 1.5 years.

**PRIMARY ANTIMICROBIAL SCREENING  
OF [1,2,4]TRIAZOLO[4,3-*a*]QUINAZOLIN-5(4*H*)-ONE DERIVATIVES**

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**Introduction.** The search for new and effective antimicrobial agents is an important task of medical chemistry because of the growth of pathogens drug resistance. Hence it is necessary to check antimicrobial activity of new synthesized compounds.

**Aim.** The aim of present study is to conduct primary antimicrobial screening of new [1,2,4]triazolo[4,3-*a*]quinazolin-5(4*H*)-one derivatives containing amide group attached by carbon or sulfur – carbon chain.

**Materials and methods.** The set of 169 new [1,2,4]triazolo[4,3-*a*]quinazolin-5(4*H*)-one derivatives containing amide group attached by carbon or sulfur – carbon chain has been tested for activity against 5 bacteria: *Escherihia coli*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa* and *Staphylococcus aureus*, and 2 fungi: *Candida albicans* and *Cryptococcus neoformans*.

Samples were tested in water – 0.3% DMSO solutions with final sample concentrations 32 µg/ml (70 – 80 µMol). All bacteria were cultured in Cation-adjusted Mueller Hinton broth (CAMHB) at 37 °C overnight. The resultant mid-log phase cultures was added to each well of the compound containing plates, giving a cell density of  $5 \cdot 10^5$  CFU/mL. All the plates were covered and incubated at 37 °C for 18 h without shaking. Inhibition of bacterial growth was determined by measuring absorbance at 600 nm using a Tecan M1000 Pro monochromator plate reader.

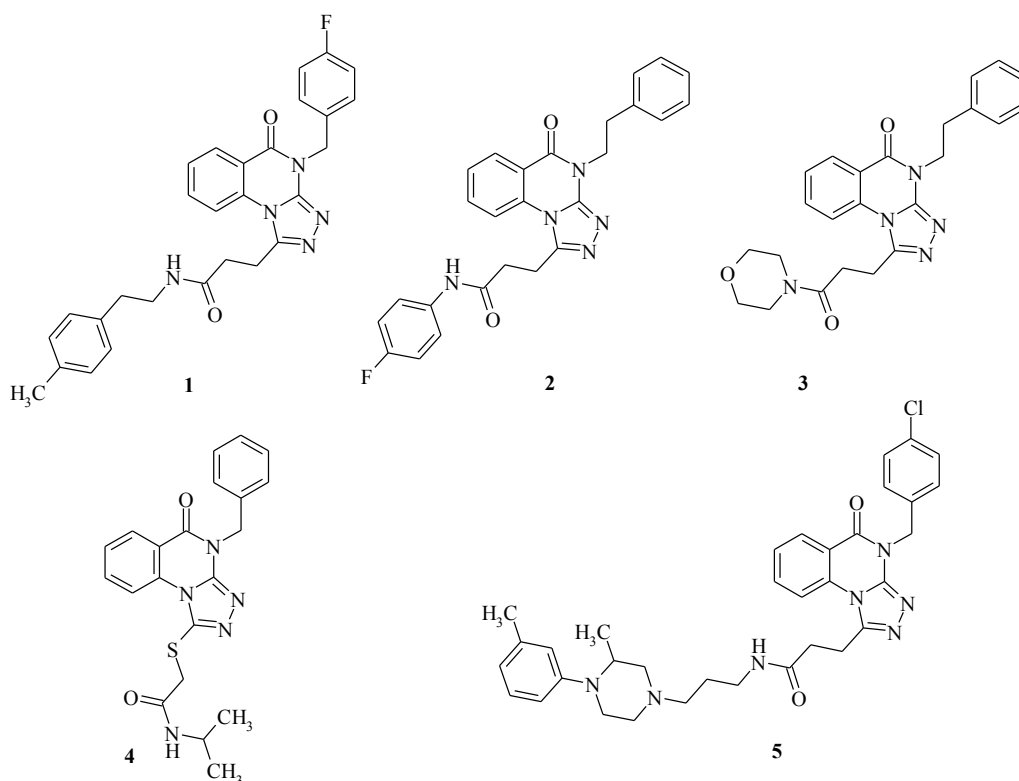
Fungi strains were cultured for 3 days on Yeast Extract-Peptone Dextrose (YPD) agar at 30 °C. A yeast suspension of  $1 \cdot 10^6$  to  $5 \cdot 10^6$  cells/mL (as determined by OD530) was prepared from five colonies. These stock suspensions were diluted with Yeast Nitrogen Base (YNB) broth to a final concentration of  $2.5 \cdot 10^3$  CFU/mL. Then, 45 µL of the fungi suspension was added to each well of the compound-containing plates. Plates were covered and incubated at 35°C for 24 h without shaking. Growth inhibition of *Candida albicans* was determined measuring absorbance at 530 nm (OD530), while the growth inhibition of *Cryptococcus neoformans* was determined measuring the difference in absorbance between 600 and 570 nm (OD600-570), after

the addition of resazurin (0.001% final concentration) and incubation at 35 °C for additional 2 h. The absorbance was measured using a Biotek Synergy HTX plate reader.

Colistin and Vancomycin were used as positive bacterial inhibitor standards for Gramnegative and Grampositive bacteria, respectively. Fluconazole was used as a positive fungal inhibitor standard for *Candida albicans* and *Cryptococcus neoformans*.

The tests have been carried out in CO-ADD laboratory (Brisbane, Australia).

**Results and discussion.** [1,2,4]Triazolo[4,3-*a*]quinazolin-5(4*H*)-ones **1-4** showed more than 80% inhibition of *Acinetobacter baumannii* growth and compounds **5** showed more than 80% inhibition of growth fungi *Cryptococcus neoformans*.



**Conclusions.** Several new [1,2,4]triazolo[4,3-*a*]quinazolin-5(4*H*)-one derivatives containing amide group attached by carbon or sulfur – carbon chain possess antimicrobial activity against *Acinetobacter baumannii* and fungi *Cryptococcus neoformans*.

# INDICATORS OF MICROBIOLOGICAL PURITY OF DRINKING WATER

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**Introduction.** To date, one of the most pressing problems in Ukraine is drinking water. High-quality drinking water in an amount to meet basic human needs, is one of the conditions for strengthening human health and the sustainable development of the state as a whole. Failure to comply with the standard of drinking water quality will lead to adverse both short and long-term consequences for the health and welfare of the population.

**Aim:** to analyze the situation with drinking water in Ukraine. Two thirds of Ukrainians consume water from rivers, lakes and reservoirs, and one-third - get water from underground sources. The main source of drinking water in Ukraine - the Dnieper. 69% of the drinking water that comes into the house of Ukrainians, does not comply with sanitary standards. Consider the main reasons for this state. In Ukraine, there is an uneven distribution of drinking water for the region.

**Materials and methods.** We have studied and analyzed the materials Sanitary and Epidemiological Service of Ukraine. In large cities (Odessa, Donetsk, Kharkiv) per person on average 400 liters per day, with an average for Ukraine - 250 liters. In the countryside - 35-40 liters. Not all regions of Ukraine have the same quality of drinking water. Quality of water for most areas of chemical and bacterial composition is classified as polluted and dirty (IV-V grade quality). The most polluted in terms of drinking water, are the following regions: the Dnieper river basin, the Seversky Donets, Azov Sea River, some tributaries of the Dniester, Western Bug. The zone includes the most critical regions of Odessa, Donetsk, Kharkiv, Dnipropetrovsk, Zaporizhia, Kherson and Mykolaiv region. In these areas, the water quality is classified as very dirty (VI class). In these regions, due to anthropogenic pollution (industry, domestic waste water), as well as due to the aging treatment facilities technical people often drink water, deviations from the norm which is sometimes up to 80 percent. Most clean regions, in terms of drinking water, is the western region of Ukraine (except Lviv): Rivne, Ternopil, Ivano-Frankivsk, Volyn and others. Pretty good situation in Sumy, Poltava and Chernihiv regions. For most regions of Ukraine are characterized by common problems related to the quality of drinking water: - anthropogenic pollution of water sources; - excessive chlorination; - secondary pollution.

**Results and discussion.** Secondary pollution causes diseases such as hepatitis, dysentery and even typhoid. Only in the past few years, outbreaks of infectious diseases recorded in Ukraine related to unsafe drinking water. It is because of unsafe



drinking water, adults and children infected with hepatitis, dysentery and even typhoid fever!

In 2005-2015 Ukraine noted the deterioration of the epidemiological situation of acute intestinal diseases, are associated with the supply of drinking water to the population of poor quality. The number of outbreaks of acute intestinal infections has increased in 3.0 times. In Dnepropetrovsk, Kirovograd, Khmelnytsky, Donetsk, Odessa and Vinnytsya regions recorded resulting from the use of poor-quality drinking water outbreaks population dysentery Flexner and Sonne, typhoid fever, rotavirus and enterovirus infections and hepatitis A, for which the water transfer factor is a major. Anthropogenic pollution of water sources due to the huge releases of untreated water by industrial enterprises of Ukraine, as well as the cities of sewage networks. According to experts, it is not cleared more than 30 percent of all the water.

To evaluate the safety of drinking water for epidemiological indicators estimated availability thermotolerant coliform bacteria (no – in 100 mL), general coliforms (no - in 100 mL), total bacterial count (the number of colony forming bacteria in 1 ml - no more than 50), coliphages (number plaque forming units per 100 ml - no), the spores of sulphite reducing clostridia (the number of spores in 20 ml - no), Giardia cysts (the number of cysts in 50 ml - no).

The number of drinking water samples with deviations for microbiological parameters, including mismatched Coli-index with the Coli-index of 20 or more were almost at the same level for the past two years (7.4 – 8.7%). The situation concerning the bottled water was no better: all 3 brands of bottled drinking water from the 8-and-tested meet the sanitary requirements in excess of the others observed total count.

**Conclusions.** Today Ukraine is on the quality of drinking water sources 95 takes place (out of 122). In the first five, Finland, New Zealand, Canada, United Kingdom and Japan. Our water is a little bit better than in Haiti and Ethiopia. 80% of Ukrainians consume water from surface sources (rivers of the Dnieper and Dniester drinking 35 mln. People), and 20% from groundwater. For comparison, on the contrary, almost all in Europe. As one of the leading Ukrainian scientists in this field, "Dnepr – a wastewater 3-4 category." In these rivers, as in most others, dumped a huge amount of untreated sewage, domestic and industrial waste, pesticides are washed away by rain, nitrates, nitrites, heavy metals, etc.

High-quality drinking water in an amount to meet basic human needs, is one of the conditions for strengthening human health and the sustainable development of the state as a whole. Failure to comply with the standard of drinking water quality will lead to adverse both short and long-term consequences for the health and welfare of the population. The problem of Ukraine's population to safe drinking water in sufficient quantity at the moment still remains unsolved.

# MODERN ASPECTS OF CANDIDOSIS VACCINES PRODUCTION

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**Introduction.** *Candida Albicans* is the most common type of yeast infection found in the mouth, intestinal tract, vagina and it may affect the skin and other mucous membranes. If the immune system is not functioning properly, the candida infection can migrate to other areas of the body including the blood and membranes around the heart. *Candida* is a fungus that aids with nutrients absorption and digestion when in proper levels in the body. By far the most common causes of invasive fungal infections are members of the genus *Candida*. *Candida Albicans* is one of the more common fungal pathogens that can colonise skin and mucous membrane all over the body and while normally harmless, can cause candidiasis or thrush infections like vaginitis. If the fungus enters into the bloodstream and spreads around the body, it becomes life threatening in some cases. There are many other types of fungal infections which can be just as harmful and are also increasing in prevalence globally.

The causes of *Candida* infections can include; birth control pills, oral corticosteroids, cancer treatments, diabetes, weakened immune system, broad spectrum antibiotics.

The symptoms can include; chronic fatigue, sinus infections, mood disorder, intestinal distress, recurring vaginal and urinary tract infections, oral thrush, brain fog skin and nail fungal infections, hormonal imbalance.

**Aim.** Analyze existing development of drugs for the prevention of candidiasis.

**Results and discussion.** There have been different vaccines strategies for active immunisation and two have gone through phase 1 of clinical trials against *C. Albicans*. An active vaccine is created containing a live attenuated strain of *C. Albicans* with an adjuvant chemical that helps stimulate the required immune response. This allows production of antibodies against the fungal antigens in the vaccine and induces protection against the infection. Active vaccination is not ideal for immune suppressed patients as their immune system is not strong enough to produce the antibody response seen in healthier individuals. Another passive form of immunisation would need to be developed for these individuals. A live attenuated vaccine called rAls3p-N has been developed and was recently tested in humans after positive findings in mice and primates. It demonstrates a high immune response leading to antibody production to fight *C. Albicans* infection, preventing vaginitis. In human trials, 30 subjects were administered 2 increasing doses of vaccine and no side effects were reported. The increased immune response suggests this vaccine provides

protection against C.Albicans. Another active vaccine Sap2p that prevents vaginitis caused by C.Albicans has also gone through Phase 1 trials and shows tolerability and efficacy in humans. Trials of other vaccines in mouse models have shown promising data. One problem with using mice is that they have a very different immune response to candida. Unlike mice, humans exposed to Candida develop immune responses early in life, so primate models may be better models for human infections.

**Table**

Strategies of two vaccines currently in clinical development

VACCINE IN DEVELOPMENT	TREATMENT	ADDITIONAL INFORMATION	PHASE 1 HUMAN TRIALS
rAls3p-N	Active vaccine for vaginitis caused by C. Albicans.  Also targets skin and soft tissue infections in S. aureus.	In mice and primates, demonstrated an increased response of immune cells and antibody production to fight infection.	30 subjects were given two doses of the vaccine.  No adverse side effects were reported.
Sap2p	Active vaccines for vaginitis caused by C. Albicans.  Contains a genetically modified protein called SAP.	Delivered into body in a virus particle.  Intravascular and intravaginal infections have been developed.	Well tolerated vaccine and effective at low doses.

**Conclusions.** There are still challenges yet to overcome associated with the high cost and risks of developing a vaccine. Gaining the technical skills requires to manufacture, store and transfer live vaccines is required. Preparing antigens for use in human studies may require further evidence, for regulatory authorities such as Food and Drug Administration in the US to approve and accelerate the vaccine development. Further exploitation into gaining data in humans will promote this exciting research area.

## FOOD VACCINES

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**Introduction.** Vaccination is the most effective and economical way to protect the organism against infectious diseases. Most infectious agents enter the body through the mucous membranes of the digestive, respiratory and urogenital systems. To effectively protect the mucous membranes, mucosal immunization is needed.

**Aim.** To analyze the prospects of the use of edible vaccines in the prevention of infectious diseases.

**Results and discussion.** The advantages of mucosal protection include: improved efficiency, simpler administration of the drug, reducing the risk of contamination by other microorganisms compared to injection or other methods that violate the skin. However, mucosal protective physiological mechanisms have removed any surface antigens from their own, including the participation of enzymes. How to overcome this barrier and deliver the antigen to the destination? Traditionally, this is done using the packaging - biodegradable polymeric or lipid particles, which are often administered orally or intranasally. Another more modern approach is to obtain transgenic plants which produce protective antigenic proteins of infectious agents, and their use as edible vaccines. What are the advantages of this approach? Plant cell walls effectively protect the antigen present in them after entering the human oral cavity, swallowing, and subsequent passage through the stomach. "Packaged" in a manner, antigen safely reaches the intestine, where it appears to the mucosal immune system. An important feature of edible vaccines is their potentially low cost. Other attractive properties include biological safety (in which there are no viral and other human and animal pathogens), ease of storage and use. Moreover, it is possible to create plants simultaneously producing several protective antigens of various pathogens, which in practice means the appearance of edible multivalent vaccines.

**Conclusions.** Currently, many world laboratories working on similar vaccines have already developed such candidate vaccines based on transgenic plants: HIV-AIDS, hepatitis B. Another research group prepared tobacco and potato plants that synthesize immunoglobulin A - C, enterotoxin, cholera toxin, surface antigen of hepatitis B. Protein produced by transgenic plants have the same antigenic and physiological properties as the protein derived from animal cells. A promising area is developed in recent years, projects of creation of so-called therapeutic vaccines against papillomaviruses. Currently, we discussed the prospect of "edible" vaccines against tuberculosis based on transgenic plants.

# FEATURES OF COMPOSITION AND ANTIBIOTIC RESISTANCE IN PATOGENS OF OPPORTUNISTIC INFECTIONS OF THE URINARY TRACT IN WOMEN

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**Introduction.** In recent years there has been a tendency to increase in the number of inflammatory diseases of the urinary tract of people of reproductive age that are due as pathogens, sexually transmitted infections (STIs) and opportunistic microflora (UPM). Despite numerous studies in the field of clinical microbiology, the use of modern diagnostic and therapeutic equipment, more and better drugs, regular monitoring of microbiological pathogens opportunistic infections remains relevant.

**Aim.** To study the characteristics of vaginal microbiota of women of reproductive age with inflammatory diseases of the urinary tract, which were caused by pathogens opportunistic infections with sensitivity remote definition of microorganisms to antibiotics of different groups. **Materials and methods.** Survey of 250 patients with inflammatory diseases of the urogenital tract, who was hospitalized in the department of STI control "DVM NAMS" on inflammatory diseases of the urinary tract. To perform research using biological material obtained from the lower urinary tract of women with inflammatory diseases (excretion from the urethra, cervix, vagina, urine). **Results and discussion.** As a result of bacteriological research laboratory was seized 281 strains that were assigned to 8 genera. The lack of growth in samples of clinical material was identified in 28 (11.2%). In 62.5% of cases were highlighted aerobic gram-positive cocci (staphylococci, streptococci, enterococci, micrococci) microflora, 23.9% - gram-negative rod-shaped bacteria (representatives of Enterobacteriaceae, Pseudomonadaceae). In other samples (13.6%) was found rod-shaped gram-positive microflora (non-pathogenic members of the genus *Corynebacterium*) and mushrooms genus *Candida*. It was determined the prevalence of staphylococcal component of vaginal habitat (92 strains - 32.7%). Most often allocated coagulase-negative the genus. The second position in the structure microbiocenosis occupied by representatives of the family Enterobacteriaceae (64 strains of laboratory - 22.8%). In analyzing the species composition established dominance *E. coli*, *Klebsiella* species. Determination of the sensitivity remote laboratory strains of *Staphylococcus* showed a high frequency of resistance to benzylpenicillin, doxycycline and lincomycin. Sensitivity laboratory strains of Enterobacteriaceae high to ciprofloxacin, doxycycline, chloramphenicol. Sensitivity to cephalosporins III generation amounted to an average of 55.7%.

**Conclusions.** Therapy vulvovaginitis, caused by opportunistic pathogens, must be made individually based on the results determine the sensitivity of aerobic microorganisms to antibiotics. If you can not conduct this study drugs of choice for treating vulvovaginitis caused by opportunistic aerobic bacteria can serve as ceftriaxone and quinolones, which observed the highest sensitivity opportunistic agents.

## MODERN ASPECTS OF CHLAMYDIA TREATMENT

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**Introduction.** According to the World Health Organization, urogenital chlamydia infection is one of the most common sexually transmitted diseases. The feature of the clinical course is (scanty symptomatology or its full absence in man and women case), so difficulties of the laboratory diagnostics lead to the thing, that infected persons refer to the specialists untimely. Therefore it prevents treatment and increases the risk of complications development.

**Aim.** Consider the current approaches to the treatment of Chlamydia.

The exciter of Chlamydia - *Chlamydia trachomatis*. It is gram-negative, intracellular parasite, that infect the epithelium of the mucosa of the urogenital tract, nasopharynx, conjunctiva and causes their inflammatory disease. Chlamydia is identified in every second of the explored women, who suffer from the inflammatory urogenital diseases, 2/3 of women suffer from infertility and 9/10 women suffer from miscarriage. Every second urethritis is caused by Chlamydia in the men case. The main scheme of treatment of the Chlamydia infection consists of causal therapy (antibacterial preparation), pathogenetic, eubiotic therapy, the effect on nonspecific body resistance, system enzymotherapy, immunomodulatory therapy. However it is not recommended to use the ready scheme of treatment because the course of the chlamydia's process has its own features. Currently there are three main groups of antibiotics to treat the Chlamydia infection. They are tetracyclines, macrolides, fluoroquinolones, sulfonamides, penicillins, and cephalosporins. They have the low activity and may contribute the persistence of infection. Unreasonably the long courses of antibiotics of the different classes, (that are aimed only at elimination chlamydia from the urogenital tract), fight with the specific microbe and forget about the readjustment of microorganism in which the microbe lives, and don't consider the immune dysfunction. As a result of treatment there may be some complications such as drug-induced hepatitis, dysbiosis of intestines, toxic-allergic reactions. The Chlamydia infection treatment is a big problem which must be resolved not only by the narrow section specialists, but immunologist doctor and therapist must also take part in treatment. So it is not recommended to use the ready scheme of treatment because the course of the chlamydia process has its own features.

**Conclusions.** The application of antibacterial preparations as a topping medical factor is allowed only for young persons who have acute phase of Chlamydia infection without any associated diseases. In other cases of Chlamydia infection, it must be checked the state of the immune status, hepatobiliary zone, microbiocenosis of intestines and urogenital tract before the course of etiotropic treatment.

# MODERN ASPECTS CREATING OF IMMUNOBIOLOGICAL DRUGS FOR THE TREATMENT AND PREVENTION OF INFLUENZA

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**Introduction.** Influenza - an acute infectious viral disease that is highly contagious, it passes with symptoms of intoxication , high fever and lesions of the mucous membranes of the upper respiratory tract. It is characterized by symptoms of tracheitis.

**The goal** was to monitor existing in Ukraine influenza vaccines.

**Materials and methods :** analysis of scientific literature and the results of cutting-edge research in the field of immunology .

**Results and discussion .** Every year , in the autumn- winter season under the threat of an influenza virus it is a large part of the population of Ukraine. According to the WHO, every adult on average 2-4 times per year sick influenza or other respiratory diseases. Diseases cause three types of influenza viruses : A, B, C. In the autumn of 2015 and winter of 2016 in Ukraine were strains of influenza A viruses California / 7/2009 (H1N1) pdm09; A virus -like A Switzerland / 9715293/2013 (H3N2), the type of virus B Phuket / 3073/2013 , influenza virus type A (H3) seasonal , A (H1N1) pdm09 and B. The most dangerous - influenza virus type A. All severe epidemics and pandemics (such as the Spanish flu ) to his credit. This type of virus can quickly genetic variation , so that every year is perceived by the immune system as a new one. The most famous of his species - the "bird" flu (H5N1) and "swine " flu (H1N1). But the dangerous is not the virus itself, and its complications(tracheitis, bronchitis, highmoritis; pneumonia, meningitis, neuritis, etc.), that is becoming a often cause of death (500 thousand people in the world). The influenza virus has a segmented genome and related high changeability through the exchange of genes between viruses. In the manufacture subunit vaccines capsule virions destroy detergents and the resulting drug is used as a split vaccine.

Of the influenza virus particles also produce surface antigens ,which can be scrutinize as the basis of chemical subunit vaccines. The advantages of this drug is low reactogenicity. The main disadvantage is considered their low ability to induce cell-mediated immune reactions.

**Conclusions.** An effective method of prevention is considered vaccination. Influenza vaccines are updated every year, given the circulation of influenza virus strains. Currently in Ukraine(according to the recommendations of the Ministry of health) permitted vaccines "Influvac" (production of "Abbott Biologicals B. V.", Netherlands), "Fluarix" ( production of "GlaxoSmithKline Biologicals", Germany), "Vaxigrip" (LLC "Pharmex Group", Ukraine-France, and "Sanofi Pasteur S. A.", France).

**FEATURES MICROBIOLOGICAL DIAGNOSIS  
OF TRICHOMONIASIS IN COMBINATION  
WITH OTHER INFLAMMATORY DISEASES OF  
THE URINARY TRACT BACTERIAL ORIGIN**

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**Introduction.** Urogenital trichomoniasis at present is one of the most common worldwide infections, sexually transmitted. Despite the intensive study of urogenital trichomoniasis, this time a number of questions remain about its detection and treatment.

**Aim.** The aim of our research was to study the characteristics of microbiological diagnostics tryhomanozu in combination with other inflammatory diseases of the urinary tract bacterial genesis.

**Materials and methods.** The material used biological material obtained from tryhomanoz patients that were hospitalized in the department Venereology SI "Institute of Dermatology and Venereology Medical Science of Ukraine."

**Results.** In the study of clinical material obtained from women, we observed a higher rate of detection of Trichomonas as with bacterioscopic and bacteriological methods. When working with clinical material obtained from men experienced a low rate of detection of Trichomonas using bacterioscopic method. It is proved that the diagnosis of urogenital trichomoniasis in men requires a complex laboratory diagnostics mandatory inclusion of bacteriological methods of allocation of a pure culture of the pathogen.

**Conclusions.** We have shown that the percentage of detection of some infections differed between men and women. So, chlamydia and ureaplasma dominated by men, and representatives of the family Enterobacteriaceae -in women.

In women dominated Association of tryhomanadamy chlamydia, trichomonas trichomonas with Ureaplasma and representatives of pathogenic microorganisms.



## FEATURES OF THE EPIDEMIOLOGICAL SITUATION OF POLIO IN UKRAINE

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**Introduction.** Polio - a contagious viral disease that affects the nervous system - is incurable, it can only be prevented by vaccination. In one of the 200 cases of infection with the polio virus develops irreversible paralysis. Due to paralysis of the respiratory muscles to 10 percent of cases die.

**Aim:** to explore the history of polio and assess the situation with polio vaccinations in Ukraine today.

**Materials and methods.** We have studied the WHO material about the history of polio vaccine and materials Sanitary and Epidemiological Service of Ukraine on the situation of polio in Ukraine today. The infectious agent of this terrible disease, which causes fear in people has 3 thousand years ago, was discovered only in 1913 K. Levaditi, who worked for 60 years at the Pasteur Institute and the Institute for Fournier in Paris. He was one of the first researchers who raised the viruses on living cells, and the first in the world by the experimenter, who managed to grow the polio virus in vitro on cells of the spinal ganglion monkey. It turned out that poliomyelitis (children's infectious palsy) - severe viral disease caused by several types of viruses. It was necessary for the prevention of the terrible disease urgently create a safe vaccine. However, scientists have been able to succeed only after the discovery of D. Enders and Frederick Robbins, who in 1949 proved that the polio virus can be cultivated in tissue culture (monkey kidney cells). In 1954, the American scientist J. Salk produced a vaccine based on formalin-inactivated virus grown in monkey kidney cells. D. Salk tested the safety of the vaccine on himself and volunteers - students who choose to participate in this important experiment to be vaccinated three of his sons. The vaccine has been tested and handed over to the US health authorities. 46 Salk vaccinated children fell ill severe paralytic form of polio. But soon 46 Salk vaccinated children fell ill severe paralytic form of polio. As a result, it was found that all my fault not in itself a vaccine, and the negligence of the pharmaceutical company's experts "Boat." Employees of the company, violating method Salk, cooked poor quality vaccine containing live virus. Thus, instead of killed virus for children was introduced virulent culture of poliomyelitis virus. However, the tragedy occurred expediency dictated new searches. Polio vaccination has made a huge step forward when the practice was introduced vaccines using attenuated formalin not aggressive viruses and modified live viruses. This "tamed" a strain that does not cause paralysis and creating strong immunity, was isolated American researcher Albert Sabin. The vaccine has been tried it on themselves, their employees, and then to his daughters. On the basis of isolates of A. Sabin, Russian scientists A.A. Smorodintsev and M.P. Chumakov in 1956-58 vaccine manufactured in the form of a syrup or candy-coated tablets. In Moscow in 1955, Institute of Poliomyelitis was created, whose director was one of the founders of the domestic Chumakov vaccine.

He organized the production of a live polio vaccine, the implementation of which in practice has led to the eradication of polio outbreaks in the USSR and other countries.

**Results and discussion.** In Europe, the last case of wild poliovirus has been registered in Bulgaria in 2001, in the Odessa region - in 1958. The local media start of the new century and millennium, it was reported that in Ukraine in connection with the aggravation of the epidemiological situation on polio in the years 1992- 1996 (32 cases) mass immunization days were conducted. Then, about two million vaccinated children, and two rounds of "catch-up" immunization in eight administrative regions were organized in 1998 to the year. This made it possible to vaccinate another 500 thousand children. Ukraine has managed to carry out the whole range of preventive, recommended by the WHO, which made our country the right to receive a certificate of polio eradication. In 2002, WHO has provided Ukraine the status of a territory free from poliomyelitis. In 2010, several cases of polio have been reported in Russia, imported from Tajikistan, one - with fatal consequences. In Tajikistan, 705 cases of acute paralytic polio were reported in 2010. Of these, 458 cases of wild poliovirus was isolated type 1. 26 people (adults and children) died. The outbreak in Tajikistan was eliminated due to the massive anti-viral activities. In 2012, the chief state sanitary doctor of the Russian Federation adopted a resolution number 17 from 22.02.2012 "On supplementary immunization activities against polio in the Russian Federation in 2012". But in the current 2013 polio again looked up from January to September 18, the world's recorded 264 cases of infection caused by wild polio virus (Somalia, Kenya, Ethiopia). The World Health Organization noted that our country is particularly vulnerable to the epidemic because of low vaccination coverage against polio: the graft is only 74% of the population. Polio is caused by an infection of one of the three types of poliovirus. All three species can cause paralysis. Polio infects only humans, spread occurs from person to person. No long-term carrier of poliovirus, it spreads mainly by the fecal-oral route, especially in countries with poor sanitation. In countries where high-level sanitation, polio virus is transmitted primarily by respiratory, most often affecting children under five years. Before the polio vaccine poliovirus was observed all over the world.

According to WHO, in today's world remain endemic for polio-3 countries - Afghanistan, Pakistan and Nigeria, where polio virus circulating always the incidence has never been stopped. Today, the epidemiological situation of polio in the world is unfavorable, since February this year, poliovirus was isolated from sewage Egypt, and from February to August - in Israel in environmental samples in healthy humans.

**Conclusions.** Preventive work, which took place in Ukraine after the receipt of the certificate of polio eradication allowed to retain favorable situation with respect to this dangerous disease. But now the threat of an epidemic in our country, according to WHO recognized as real. The instability of the socio-political situation, the economic decline may have the consciousness of the population - is one thing. But no less worried and lasting for several years, the distrust of our fellow citizens to such an important preventive direction as vaccination. According to UNICEF data, in Ukraine the level of vaccination against 10 infectious diseases has decreased from 80% (in 2008) to 50% in the 2012th. A vaccination against such diseases as polio - is actually warning of morbidity and mortality.

# IMPROVED METHODS FOR THE DISCOVERY OF NEW MICROORGANISMS – INFECTIOUS DISEASES

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**Introduction.** Improved methods of taxonomy of microorganisms and their practical implementation was accompanied by the opening of new infectious diseases that are separate species and even families. In nearly every known group of microorganisms have been described new species agents. At the present time genus *Escherichia*, except for species *Escherichia coli*, including other types of *E. fergusonii*, *E. hermannii*, *E. vulneris*, which are able to cause inflammatory diseases in humans.

The **aim** of the study is to clarify improvement of methods of discovering new microorganisms - infectious diseases.

**Methods:** a comparative and systematic.

**Results and discussion.** In the early 90 years through a combination of several molecular genetic technology was established methods of detection and identification of pathogens refractory immune new (unknown) infectious diseases. Successfully combined molecular genetic technology PCR and sequens analysis of 16S rRNA ensured success at the opening of a number of human diseases, pathogens, disease *Viplaix* - *Tropheryma whippelii*, bacillary anhiomatoza - *Bartonella henselae*, numerous lesions caused mikoplazmopodibnymy organisms. Researchers hope that this is the methodological approach will accelerate the search for etiologic agents of idiopathic disease with a chronic course as sarcoidosis, rheumatoid arthritis, systemic lupus erythematosus.

Extremely productive is a promising method for detecting pathogens are immune refractory method "hybridization in situ». The advantage of in situ hybridization method is examined specific nucleic acid sequences can be localized microscopic methods directly in the cell. The above methodological approaches for the detection and study of new immune refractory etiologic role of infectious agents causing R. Koch postulates an audit due to the inability to allocate a pure culture in vitro on nutrient media and play in the experiment infectious process with subsequent confirmation of its specificity by re abjection of the originator.

**Conclusions.** The use of modern molecular genetic technologies to prove the specific etiology of new infections remains active only the first postulate, complete "confirmation of a specific connection rule" when testing samples of clinical material from patients with clinical investigational disease, patients with other diseases and of healthy people.

# THE PREVALENCE OF HERPES SIMPLEX VIRUS TYPE 1 AND 2 IN KHARKIV

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**Introduction.** Herpes simplex virus 1 and 2 is the most common disease (according to different sources, this virus infects near 60-95% adult and child population of the world), it is transmitted mainly by contact, through everyday objects, airborne, through the placenta at birth. It is known that the herpes simplex virus 1 type (HSV-1) infects more frequently than herpes simplex virus type 2 (HSV-2). Antibodies to HSV-1 type have almost 90% of the population under 40 years. Antibodies to HSV-2 are usually founded in people who have reached puberty. Herpes simplex virus plays a crucial role in the etiopathogenesis of different pathological processes numbers. The most common clinical manifestations are observed on the skin and mucous membranes.

**The aim** of our research was to investigate the degree of infection with herpes simplex virus 1 and 2 types in people. Kharkiv 2015.

**Materials and methods.** Based on the data laboratory "B.A.T." city Kharkiv, analyzed the morbidity of herpes virus 1 and 2 by 2015. We determined IgG antibodies and IgM for herpes simplex virus type 1 and 2 by ELISA.

**Results and discussion.** According to the analysis in 2015 to herpes virus 1 and the second type there were examined 3865 patients, including 1619 patients had positive results, which have made 41.8%. In the adult age group, the percent was 87.7%. There were no significant differences depending on gender features. There was a relatively even distribution of the incidence of HSV 1 and 2 among adults in the following age groups: 20-30 years - 42.8% in 31-40 - 34.0% in the group 41-50 - 14.6%. However, these groups of persons in comparison with groups of more elderly were significant differences between 51-60 years -5.9%, 61-70 – 2.0% and 71-80 – 0.7%.

**Conclusions.** Our research has shown a fairly high level of infection with the herpes virus 1 and type 2, which is an actual problem today. Therefore, we believe that the earlier detection of the virus, its diagnosis and prescribed treatment time may be favorable background to avoid further complications of the disease.

## **ANALISE OF STUDENTS HEALTH OF NUPH**

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**Introduction.** Student youth are the future of the country. The health of students significantly affects to the process of learning, getting education, practical skills, participation in university life. In addition, throughout the training period they should take care of it and maintain by keeping fit, refusal of bad habits, availability of physical activity, timely appeals to doctors in case of illness. The future of the state, science and society directly depends from The state of health of the most valuable labor resource of society that is youth.

**Aim:** to determine aspects of health status of applicants higher education pharmacy.

**Materials and methods:** analysis of materials that was obtained by survey of students from first to fourth years of the National University of Pharmacy. The main method of research - sociological.

**Results.** In the study participated 70 applicants of higher education.

The average age of respondents in 60% was 20-24 years, up 20 years – 38.5%. 90% of respondents was of female representatives and 10% - men.

54.3% - are residents of the city and the rest - villagers.

48.6% are involved in sports or fitness. Hardening keep 14.3%.

30% of respondents smoke.

Asked how often suffer from colds, respiratory diseases, we have the next answer: one by month - 1.4%, every 2 months - 7.1%, 2 times in six months - 17.1%, 2 times a year - 38.6%, rarely - 35.8%.

The absolute majority of respondents (70.0%) rarely go to the doctor, 20% - 2 times a year, 10% - 2 times in six months.

Among carried childhood infections often noted chicken pox - 40%, rubella - 14.3%, streptococcal angina - 12.9%, measles - 4.3% parotitis - 1.4%. 27.1% feel difficulty to response, which is children's infection was carried.

11.4% have specific infectious or parasitic disease. In 34.3% of the interviewed applicants higher education present physical illness.

Students determine the next violations of health:

visual impairment - 18.6%,

vegetative-vascular dystonia (VVD) - 15.7%,  
gastritis - 14.3%,  
gynecological diseases - 11.4%,  
allergic reactions - 7.1%,  
osteochondrosis and other diseases of bones or joints - 5.7%, dysfunction of the  
thyroid gland - 5.7%,  
other endocrine disorders - 1.4%,  
biliary dyskinesia - 4.3%,  
respiratory diseases - 4.3%,  
urological diseases - 4.3%,  
diseases of the skin, nails, hair - 4.3%,  
gastric - 2.9%,  
cardiovascular diseases - 2.9%,  
hearing loss - 1.4%,  
diseases of the gastrointestinal tract (GIT) - 1.4%,  
neurological diseases - 1.4%.

**Conclusions.** There is the problem of keeping students' healthy lifestyle. More than half of them are not involved in sports. Only 14% support the hardening. More over to nearly a third of respondents smokes.

36% of respondents answer, that get sick hardly ever, but in this time call for doctor hardly ever 70% of them. This indicate that students get sick more often than call for treatment.

Natural acquired active immunity to rubella virus has 14% of respondents. It should be noted, the majority of respondents (90%) is women of reproductive age. It can be extremely dangerous infection with the virus for the first time during pregnancy. Consequently, it may be important issues young vaccination against rubella.

Almost a third of respondents have different physical illness severity and different combine. The most common diseases are the gastrointestinal tract illnesses (about 23%), visual impairment (18%), VVD (16%) and gynecological disorders (11.5%).

# THE STUDY OF TOOTHPASTE INFLUENCE ON MICROBIAL COMPOSITION OF PLAQUE

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**Introduction.** The study of the oral microbiota cavity is taken the important place in discussion of prevention of dental disease ourtimes. Cavity is a combination of different taxonomic groups of microbes, which inhabite the mouth and come into a biochemical, immunological and other contacts with microorganism and each other.

One of the modern hygiene products is toothpaste. Plaque is composed of bacteria of the mouth normal microflora and food debris. Accumulation of it can lead to gum disease, caries, etc. Rational oral hygiene with the directed action remedy is one of the most massive and effective prevention method of dental diseases.

The target of study has become the optimization of choice of the toothpaste and study of their impact on mouth microbiocenosis. If we consider prevention of dental diseases by microbiological point of view, so the most important is mechanical removing of plaque and using antimicrobials and substances, which increase protective reactions of oral cavity. The most common are oral hygiene products, as toothpaste first of all.

**Aim.** The aim of the study was - to optimize the choice of toothpaste and study their impact on microbiocenosis mouth.

**Subject of research** - the impact of oral hygiene, the oral microbiocenosis

**Materials and methods.** Microbiological studies of the oral cavity; statistics - to confirm the validity of the data. To address the goals and objectives of complex laboratory tests conducted. In experiment participated 9 persons aged from 16 to 50 years of healthy, who were divided into groups and used according pasta: Blend-a-med, Colgate and New Pearl. A 36 laboratory tests. Laboratory studies were carried out within 21 days to use toothpaste and dynamics applications. Studied toothpaste delivered to the domestic market by foreign manufacturers of drugs for oral care: Blend-a-med, Colgate and New Pearl.

**Results and discussion.** As a result of microbiological tests confirmed that the toothpaste used: Blend-a-med, Colgate, New Pearl exhibit preventive effects. Found that in the experiment toothpaste New Pearl reveals a pronounced antiseptic effect, resulting in reducing the number of microorganisms in 5 times. It is proved that the use of health care toothpaste term of more than 3 weeks, accompanied by the formation of microbial resistance to them.

**Conclusions.** When using toothpaste as a means of prevention must necessarily change them every 3-4 weeks to prevent the emergence of resistance in microorganisms plaque microflora.

## EPIDEMIC FEATURES OF SOME REGIONS IN EAST AFRICA

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**Introduction.** Dengue infection is caused by any one of four distinct but closely related dengue virus (DENV) serotypes (called DENV-1, -2, -3, and -4). These dengue viruses are single-stranded RNA viruses that belong to the family Flaviviridae and the genus Flavivirus—a family which includes other medically important vector-borne viruses (e.g., West Nile virus, Yellow Fever virus, Japanese Encephalitis virus, St. Louis Encephalitis virus, etc.). Dengue viruses are arboviruses (arthropod-borne virus) that are transmitted primarily to humans through the bite of an infected *Aedes* species mosquito.

**Results and discussion.** The origins of the Spanish word dengue are not certain, but it is possibly derived from dinga in the Swahili phrase Ka-dinga pepo, which describes the disease as being caused by an evil spirit. Slaves in the West Indies having contracted dengue were said to have the posture and gait of a dandy, and the disease was known as "dandy fever". Dengue is of the infectious disease that can cause death if not treated, Tanzania is one where the disease became epidemic especially in the year 2014, dengue fever outbreak notified to the World Health Organization by the Ministry of Health and Social Welfare (MOH&SW) on 4 February 2014. As at 30 May 2014, the dengue fever outbreak has spread to seven (7) regions on the mainland and two (2) regions in Zanzibar. The geographical distribution of cases and deaths is as follows: mainland (1,017 confirmed cases out of a total of 2121 suspected cases including 4 deaths) and Zanzibar (1 confirmed case out of 8 suspected cases, and no deaths). Ninety-nine (99%) of the cases of the mainland were reported from the following three districts of Dar es Salaam: Kinondoni, Temeke, and Ilala. Of the four (4) deceased cases, 1 had presented with Dengue Haemorrhagic Fever (DHF) and 1 with multiple organ failure.

Dengue virus is primarily transmitted by *Aedes* mosquitoes, particularly *A. aegypti*. These mosquitoes usually live between the latitudes of 35° North and 35° South below an elevation of 1,000 metres (3,300 ft). They typically bite during the day, particularly in the early morning and in the evening, but they are able to bite and thus spread infection at any time of day all during the year. Other *Aedes* species that transmit the disease include *A. albopictus*, *A. polynesiensis* and *A. scutellaris*. Humans are the primary host of the virus, but it also circulates in nonhuman primates. An infection can be acquired via a single bite. A female mosquito that takes a blood meal from a person infected with dengue fever, during the initial 2–10 day febrile period, becomes itself infected with the virus in the cells lining its gut. *Aedes aegypti* is



particularly involved, as it prefers to lay its eggs in artificial water containers, to live in close proximity to humans, and to feed on people rather than other vertebrates.

Dengue can also be transmitted via infected blood products and through organ donation. In countries such as Singapore, where dengue is endemic, the risk is estimated to be between 1.6 and 6 per 10,000 transfusions. Vertical transmission (from mother to child) during pregnancy or at birth has been reported. Other person-to-person modes of transmission have also been reported, but are very unusual. The genetic variation in dengue viruses is region specific, suggestive that establishment into new territories is relatively infrequent, despite dengue emerging in new regions in recent decades.

The World Health Organization's 2009 classification divides dengue fever into two groups: uncomplicated and severe. This replaces the 1997 WHO classification, which needed to be simplified as it had been found to be too restrictive, though the older classification is still widely used included by the World Health Organization's Regional Office for South-East Asia as of 2011. Severe dengue is defined as that associated with severe bleeding, severe organ dysfunction, or severe plasma leakage while all other cases are uncomplicated. The 1997 classification divided dengue into undifferentiated fever, dengue fever, and dengue hemorrhagic fever. Dengue hemorrhagic fever was subdivided further into grades I–IV. Grade I is the presence only of easy bruising or a positive tourniquet test in someone with fever, grade II is the presence of spontaneous bleeding into the skin and elsewhere, grade III is the clinical evidence of shock, and grade IV is shock so severe that blood pressure and pulse cannot be detected. Grades III and IV are referred to as "dengue shock syndrome.

In December 2015, the first dengue fever vaccine received approval in Mexico and should be available in 2016.<sup>1</sup> The vaccine is produced by Sanofi and goes by the brand name Dengvaxia. It is based on a weakened combination of the yellow fever virus and each of the four dengue serotypes. Two studies of a vaccine found it was 60% effective and prevented more than 80 to 90% of severe cases. This is less than wished for by some.

**Conclusions.** There are ongoing programs working on a dengue vaccine to cover all four serotypes. Now that there is a fifth serotype this will need to be factored in. One of the concerns is that a vaccine could increase the risk of severe disease through antibody-dependent enhancement (ADE). The ideal vaccine is safe, effective after one or two injections, covers all serotypes, does not contribute to ADE, is easily transported and stored, and is both affordable and cost-effective.

Pain relievers such as aspirin and nonsteroidal anti-inflammatory drugs (NSAIDs) should only be taken under a doctor's supervision because of the possibility of worsening bleeding complications. Acetaminophen (Tylenol) and codeine may be given for severe headache and for joint and muscle pain (myalgia).

# A COMPARATIVE STUDY OF THE ANTIBACTERIAL ACTIVITY OF DIPEROXYAZELAIC AND MONOPEROXYPHTHALIC ACIDS

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**Introduction.** Among the realm of disinfectants noteworthy preparations based on organic peroxides. They are characterized by broad spectrum of activity against microorganisms, germicidal type of action, low toxicity, combination of disinfectant properties with low corrosion activity and aggressiveness on structural materials for the production of medical devices; flexibility, solubility in water; availability and low cost of raw materials, environmental friendliness. The well-known European brand disinfectant Dismozon® pur (Germany) based on magnesium salts of monoperoxyphthalic acid (MMPP), which is a water-soluble powder substance is effective against bacteria, spores, viruses and fungi. Activity increases in acidic solutions and the combined use with alcohol or heating. They are recommended for disinfection baths, kitchens. In powder form of anionic surfactants can be used to disinfect walls and floors in hospitals, in particular, to control hepatitis B and HIV. Monoperoxyphthalic acid (MPP) belongs to Aromatic peroxy monocarboxylic acids. Interest was the study of antimicrobial activity Aliphatic diperoxydicarboxylic acid compared to Aromatic peroxy monocarboxylic acids.

**Aim.** The purpose is synthesis of diperoxyazelaic acid and comparative study of antimicrobial activity regarding Magnesium monoperoxyphthalate.

**Material and methods.** The substance of Magnesium monoperoxyphthalate hexahydrate (the active ingredient) in certain surface disinfection such as Dismozon Pur), 50%. The diperoxyazelaic acid was produced in accordance with the publications cited above, J. Am. Chem. Soc. 79, 1929 et seq (1957); more particularly, 100 g (0.53 mole) of azelaic acid was dissolved in 300 g. of 95% sulfuric acid in an open reaction vessel. With good stirring 105 g. (2 moles) of 65% hydrogen peroxide was added dropwise over a 5-10 minute period while maintaining the internal temperature at 20°-25° by an ice-water bath. Stirring was continued for an additional 8 hr. Several volumes of a half-saturated aqueous solution of ammonium sulfate (35 g./100 g. H<sub>2</sub>O) were added at 0° and the precipitate of diperoxyazelaic acid was filtered off. The product was washed on the funnel with the cold ammonium sulfate solution until the filtrate was free of sulfuric acid (several washes). The crude product was dried under vacuum at room temperature. Recrystallization from ethanol-water (1:5) yielded an analytically pure product.

To assess drug activity test was used Staphylococcus aureus strains ATCC 25923, Escherichia coli ATCC 25922, Pseudomonas aeruginosa ATCC 27853,

*Bacillus subtilis* ATCC 6633, *Proteus vulgaris* ATCC 4636, *Candida albicans* ATCC 885/653. Microbial load was  $10^7$  bacterial cells per 1 ml of media and installs in McFarland standard. The work took a 18-24 hour culture of microorganisms. For studies were used the agar Mueller Hinton ("Nutrient medium" Dagestan NGO). The diffusion of the drug in agar method was carried out "wells". Determination of antibacterial drugs was performed on two layers of a dense nutrient medium poured into a Petri dish. The lower layer was used "hungry" not inoculated medium (agar-agar, water, salt). The bottom layer is a substrate height of 10 mm which horizontally mounted thin walled cylinder of 03/06 stainless steel with a diameter of 8 mm and a height of the cylinder 10. Around the poured upper layer consisting of a nutrient agar medium, melted and cooled to 40 °C to which was added an appropriate standard overnight culture test microbe. Previously, the top layer is well mixed until smooth. After solidification cylinders were removed with sterile tweezers and placed into wells formed with a test substance given its volume (0.3 ml). The volume of the medium to the top layer varied from 14 to 16 ml. The plates were dried for 30-40 minutes with room temperature and placed in an incubator for 18-24 hours.

**Results and discussion.** The results of disquisition of antibacterial activity of the samples diperoxyazelaic acid (DPAA) and the magnesium salt of monoperoxyphthalic acid (MMPP) are represented in the table. They show higher activity of newly synthesized diperoxyazelaic acid.

**Table**

Antibacterial properties of peroxycarboxylic acids samples

<i>w</i> , in terms of API, 0,05%	The diameters of the zones of growth inhibition in mm ( <i>n</i> =3, <i>P</i> =0,95)					
	<i>St.aureus</i> ATCC 25923	<i>E.coli</i> ATCC 25922	<i>P. eruginosa</i> ATCC 27853	<i>Proteus vulgaris</i> ATCC 4636	<i>B. subtilis</i> ATCC 6633	<i>Candida albicans</i> ATCC 653/885
DPAA	21.0±1.8	16.3±1.1	17.3±1.1	17.3±1.1	21.3±2.1	16.0±1.8
MMPP	15.7±1.1	14.3±1.1	14.3±1.1	14.3±1.1	17.3±1.1	14.3±1.1

**Conclusions.** In a comparative perspective antimicrobial activity of magnesium monoperoxyphthalate and the newly synthesized diperoxyazelaic acid is investigated. It was found that the activity diperoxyazelaic acid is significantly higher than the comparison drug (reference preparation). Based on the availability of raw materials bases findings can be seen as an opportunity to create a new class of oxidants disinfectant based on aliphatic diperoxy-carboxylic acids.

## LIPOSOME TECHNOLOGY IN VACCINOLOGY

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**Introduction.** Liposomes are microscopic structures consisting of one or more lipid bilayers, surrounded by a water layer. For practical application of the liposomes is essential their ability to include and retain substances of different nature - of inorganic ions and low molecular weight organic compounds to large proteins and nucleic acids. Due to the presence of the liposomes bilayer membranes, they may be used to transport both hydrophilic and hydrophobic drugs. Currently liposomal forms of anticancer drugs, antifungal drugs, polyene antibiotics, anti-inflammatory corticosteroids, bovine insulin and other drugs are developed. An interesting use of liposomes as carriers of antigens is to create a new generation of vaccines.

**Aim.** Analyze the use of liposomes as carrier epitopes in the production of modern vaccines.

**Results and discussion.** The achievements of modern immunology allow to obtain an isolated antigenic determinant (epitope) - part of the macromolecular antigen which is recognized by the immune system. Isolated antigenic determinant is not immunogenic. Therefore, vaccine development requires conjugation of the antigenic determinants with the carrier molecule. One promising solution to this problem involves the use of liposomes. Construction of artificial vaccines gives an opportunity to connect a number of epitopes of different specificity with common carrier, to include necessary adjuvant group into this complex. Vaccination should provide the delivery of antigenic epitopes to immunocompetent cells, while necessary to exclude the possibility of changing its structure under the action of enzymes. Furthermore, because of their resemblance to cellular membranes, liposomes are non-toxic to the body, and the compound in it is protected against degradation and dilution in the blood. Liposomes can be adsorbed in the cells, and their contents are slowly fed into the cell. Phagocytic cells can capture the liposomes by endocytosis with subsequent degradation of their membranes.

**Conclusions.** The antigens included in the composition of the surface membrane of the liposomes, acquire properties of adjuvants - the ability to cause a strong immune response. Other antigens may be introduced into the contents of the liposomes. In the experiment, such "liposome" vaccine caused a thousandfold increase in the immune response. Liposomes with incorporated antigens, can be administered in different ways: intravenously, intraperitoneally, subcutaneously and intramuscularly. At the injection site granuloma liposomes are formed and they can quickly reach the draining lymph nodes.

## CHARACTERISTICS AND TRENDS OF EPIDEMIC OF HEPATITIS C IN UZBEKISTAN AND UKRAINE

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**Introduction.** The urgency of the problem of chronic viral hepatitis is related to their high level of social, medical and economic significance. Viral hepatitis is a global one, as the scale of the spread of the globe; it far exceeds all known infectious diseases. That hepatitis C is the main cause of the formation of the whole group of chronic liver diseases - chronic hepatitis, cirrhosis, hepatocellular carcinoma.

**Aim.** To study epidemiological situation with hepatitis C in Uzbekistan and Ukraine.

According to WHO, in the world are infected with HCV about 3 % of the world population of these, more than 170 million. Patients with chronic hepatitis Can the number of infected people reaches 500 million. Man. According to experts, the number of people infected with the virus around the world is growing every year. Regional features that has epidemiology of hepatitis C is obviously related to the standard of living and quality of sanitary and epidemiological surveillance. In the 21st century, this pathology is one of the leading competing with HIV and tuberculosis. Disease, Hepatitis C is dangerous in that it has a long incubation period. Most infected people the disease is in a latent form.

Hepatitis C is everywhere, but not evenly spread. It was found that hepatitis C is an urgent public health issue and the Ukraine and Uzbekistan. Officially hepatitis C in Uzbekistan has started to register in 1998. In the next 10 years, the frequency of chronic viral hepatitis C increased by 4 times. But in 2010 compared with 2009, the incidence of viral hepatitis decreased by 18,6 % due to the improvement of material and technical basis of virological laboratories, as well as modern methods of diagnosis and treatment of patients. In 2012, it issued an order of the Ministry of Health of the Republic of Uzbekistan on measures to improve the fight against viral hepatitis in the country. Based on the available data, approximately 50 - 60 % of cases of hepatitis C in the country caused, by the infection in hospitals. The proportion of injecting drug users is not high. For example, according to the epidemiological surveillance carried out in 2011, prevalence among injecting drug users, hepatitis C was 20,9 % (28,5 % in 2010), although formal studies on the prevalence of drug use among the general population assessment in the Republic of Uzbekistan was conducted. To date official statistics on the incidence of hepatitis C in Uzbekistan could not be found in the public domain. With high probability data either were not published by the government or medical experts.

According to the WHO - in Ukraine up to 8% of the population is living with hepatitis C virus. Ukraine ranks first in Europe in terms of the spread of hepatitis C. However, the majority of Ukrainian patients do not know about the disease, due to the long latency period of the onset of the disease and with minor symptoms, masquerading as other diseases associated with a slight malaise and depression.

For the first time in Ukraine officially register the incidence of hepatitis C started in 1994. By the year 2010, and to date the disease was observed growth of which increased during this period by almost 7 times. Please note that the official registration data is likely incomplete, because it is impossible to consider the cases of acute viral hepatitis, which occur without jaundice (acute hepatitis C, the proportion of such patients is about 80 %).

The official registration of hepatitis C, mainly icteric form of acute infectious process, conducted in Ukraine since 2003. Most often, hepatitis C can be detected during random clinical research. 80 % of patients exhibit this virus already at a chronic stage, 15 % of them may develop cirrhosis, and at 7,10 % - liver cancer. Due to the late diagnosis of hepatitis C virus and are called "tender" killer".

The disease is aggravated by the fact that the HIV / AIDS epidemic in Ukraine continues. According to statistics, about 30 % of those infected with HIV are also infected with hepatitis C. In Ukraine, among the social groups, leading place injecting drug users and sex-workers. In these groups favorable conditions for the transfer of mixed infections parenteral and sexual transmission routes. Considerable percentage allocated and the transmission of infection through blood transfusions and surgical interventions. Among the age groups, about 75 % of cases of hepatitis C are young people of working age 15-29. In Ukraine there are government programs for which medication is helping children's t adult population, but this is not enough, as it covers only 17 % of the population.

No serious control measures such as vaccination against hepatitis C, optionally also in most cases asymptomatic course of the disease leads to the annual growth of the number of infected people in the world.

The improvement of the epidemiological situation on the incidence of hepatitis C is an important factor to obtain objective information. This can be achieved thanks to the timely detection of various forms of the infection process, the implementation of state programs of prevention, diagnosis and treatment of patients with acute and chronic hepatitis forms. The important factor is to improve the quality of care.

**Conclusions.** In connection with the problems of globalization, the growth of the disease worldwide each year on July 28, is World Hepatitis Day. The main purpose of this event is to draw attention to the problems of awareness about the incidence of viral hepatitis with an appeal to the public, policy makers and health professionals to act without delay to prevent HIV infections and deaths from hepatitis.

# HELICOBACTER PYLORI IN THE KHARKIV CITY

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**Introduction.** Helicobacter pylori - microorganism that lives on the surface of the mucous membrane of the stomach. These bacteria produce large amounts of toxins that damage the mucous membrane of the gastrointestinal tract. Such damage leads to inflammation and the development of gastritis, ulcers and other pathological conditions. Most of the currently known organisms can not survive in the acidic environment of the stomach. But the bacteria this environment is most favorable contrast. This is one of the features of bacteria. H. pylori was first investigated by two Australian scientists - Robin Warren and Barry Marshall. For this discovery in 2005 they were awarded the Nobel Prize. Today H. pylori infection is widespread throughout the world, about 60% of the world's population are infected with this microbe. H. pylori is determined in 95% of patients with duodenal ulcer in 70-80% of gastric ulcer, 50% of patients with non-ulcer dyspepsia. In addition, H. pylori is an etiologic factor highly differentiated MALT-lymphoma and stomach cancer. In the scientific literature points to the possible role of this organism in the development of other diseases not related to the digestive system - including coronary heart disease, as well as delayed growth of children. According to statistics, the incidence of infection increases progressively with age. In the literature there are data that indicate the seasonality of H. pylori infection - infection rate higher in May and October-November.

**Aim.** To study degree of infection H. pylori in Kharkiv during 2015 year and to determine its seasonal dependence.

**Materials and methods.** Based on data provided by the laboratory "B.A.T." city Kharkov, analysis identifying H. pylori in patients appealed to the laboratory for 2015. Determine the total level of antibodies to H. pylori ELISA method.

**Results and discussion.** According to the analysis in 2015, H. pylori antibody was examined 2,841 patients, including 1,338 patients had positive results, which amounted to 47%. In the age group dominated by adults, whose share was 97.9%. Observed significant differences by gender. Female found 46.3% positive results, among male-40%. Depending on the age distribution was recorded a detection: 1-14 years – 2.1%, 15-40 years – 58.3%, 41-80 years – 39.6%. Dependencies detection of seasons we have not found.

**Conclusions.** The study showed that the study helicobacterioza prevalence among different population groups, ways of transmission can be considered as helicobacterioza infectious disease is endemic. So today we can say that people suffering from diseases of the stomach, there are good reasons checked the presence of H. pylori, especially taking into account that effective treatment can prevent diseases and their complications.

# ASPECTS OF METHODS FOR DETECTION OF RESISTANCE OF MYCOBACTERIUM FOR TB DRUGS

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**Introduction.** Resistance today is one of the major characteristics of the epidemic process of tuberculosis (TB) in the world. In the Kharkiv region as a whole in Ukraine, noted a tendency to increase the allocation of multiresistant strains, which amounted to 63.7% of the total array. Among the first-diagnosed TB patients steadily increasing number of drug-resistant forms of the pathogen.

According to reports of mycobacterias resistance the detection rate of resistance pathogen to the main TB drugs in the first-diagnosed TB patients reaches 25%, and in patients with recurrence - 47%, and patients re-treatment - 30%. The above requires the timely correction of medical treatment and treatment according to sensitivity of the pathogen and at first doing tests for sensitivity on time.

**Aim.** to analyze the methods of determining the resistance of mycobacteria to TB drugs.

**Methods.** Comparative analysis of direct and indirect methods of determining drug resistance of Mycobacterium tuberculosis (MBT).

**Results.** Determination of microbial sensitivity to chemotherapy in vitro antibacterial held in conditions that are significantly different from those in which the drug acts in the body. Its results are strongly affected by factors such as the composition and pH of the culture medium, size seeding dose, age, culture, cultivation conditions, etc.

Mediums to determine the sensitivity should be standard and provide optimal conditions for the growth of microorganisms not contain inhibitors of bacterial growth and excessive amounts of stimulants do not contain substances that inhibit the action of antibacterial chemotherapy.

The method of direct determination of drug resistance is that sputum or other clinical material sown directly in media containing extremal concentrations of antibiotics. Among the disadvantages of this method is the inability to standardize the method, the inability to use the specimen with negative result of microscopy, increased risk of contamination, deficient growth of culture that does not give reliable conclusions. Thus, the error rate can be 10-15%.

To indirect method of detect the sensitivity MBT uses pure culture obtained during sowing in growth medium. There are 3 classic cultural methods for detection the sensitivity of mycobacteria to drugs: by absolute concentration, by coefficient of



resistance and by proportions. The method of proportions is well known at present and its generally accepted in Ukraine.

Principle detect sensitivity of micobacteria to drugs by proportions method (Canetti) is in indication the ratio (proportion) between resistant and sensitive bacterias in population of micobacteria to extremal concentration of TB drugs. If the number of individuals resistant to antibiotics in a population of less than 1.0%, a strain considered sensitive to the drug. The method to evaluate bacterial population *M.tuberculosis* not only as sensitive or resistant, but also distribute it according to the degree of resistance.

Rapid diagnosis of resistance allows the molecular methods, which include polymerase chain reaction (PCR). The methods have their advantages: high specificity, high sensitivity (10-100 cells per 1 ml of sample), the identification of genetic markers of resistans of *M.tuberculosis* complex, universal procedures for all pathogens, a variety of detection formats.

To speed up the detection of the multydrug-resistant TB, WHO recommends the use in the laboratory diagnosis of tuberculosis two technological approaches: PCR in real time using the cartridges Cepheid (GeneExpert, USA) and DNA strip technology GenoType® MTBDR (Hain Lifescience, Germany). Technology GeneExpert allow to detect MBT in the same time sensitivity to riphampicin that is one of the most efficient TB drugs. The results can be received through two hours after start assay.

Test GenoType® MTB plus system can detect *Mycobacterium tuberculosis* resistance to isoniazid and rifampicin, and GenoType® MTBDRsl indicate resistance to fluoroquinolones, ethambutol, aminoglycosides, cycl peptides.

The disadvantage of these methods can be false negative test results. This is due to the presence of a significant number of amplification inhibitors in the experimental samples (blood, pus, enzymes, DNA-polymerase and RNase). The presence of several types of bacteria in the test sample can interfere correct interpretation of the test. False positive results can be caused by using insufficiently specific test systems.

**Conclusions.** To detection the sensitivity of micobacteria to TB drugs, there are several bacteriological methods. The most common among them there is method of proportions, and several express methods using the equipment for molecular genetic diagnosis. As with other diagnostic tests, PCR results should be interpreted together with the other laboratory results and clinical data. Timeliness diagnosis with use of modern equipment affects at increasing the detection of TB cased by resistant forms of pathogens. Combining traditional and new research methods to optimize and speed up laboratory diagnostics, as well as contributes to the success in the treatment of mycobacterial infections.

**SECTION № 12**

**CLINICAL PHARMACY**

## INVESTIGATION OF ANTIHYPERTENSIVE DRUGS USED IN LIGHT HOSPITAL IN NIGERIA

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**Introduction.** According to statistical data, nearly every third person on our planet has Hypertension. It is the most common chronic condition for persistent taking medication. The treatment of Hypertension in Nigeria remains a difficult problem not only due to a lack of diagnostic as well as due to in compliance patient to treatment.

**The aim** of study was to analyze appropriateness of prescription of different antihypertensive drug in Light Hospital in Nigeria to improve medical care condition in African Patients and to ensure compliance to medication for optimum efficiency of Treatment of Hypertension.

**Materials and methods.** We have used as material random sampling of 61 Case History of Hypertensive Patients in Light Hospital in Nigeria. Frequency of prescription of antihypertensive agent as monotherapy and as combined treatment were studied. We analyzed how rational combinations were, and if prescriptions were consistent with international guidelines.

**Results.** We observed frequently prescription of the first-line antihypertensive drugs. ACE inhibitors were prescribed to 27 patient (44.26%). CCB were in 56 cases (91.80%), out of this about 50 patient (81.96%) are using amlodipine, 23 patients (37.7%) using nifedipine, 17 patient (27.87%) using both nifedipine and amlodipine. ARB were prescribed to 5 patient (8.20%). Diuretics were in 33 cases (54.09%), out of this only 1 patient (1.63%) had monotherapy by Thiazide-like diuretic, but another 32 patients (52.46%) had combination therapy of Thiazide diuretics with other antihypertensive agents. Beta-blocker were prescribed to 3 patients (4.92%). Among antihypertensive drugs not included in the guidelines, we met alpha<sub>2</sub>-adrenergic receptor blockers in 10 patient (16.39%).

**Conclusion.** Nigeria, which adopts the British pharmacopoeia and method of treatment, has a little deviation in antihypertensive treatment order due to the African race and predisposition. Development of national guidelines for treatment of Hypertension could improve medical care condition in Nigeria and ensure compliance patients to antihypertensive treatment.

## ASSESSMENT OF TREATMENT WITH NEUROPROTECTIVE AGENTS IN PATIENTS WITH ENCEPHALOPATHY

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Neuroprotective therapy is a widely explored treatment option for prevention or slowing of neurological disease progression in patients. Neuroprotective drugs is a collective term that includes regulators of afferent innervation with depressing and stimulating action and medicines with efferent actions influencing on the autonomic nervous system and skeletal muscle motor nerves.

**The aim** of our research was to investigate the prevalence of neuroprotective agents in treating encephalopathy.

**Materials and Methods.** We have analyzed fifty four patients case history with encephalopathy from Neurological Department of the Therapeutic Hospital of Scientific Educational Medical Complex “University Clinic” of Kharkov National Medical University.

**Results.** Among all prescriptions, the most often we met drugs affecting metabolic processes, psychostimulant/nootropics, vitamin B complex, angioprotectors. From 54 cases, 22 (40.7%) cases had combination these four groups of drugs. Psychostimulants/nootropics were prescribed to 48 patients (88.9%), of which 29 (53.7%) were prescribed citicoline. Vitamin B (B1, B6, B12) complex were prescribed to 30 patients (55.6%). From the group of medicines affecting metabolic processes, the following drugs were mostly prescribed: actovegin/solcoseryl (help improve tissue regeneration, membrane stabilizing and cytoprotective) was prescribed to 38 patients (70.3%), mexidol (antioxidant) was prescribed to 32 patients (59.3%), meldonium (help improve metabolism and energy supply of tissues) was prescribed to 25 patients (46.3%), citoflavin (help improve cerebral metabolism) was prescribed to 18 patients (33.3%). There were 15 cases (27.8%) with prescriptions of combination: actovegin/solcoseryl, mexidol, meldonium, citoflavin. Among angioprotectors were prescribed L-lysine aescinate in 18 cases (33.3%), and detralex/normoven in 18 cases (33.3%) respectively.

**Conclusions.** In spite of the recent study of pathogenic aspects of encephalopathy, practical medicine treatment approaches of encephalopathy is still symptomatic. This leads to over-prescription and decrease compliance of patients.

# THE STUDY OF ALDOSTERONE ANTAGONIST EFFECTIVITY IN THE TREATMENT OF CHRONIC HEART FAILURE

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**Introduction.** Heart failure (HF) is a clinical syndrome characterized by the functional inability of the ventricle to meet the hemo-dynamic demands of the body. Renal hypoperfusion occurs as a result of reduced cardiac output, resulting the activation of the renin–angiotensin–aldosterone system. Aldosterone is a major prognostic determinant in heart failure. As the rise of aldosterone in bloodstream causes increase in atrial and perivascular fibrosis. In this regard, angiotensin II reduction strategies, such as through the usage of ACE inhibitor as well as angiotensin receptor blocking (ARB) agents, or their combination are insufficient to block aldosterone production.

**Aim.** To investigate the epidemiology, pharmacoepidemiology and medical charts of heart failure treatment in Iraq hospital. To develop practical recommendations for healthcare professionals to increase the criteria of efficiency and safety of spironolactone use in case of Chronic Heart Failure (CHF) treatment in Iraq patients.

**Materials and methods.** While conducting the above-mentioned analysis it was created a questionnaire based on Chronic Heart Failure Questionnaire (CHFQ) for patients and cardiologists that used to treat these patients in cardiology department of Sader teaching hospital (Iraq, Basra city). The questionnaire contained the main information on patient state with moderate and severe heart failure, treatment with specification of spironolactone administration, and its side effects

**Results and discussion.** During the conducted analysis of data for 50 patients with chronic heart failure we observed the successful use for spironolactone in different dosages (25-100 mg) which were chosen on the severity of diagnosis (n=44). However, 4 patients discontinued because they experienced gynecomastia and hyperkalemia related to spironolactone use in the dosage range from 50 mg or 100 mg and 6 patients withdrew due to high levels of serum urea and creatinine. While 6 patients with moderate heart failure weren't administered the aldosterone antagonist due to the left ventricle ejection fraction more than 40% (LVEF>40).

**Conclusions.** The conducted analysis for medical charts of CHF treatment in Iraq hospital observed that the spironolactone should be administered in patients with III-IV NYHA classes and for patients with LVEF<40, in dosage 25 mg with gradual increasing to 100 mg if required. At the same time, it was proved that Iraq approaches of CHF treatment corresponds to the European and US requirements. According to the study results the drug improves patients' state as well as diuretics effect in combination with loop diuretics and ACE inhibitors with favourable effects to decrease morbidity and mortality.

## **ABDOMINAL OBESITY AS THE RISK FACTOR OF DIABETES MELLITUS TYPE 2**

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The pattern of fat distribution, as assessed by waist circumference, can be used as an alternative definition of obesity and is particularly important for cardiovascular risk assessment. The prevalence of abdominal obesity has been increasing continuously with increased obesity. Abdominal obesity more frequently associated with diabetes mellitus, CAD than gynoid obesity, besides the finding that obesity is strongly predictive of CAD.

**Aim of research** was to determine role of abdominal obesity in development of diabetes mellitus type 2 among others risk factors.

**Material and methods.** 50 case histories of patients with diabetes mellitus type 2 were obtained from hospital of Babylon city in Iraq. We analyzed amount of obese people among all diabetic patients, percentage of abdominal obesity, and frequency of hypertension and CAD in DM type 2. Abdominal type of obesity was identified according to waist circumference >102 cm in men and >88 cm in women when body mass index >30. (Diabetes Prevention Program Research Group, 2005).

**Results and discussions.** We noted that over criteria of waist circumferences was in 14 cases (28%) from 50 cases in both gender, in male it was 4% and in female it was 24%. The prevalence of obesity was in 29 cases (58%), overweight was discovered in 11 cases (22%). The average age of obese patients was  $52.32 \pm 9.29$  years, the age of overweight patients was  $47.9 \pm 7.58$  years. There were only 10 patients (20%) with normal BMI.

We have found 24 patients (48%) had hypertension, 10 cases (20%) was male and 14 cases (28%) was female. The average age in this group was  $53.13 \pm 5.68$  years in compare with age in all patients with DM type 2 it was  $57.78 \pm 8.36$  years. CAD was found in 12 cases (24%).

**Conclusion.** Comparing with Framingham Heart Study demonstrated correlate the risk of insulin resistance with cardiovascular diseases, we proved there are significantly increasing of abdominal obesity in Diabetes mellitus type 2, because increased body fat, particularly abdominal fat, is associated with increased lipolysis and elevated plasma concentrations of non-esterified fatty acid.

## **THE USE OF LIPID-LOWERING DRUGS OF STATIN GROUP IN PATIENTS AFTER MYOCARDIAL INFARCTION.**

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**Introduction.** The purpose of this retrospective research is study of efficiency and quality of lipid-lowering therapy in patients (73) under one year observation after acute myocardial infarction.

**Aim.** Contribute the efficiency of lipid-lowering therapy group of statin in patients after myocardial infarction.

**Materials and methods.** Researchers were conducted on the base of the city cardiology clinic facility the second city hospital. A material for the research was based on medical documentation (hospital records) of patients with myocardial infarction.

**Results and discussion.** As a result analysis of 73 patient's hospital records. The patients were registered in the hospital because of myocardial infarction in 2012-2013. The diseases of the patients included such conditions as: arterial hypertension 94.5%, dyslipidemia 39.7%, hypercholesterolemia 13.7%, diabetes 8.2%. Rehabilitation were 55 (75.3%) patients because of the with myocardial infarction. 18 patients weren't rehabilitation.

After hospital treatment, the doctors prescribed to the patients statins: atorvastatin 65 (94.2%) with dose 20 mg – 50 (76.9%), to 5 patients in dose 40 mg – 10(15.4%) Lovastatin was appointed to four patients (5.8%) in dose 20 mg. The dose of statin was changed during the year to 20 patients (26.31%).

According the last visit (one year later after myocardial infarction) the following statins were appointed to the patients: atorvastatin was appointed to 58 patients (79.4% ), to 43 patients in dose 20 mg (24.94%), to 5 patients in dose 40 mg (8.6%), to 3 patients in dose 10 mg (5.1%). Rosuvastatin was appointed to 8 patients (11%). To 4 patients in dose 20 mg (5.5%), to 4 patients in dose 10 mg (5.5%). Study patients lipid center were treated at the city cardiology clinic in average 2.7 times a year.

When the patients first visited the city cardiology clinic, doctors researched lipid spectrum of patients: the average meaning of total cholesterol was 4.95 mmol/l The average meaning of LDL was 3 mmol/l, the average meaning of HDL was 1.25 mmol/l , the average meaning of TG was 1.93 mmol/l.

12 patients were hospitalized repeatedly. The reason for repeatedly hospitalization basically was progressive stenocardia which than passed into stable stenocardia or repeated myocardial infarction.

### **Conclusions.**

It was found that all the 73 analyzed patients received lipid-lowering therapy.

Efficiency analysis of lipid-lowering therapy clarified that achieving the purpose endpoint (level LDL below 1.8 mmol/l) was reached only in 24.5 % patients.

Analyzing dose statin therapy was found that atorvastatin ( which belongs to group of high dose statins with recommended dose 40-80 mg) used in this dose range only in 5 (8.6%) patients.

Despite on the fact that the purpose meaning didn't achieve in 75,5% dose of drug or his change was realized to 20 patients (26.31%) during the year. According the above information we can do the conclusion that used tactic of lipid-lowering therapy is not effective enough. Also dose regime in certain group of patients is not effective enough.

Considering received results during our analysis, we can say about few recommendations to correct "typical" practice of using statins.

- If we have no effect from beginning medical drugs we have to use medical drugs with more strong effect - medicine of the latest generation Rozuvostatin (Mertenil, Rozucard, Rocsera, Rozulip)

- With myocardial infarction ( with or without interventional therapy) doctors recommend to use statins in high dose with subsequent dose titration until effective . The effective dose has to allow to support level of LDL with meaning under 1.8 mmol/l

- Provide detailed consultations with patients about the need to follow hypocholesterolic diet, correct level of physical activity, correct principles taking drugs.



# THE PHARMACOLOGICAL STUDY OF GLUCOSAMINE AND ITS COMBINATIONS WITH NSAIDS AND FLAVONOIDS

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**Introduction:** Today at the Department of Clinical Pharmacology and Clinical Pharmacy of National University of Pharmacy, under the guidance of professor Zupanets I. A., is developing research area for the pharmacological study of promising compounds in the ranges of derivatives of aminosugar glucosamine and its combinations with NSAIDs and natural bioflavonoids. Glucosamine relates to natural aminosugar, is composed of polysaccharides, glycosaminoglycans, glycoproteins, lipopolysaccharides in the structure of biological membranes, intercellular substance, matrix of articular cartilage and other connective tissue components of organisms, thus performing the plastic function. The exogenous glucosamine detects a wide range of pharmacological activity, which is based on protective properties to all organs and tissues of the human body. It has cardioprotective, hepatoprotective, gastroprotective, nephroprotective, chondroprotective, pulmoprotective, cerebroprotective, anti-inflammatory, analgesic, immunomodulatory, reparative, antithrombotic, gonadoprotective, anti-toxic activities. This research area has high relevance as the focus on optimization of degenerative and inflammatory diseases therapy and the correction of toxic effects of anticancer therapy.

**Purpose of the study:** pharmacological studies of glucosamine combinations with NSAIDs and bioflavonoids to optimize the treatment of osteoarthritis and correction toxic effects of anticancer drugs.

**Materials and methods:** for realization of research were used the pharmacological, biological, biochemical, electrocardiographic, histomorphological, immunohistochemical and statistics methods.

**Results:** The pharmacological study of glucosamine hydrochloride with ketoprofen combination (2.5:1) in the form of cream-gel firstly was performed and proved experimentally expediency of its use in the treatment of degenerative, inflammatory and destructive joint disease.

The comparative study of analgesic and anti-inflammatory properties of different combinations glucosamine and ketoprofen in topical dosage forms proved that the optimal composition of glucosamine was 5% and ketoprofen 2% in the form of a cream-gel. At the advanced stages of the pharmacological study was established that chosen drug had distinct analgesic effect in conditions of inflammatory hyperalgesia and acute gonarthritis in rats. The high protective and antiexudative influence and moderate antiproliferative activity of the investigated combination has been proven, that a balanced allowing it to influence to inflammatory processes.

Chondroprotective properties of combination was studied in the model of systemic steroid arthritis in rats and proved a positive influence by the content of biochemical markers of connective tissue and histological structure and ultrastructure of articular cartilage tissue. The application of glucosamine derivatives and their combination with quercetin to optimize the approaches to the prevention and correction of the toxic effects of anticancer drugs is a topical issue too.

It have been demonstrated the ability of glucosamine derivatives and their combination with quercetin to reduce general toxic effect of anticancer antibiotic doxorubicin in screening studies in mice. It have been proved that glucosamine derivatives and their combination with quercetin do not have cytotoxic effect on rat's intact cells of bone marrow and enhance their viability under the destabilizing influence of doxorubicin in the experiments «in vitro». At the advanced stages of the pharmacological study it have been found the corrective influence of glucosamine hydrochloride and combination of glucosamine hydrochloride and N-acetylglucosamine with quercetin on the cytostatic-induced toxicity (under the influence of doxorubicin, cyclophosphamide, methotrexate) in experiments on rats. Under the influence of the objects it have been observed the inhibition of the process of lipid peroxidation and displays of cytolysis, reduced inflammation and dystrophy, a significant decrease of the animals mortality (model of intoxication with doxorubicin), decrease of the immunosuppression (model of intoxication with cyclophosphamide). It have been proved the regulating effect on the process of doxorubicin-induced cell death by the investigated objects mediated with the interference in the bcl-2-dependent mechanisms of the apoptosis controls. Based on the complex of the pharmacological studies it have been selected the perspective object – the combination of glucosamine hydrochloride and N-acetylglucosamine with quercetin. Thus, the combination of glucosamine derivatives with quercetin can influence the pathogenesis of many of the toxic effects of anticancer drugs with different mechanisms of action (antibiotic doxorubicin, alkylating cytostatics cyclophosphamide, antimetabolite methotrexate). The effectiveness of combinations of glucosamine hydrochloride and N-acetylglucosamine of quercetin is caused by the presence of various components in the mechanism of action, such as antioxidant, antycytolytic, membrane stabilizing, anabolic, immunotropic, antiapoptotic and anti-inflammatory.

**Conclusions:** The results of studies justify advisability of further clinical study of combination with glucosamine and ketoprofen in the form of a cream-gel with the aim of implementation as new combined chondroprotective drug. The combination of glucosamine hydrochloride and N-acetylglucosamine with quercetin is a promising object for future to pre-clinical, clinical study and implementation of practical medicine as modifier of toxic effects of anticancer drugs.

# THE STUDY OF THE TRIAL SUBJECTS' PROTECTION ASPECTS DURING ORGANIZING AND HOLDING CLINICAL TRIALS IN UKRAINE

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**Introduction.** The start of any clinical trial (CT) is impossible without its approval by the research ethics committee (REC). Our analysis of literature sources showed that the world's great attention is paid to assessing and improving the quality and efficiency of the RECs work. In Ukraine there are about 500 local research ethics committees (RECs) that perform the review of different health research projects including clinical trials of drugs and medical devices. As for today their work isn't studied enough. There is a need to develop tools to assess the quality and effectiveness of the RECs work. The lack of supervision and coordination of local RECs activity, patchy and incomplete guidelines for the RECs hinders effective protection of human subjects.

**The aim** of this work is to find strengths and weaknesses of the REC system in Ukraine and to identify challenges to the effective functioning of the REC system in Ukraine for increasing the trial subjects' protection.

**Materials and methods.** The interview of the RECs' members was held to evaluate the accordance of the RECs to the regulatory requirements. The questionnaire for respondents consisted of two parts and contained questions about RECs' work organizing, membership and members' educational training.

**The results.** The analysis of the obtained results showed that most of the RECs (60.9%) are functioning 6 – 10 years. 100% of RECs use national regulations in their work; 95.7% use GCP, 65.2% - declaration of Helsinki, 26% - Oviedo convention and 21.7% - Nuremberg code. This shows not enough awareness of RECs in international regulations in CT. 17.4 % of RECs don't use their policy in work what contradicts with the regulatory requirements and could lead to decreasing of the trial subjects' protection. At 26% of RECs the head and at 78.3% - members of RECs were assigned by the healthcare institutions administration where the RECs are functioning. This could be the reason for possible conflict of interests during ethical review of the CT since on this fact shows the dependence of the RECs from the healthcare institutions administrations but RECs should be independent during the review of CT. More than 60% of RECs have need in development of different kind of documents for improvement the effectiveness of the REC's work.

**Conclusions.** The obtained results showed the need of farther research on RECs' work to increase the trial subjects' protection during organizing and holding CT in Ukraine.

## MODERN APPROACHES TO DIAGNOSIS AND TREATMENT OF HYPERLIPOPROTEINEMIA

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**Introduction.** Lipid-lowering therapy is being considered as one of the primary goals of health care. It is a part of primary prevention of coronary heart disease (CHD) (when disease has not evolved yet) or secondary prevention (in patients with CHD). Many studies proved that diet and drug cholesterol-lowering therapy reduces the incidence of CHD and mortality from it.

**Aim.** To research the new approaches to diagnosis and correction principles hyperlipoproteinemias (HLP).

**Results and discussion.** Modern treatment of HLP is determined by the coronary risk degree depends on the cholesterol level and the presence of other CHD risk factors. It is recommended to determine the total cholesterol and HDL cholesterol (fasting is not required) as a screening test by all persons under the age of 20 years. If the total cholesterol level is acceptable ( $<5.2$  mmol/L) and HDL cholesterol is not less than 35 mg/dL (0.9 mmol/L), no special action is required and the next tests is rational to perform every 5 years because the cholesterol tends to increase gradually with age. If the total cholesterol is greater than 5.2 mmol/L or HDL cholesterol is low ( $<0.9$  mmol/L) fasting blood sampling is required to determine the content of total cholesterol, triglycerides and HDL cholesterol and to calculate LDL cholesterol.

Further tactic depends on the estimated LDL cholesterol and the number of CHD risk factors. If LDL does not exceed 130 mg/dL (3.4 mmol/L) general recommendations is sufficient and active intervention is not done. A similar tactic is carried out for persons with LDL cholesterol in the range of 130 to 160 mg/dL with no more than one additional risk factor. For patients with the same cholesterol level and the presence of two or more additional risk factors dietary therapy should be prescribed to reduce LDL cholesterol to normal (130 mg/dL or less). In cases of high LDL cholesterol ( $>160$  mg/dL) dietary therapy (limiting intake of cholesterol, saturated fat and calories) should be prescribed to majority of patients. Deciding whether to start lipid-lowering therapy clinical status of the patient should be considered. Cholesterol-lowering therapy is not prescribed to elderly patients with poor prognosis of main disease or severe comorbidities.

**Conclusions.** Achieving the ideal cholesterol values within population is absolutely impossible task even in the most developed countries. Therefore, measures of CHD primary prevention is reasonable only to patients with very high cholesterol levels and the presence of several other CHD risk factors. The question about the purpose of drug lipid-lowering therapy is considered only if the diet therapy is ineffective.

# EUROPEAN GUIDELINES (ESC-ESH, 2013) FOR HYPERTENSION THERAPY IN PREGNANT WOMEN

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**Introduction.** According to the WHO study group hypertensive disorders during pregnancy are one of the priority healthcare issues. After all, when arterial hypertension (HT) in pregnant women is observed there are serious violations of health, in some cases even ends with mother's death and a high level of child perinatal morbidity and mortality. Globally, this disease (pregnancy-induced hypertension) is 3.2-4% of cases and is the most common disease in pregnant women. Different forms of hypertension in pregnant women differ in their consequences: solitary (isolated) often proceeds without complications and outcomes, while preeclampsia is a severe pathology that threatens the embryo's life and mother's health. The main factors contributing to the development of hypertension in young women are burdened heredity, overweight, post-term preeclampsia during previous pregnancies and childbirth. Today the following forms of hypertension in pregnant women are distinguished (according to the Expert consensus document on management of cardiovascular diseases during Pregnancy - Guidelines for the treatment of cardiovascular disease in pregnancy European Society of Cardiology):

- chronic hypertension (increase of pressure observed before the pregnancy with or without proteinuria in patients with the background of a specific disease that was diagnosed before, during pregnancy or after the childbirth);

- preeclampsia - eclampsia (proteinuria  $>300$  mg per 24 hours or in two different urine samples, combined with newly diagnosed hypertension). Edema is not diagnostic criterion of preeclampsia because of its low peculiarity;

- preeclampsia combined with chronic hypertension (an increase blood pressure (BP) which is higher than the typical one for patient before the pregnancy, the degree of proteinuria change and signs of target organs damage);

- gestational hypertension (newly discovered hypertension with BP 140/90 mm hg. art. at two measurements, which appears for the first time after the 20th week pregnancy).

**Goal.** Explore the new approaches to the hypertension treatment in pregnant women according to the Guidelines of the European Association (ESC-ESH, 2013).

**Results.** In international and national recommendations different thresholds for initiation of therapy and different target values of blood pressure during pregnancy are given. The proposed in recommendations ESH / ESC 2007 proposals on the feasibility of drug therapy for all pregnant women with persistent increase of blood

pressure to a level  $>150/95$  mmHg. After the publication of previous recommendations any additional information on antihypertensive drugs that could be prescribed to pregnant women with hypertension did not appear so as valid recommendations methyldopa, labetalol and nifedipine - the only calcium antagonist that really was studied during pregnancy are used.

Beta-blockers (which could cause the growth retardation of the fetus in early pregnancy) and diuretics (at the already existing reduction of circulating plasma) should be used with caution. As mentioned above, it must be strictly avoided the use of drugs which affect the renin - angiotensin - aldosterone system (angiotensin-converting enzyme (ACE) inhibitors, angiotensin receptor blockers II (ARBs), renin inhibitors). At urgent cases (preeclampsia) drug of choice is intravenous labetalol driving; also sodium nitroprusside or nitroglycerin intravenous infusion could be used.

There are great differences in opinions on the effectiveness of low doses of aspirin for prevention of preeclampsia. Despite the fact that a large meta-analysis reported a small protective effect of aspirin at preeclampsia, as a result of the other two most recent tests the opposite conclusions were done. Summarizing the data on more than 11,000 women included in the PCI low doses of aspirin in pregnancy, concluded that in women who started therapy before 16 weeks of pregnancy it was noted significant reduction of relative risk of preeclampsia (relative risk 0.47) and severe preeclampsia (relative risk: 0.09) compared with control. With these differences in the data, it is reasonable to recommend the following: women with a high risk of preeclampsia (hypertension during a previous pregnancy with chronic kidney disease (CKD), autoimmune diseases such systemic lupus erythematosus or antiphospholipid syndrome, I or II type diabetes, chronic hypertension) or with more than one factor of moderate risk of preeclampsia (first pregnancy, age more than 40 years, the interval between pregnancies over 10 years, body mass indicator (BMI) $>35$  kg / m<sup>2</sup> on the first visit, a family history of preeclampsia and multiple pregnancy) could be recommended acceptance of aspirin in dose of 75 mg per day, starting at 12 weeks of pregnancy and till childbirth, provided low risk of gastrointestinal bleeding.

**Conclusions.** Therefore, pregnant women with hypertension are at risk zone. Careful monitoring of mother and fetus allows to prevent a number of complications. Drug therapy in women at low risk does not affect perinatal outcomes, but hypotensive drugs are used to prevent vascular complications in mother. The therapeutic strategy should be aimed at improving the state of the mother, and the only way to increase child survival rates - timely childbirth.

# **ORGAN DONATION AND TRANSPLANTATION IN UKRAINE: ANALYSIS OF MODERN ETHICAL ISSUES AND PERSPECTIVES**

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**Introduction:** Nowadays around 26-28 thousand transplantations are done annually in USA; in Spain —over 3 thousand; in Poland over 1.5 thousand. Among the post-Soviet countries Estonia is leading in the number of transplantations, annually 46.2 of them are done per 1 million population, in Latvia — 36.2 and in Lithuania — 22.4 per 1 million population. Every year in Ukraine 2 thousand people demand a heart- transplantology, but only 8 operations were completed since 2001. Each year 4 thousand people demand a transplantation of kidney— in the best case only 100 of them get it. 2-2.5 thousand of patients need a liver transplantation – and only 30-40 people receive it. Despite the fact, that Ukraine was one of the first countries in which organ transplantations were done and the quality of work corresponds to international level, nowadays Ukraine is among outsiders in this area. The reason is in a number of barriers that stop the development of the national transplantology system. One of those barriers is imperfection of Legal Framework.

**Purpose of the study:** analyzing the causes of imperfections of Ukrainian transplantation system and the obstacles encountered on the way to address this issue.

**Materials and methods:** for realization of research were used historical method, methods of system analysis and synthesis.

**Results:** In spite of the fact that every year thousands of people are quicken by virtue of organ transplantations, moral and ethical issues, as well as imperfection of Legal Framework are still inhibitory factors in this medical field. Due to expert evidence, the main problem of the Ukrainian transplantology system is the lack of clear management and coordination of appropriate services, which development is braked by ineffective and irrelevant Legal Framework. In this connection the criticality of the financial issue of national transplantology is increased.

Since the adoption of Ukrainian Law «About organs transplantation and other anatomical materials» the total number of transplantation in Ukraine has decreased significantly – nowadays annual amount of operations is about one hundred. In comparison in Spain which is equal to Ukraine by area an population the annual number of transplantations is over 3 thousand.

As well reforms in our system and reorganization of transplantology services are necessary. Also it is important to solve a problem of procedure of organ removal from deceased donors. Artical 16 of the Ukrainian Law «About organs transplantation and other anatomical materials» means so-called presumption of

disagreement, which essence is in members` of the society lifetime disagreement for organ removal from deceased donors. In case of absolute disagreement person has a right to use a written waiver. As a result, there is a lack of cadaveric organs for transplantations, which complicates with lack of coordination system of cadaveric donation, negative attitude of society to this kind of donation as well as aggressive perception of this issue.

What are the negative and positive aspects of the acting presumption of disagreement in our time? One of the imperfections is excessive psychological stress for family when they need to make a decision. For elimination of this defect in Germany and Scandinavian countries doctors use so-called "principle of the information model". According to it family members don`t need to make a quick decision about the organ removal. After being informed they have to express their agreement or disagreement in a set time. In our practice Ukrainian doctors rarely get an agreement from family members about the organ removal. As a result large number of patients whose lives could be saved due to cadaveric donation don`t get a needed operation.

According to experts, the new law about cadaveric donation can radically change the situation of Ukrainian transplantology. Since 2012, a bill is considered , according to which every Ukrainian can become an organ donor after death, if a refuse wasn`t officially registered . At the same time doctors wouldn`t need a family agreement for transplantation. Problem of organ donation shortage can be solved by adoption of this bill. It is necessary to conduct a survey of the population, so that everyone could express their agreement or disagreement for their organs to be transplanted after death. According to experts, the doubts in society about the adoption of this law explains the basic ignorance of the principles of cadaveric donation. To solve this problem it is important to conduct informational work with the population.

**Conclusions:** To sum up, it is necessary to adapt laws to society needs and to accomplish a social informational campaign, that could disclose possibilities and benefits of organ donation. For example in Spain, Poland, Belarus and in other countries social programs coordinated by government played an important role. As a result these countries became leaders in number of transplantations over the past decades.

Despite the large number of arguments and counter-arguments experts agree that development of transplantology is necessary to save patients with hopeless condition. That is why it is important to revive the development of transplantation system in Ukraine based on the need to change the legal framework and an active social support.



## PHARMACIST'S PROFESSIONAL ACTIVITIES ENSURE RATIONAL USAGE OF HEPATOPROTECTORS

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**Introduction.** A wide range of non-prescribed medicines, including hepatoprotectors and frequent recourse patients to pharmacy necessitate active involvement of pharmacists in ensuring their effective and safe use. The priority of Pharmacy is a close cooperation with doctors and patients during the treatment period. To achieve this goal should be provide a qualified help for pharmacies visitors.

**Aim of investigation.** To study a level of pharmacists' competence in Chernivtsi and its region on the peculiarities of drugs usage for treatment of liver diseases.

**Materials and methods.** To study the issue we used one of the methods of marketing research – questionnaire, which was attended by 56 participated respondents. The questionnaire included questions about the professional activities of pharmacists associated with ensuring the rational usage of medicines.

**Results of investigation.** Was done the survey of pharmacies and processed the algorithm of pharmaceutical care in the treatment of liver pathologies. The survey involved respondents with experience of at least 5 years (28.57%), with experience of 5 to 10 years (46.43%) and over 10 years (25%), of which approximately 87% are working in institutions of private property and 13% in public pharmacies.

It was established that the source of information about new and known hepatoprotectors for pharmacists are medical representatives (48%), online publications (23%), a periodical publication (20%) and 9% advertising. It's revealed that the greatest demand have the following hepatoprotectors – Carsil, Darsil, Essenciale, Gepabene, Glutargin, Antral, while 65% of consumers are looking for advice on the selection and prices of the drug to the pharmacist. However, only a third of patients consulted on the rules of admission, side effects and storage of hepatoprotectors.

**Conclusion.** The research found out that pharmacists are sufficiently informed regarding the application of modern principles of sustainable hepatoprotectors and their range. However, in the course of pharmaceutical care for patients professionals should pay more attention to the possible side effects and rules of drugs storage.

# THE ROLE OF PHARMACEUTICAL CARE IN SELF-CONTROL INTENSIFYING IN PATIENTS WITH DIABETES MELLITUS AND ARTERIAL HYPERTENSION

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**Introduction.** Statistical overviews data indicate that arterial hypertension (AH) associated with a significant increase of premature morbidity and mortality (primarily from cardiovascular complications) manifests in 80% of patients with type II diabetes mellitus (DM). European Society of Hypertension (ESH) / European Society of Cardiology (ESC) and associated with global standards the Order of the Ministry of Health of Ukraine № 384 dated May 24, 2012 provides following approaches to disease control in cases where the type II DM is complicated by hypertension: 1. Reaching the target blood pressure (BP) and blood glucose levels using adequate therapy. 2. Modification of lifestyle. 3. Self-discipline.

**Aim.** To develop the approaches to optimize the treatment of patients with type II DM complicated by hypertension within pharmaceutical care, providing by a pharmacist in a pharmacy.

**Materials and methods.** The study included several stages: the development of the questionnaire, which contained questions for research of the respondents' awareness about the targets of BP, blood glucose and compliance, patients' survey, analysis of the results, development of instructions for the patient with type II DM.

The survey was conducted during November 2014 and March 2015 on the basis of Pharmacy №2 «Pharmacy of hormones drugs» in the «Institute of Endocrinology and Metabolism named V. P. Komisarenko of National Academy of Medical Science of Ukraine» (Kyiv, Ukraine). A total of 56 visitors were interviewed who purchased drugs by physicians' prescription for DM and AH treatment. The survey was conducted with their consent.

Processing of survey results was performed with statistical analysis techniques.

**Results and its discussion.** Results of survey show that 42 (75%) from 56 pharmacies visitors who purchased prescription drugs for the treatment of DM and AH bought drugs at the request of relatives, 14 (25%) – «for himself». The survey was conducted among pharmacy visitors who acquired the drugs «for himself».

The results of the survey on issues related to BP self-control showed that: 57,14% of respondents constantly measure BP, 42.86% of respondents measure BP from time to time, and only 28.57% are aware of the target BP at diabetes ( $\leq 130/80$  mm Hg). 35.71% of respondents said that they are taking drugs to lower BP constantly, 64.29% take drugs only in case of recrudescence.

Analysis of the questionnaire responses regarding blood glucose self-monitoring showed that 50% of respondents regularly take medications prescribed by a physician to reduce the blood glucose level; 14.28% of respondents answered that they constantly monitor the blood level of glucose (using glucometers), 70.58% of respondents said that occasionally control blood glucose level. None of the respondents did not know the meaning of glycosylated hemoglobin, its target levels and its continuous control significance.

As for compliance of treatment prescribed by a physician, 57.14% of respondents follow the mode of drugs taking, 42.85% said that they often forget about drugs; 42.85% of patients said that they regularly go to the physician for treatment correction; 57.14% refer to physician in case of recrudescence; 64.28% of visitors said that they are taking drugs on doctor's advice.

Considering the fact that drug therapy of patients with chronic diseases involves the doctor and the pharmacist, pharmacist has a function for implementing constant pharmaceutical care of such patients. Pharmacist conducts consultation and information work as a part of the pharmaceutical care. In this regard, we have developed the instruction, which contains information for patients with diabetes type II complicated by hypertension, target BP, fasting glucose 2 hours after a meal, the standards level of glycosylated hemoglobin, BP measurement mode, blood glucose level. Providing a consultation by a pharmacist as well as the use of the instruction by patients in everyday life will increase their awareness and self-discipline that in result will facilitate patient adherence to treatment.

### **Conclusions.**

1. The survey results show an insufficient level of self-discipline among patients with type II DM complicated with AH, which in result affects the effectiveness of the treatment. Thus, only over half of the respondents involved in a survey constantly measure BP, about one-third regularly take drugs to reduce BP and know about BP targets for diabetes type II; glucose levels monitoring is carried out only by about 20% of the respondents.

2. The survey showed an insufficient level of adherence to treatment by interviewed patients that is indicated by irregular drugs taking by majority of respondents and non-compliance with the physician's recommendations.

3. Providing consultation by a pharmacist regarding disease control, as well as use of patient instruction in everyday life will increase their awareness and self-discipline, which in result will facilitate patient adherence to treatment.

## **EKZODERIL TREATMENT OF ONYCHOMYCOSIS FOR PATIENTS WITH DIABETES**

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**Introduction.** In modern days, the problems of diabetes and onychomycosis are highly widespread and interrelated. Every third diabetic patient suffers from fungal infection of feet and nails. Carbohydrate metabolism disorder, progressive diabetic angiopathy, the elaboration of "diabetic foot", immunological changes, etc - those are the factors that favor fungal invasion and provoke chronic disease of feet and nails.

The lapse of main blood flow in the arteries of the lower extremities hampers the effective delivery of systemic antifungal drugs and the formation of necessary therapeutic concentrations. All of that explains the high failure rate even when using modern drugs and treatment regimens of onychomycosis on patients with diabetes mellitus.

**Objective.** To assess the effectiveness of the onychomycosis mode therapy of diabetic patients, which includes topical application of ekzoderil and the inclusion of midokalm to the scheme, in addition to the use of systemic antifungals.

**Materials and methods.** In the study we looked at 36 diabetic patients, aged between 35 to 59 years, who suffer from onychomycosis. All of the patients reported long-term suffering from affected feet and nails, as well as the repeated futile treatment of this disease. In all of the mentioned cases the diagnosis was confirmed by laboratory tests.

**Results and discussion.** After 4 weeks of therapy, 70% of patients reported a lighter shaded growing back part of the nail plate a clarification of the new-growing nail plate combined with the growth of clinically healthy platelets. After 12 weeks of therapy, clinical improvement was observed in 60% of cases, mycological in 74%. After 12 months of therapy, clinical improvement was observed in 75% of cases, mycological in 80%. No serious allergic reactions or side effects that could have led to the discontinuation of therapy were observed.

**Conclusions.** Studies have shown that the proposed complex therapy of diabetic patients suffering from onychomycosis significantly increases the effectiveness of commonly used therapies in the above-mentioned patients. Our method is considered to be a highly effective and relatively safe one.

**THE ASSURANCE OF QUALITY OF BIOCHEMICAL STUDIES IN THE  
LABORATORY OF CLINICAL DIAGNOSTICS OF CLINICAL DIAGNOSTIC  
CENTER OF THE NATIONAL UNIVERSITY OF PHARMACY**

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**Introduction.** The actualisation of the procedure of verification of conformity and the quality of health services, both in Ukrainian legislation and in the regulatory frameworks for this procedure, is the result of the rapid expanding of the process of Ukraine's integration into the EU. A validation is the one of the stages of the quality system development and implementation. By researches and providing the objective evidences the validation confirms that the particular requirements for a specific targeted use are performed. The main object of evaluation is the techniques by which the measurement of various parameters in the laboratory is conducted, and in order to guarantee the reliable and accurate analysis, a procedure of validation of laboratory techniques is required.

**Aim.** To study the aspects of quality in Laboratory of Clinical Diagnostics of Clinical Diagnostic Center of the National University of Pharmacy through the procedures of validation of assess of suitability of the biochemical methods.

**Materials and methods.** At the Laboratory of Clinical Diagnostics the validation of the techniques: «The comparison of the quality and reliability of estimation of the level of gamma-glutamyltransferase in biological fluids by kinetic photometric test according to the method Zeiss/Persijin at work with the biochemical analyzer Express Plus and spectrophotometer UNICO 2800UV/VIS», «The comparison of the quality and reliability of estimation of the level of alkaline phosphatase in biological fluids by kinetic photometric test at work with the biochemical analyzer Express Plus and spectrophotometer UNICO 2800UV/VIS», «The comparison of the quality and reliability of estimation of the level of direct bilirubin in biological fluids by colorimetric test at work with the biochemical analyzer Express Plus and spectrophotometer UNICO 2800UV/VIS» was conducted. The analytical, statistical and biological methods were used.

**Results and discussion.** In the first place, the validation script was compiled – the features of the techniques were set; the evaluating parameters were analyzed. Then the validation protocol was developed. This document defines the stuff involved in the validation procedure according their qualification; provides the information about proper functioning of the used equipment; establishes the list of tests (techniques) performed during the validation and selects the appropriate processing statistical methods to assess the measurement results.

Research with standard pattern samples, which had the known concentrations of analytes, was performed using the biochemical analyzer Express Plus and spectrophotometer Unico 2800UV/VIS. By relevant techniques the validated characteristics (specificity, convergence and reproducibility, correctness of techniques, uncertainty of measurements) were determined. The comparison of the results obtained when using different equipments was accomplished.

During the assessing of the convergence and reproducibility the analysis of the possible causes of loss of accuracy in the evaluation of the biochemical parameters was performed. The main source of loss of accuracy at working with equipment is operator-technician who performs research. The accuracy and reliability of the validation measurements depends on his/her skills.

To test the impact of «operator-technician» factor on the convergence and reproducibility within the laboratory two operator-technicians, who had the same education, accomplished ten measurements of standard samples of gamma-glutamyltransferase ( $C = 23.2$  mmol/l), alkaline phosphatase ( $C = 219$  mmol/l) and direct bilirubin ( $C = 14.6$  mmol/l). Based on the data we can conclude that the variances are homogeneous and the samplings belong to the same general population. Thus, these techniques have intra-laboratory convergence of researching factor.

The correctness of technique was investigated. The accuracy within the laboratory was estimated using standard samples. The experiment was carrying out in conditions of intra-laboratory repeatability and convergence. Each series of measurements were checked for homogeneity. According to the requirements of the State Pharmacopoeia of Ukraine at least three measurements were performed in each series.

As the metrological parameter of validation we also calculated the expanded uncertainty of the measurement under conditions of convergence, reproducibility and accuracy of the technique. Expanded uncertainty showed that the values of gamma-glutamyltransferase, alkaline phosphatase and direct bilirubin can be considered as accurate and reliable results. So our determination of indicators by the biochemical analyzer Express Plus can be compared with those obtained by the spectrophotometer Unico 2800UV/IS.

**Conclusions.** The validation of the techniques of evaluation of gamma-glutamyltransferase, alkaline phosphatase and direct bilirubin in biological fluids at work with the biochemical analyzer Express Plus and spectrophotometer Unico 2800 UV/VIS proved that these techniques have the parameter performances, which are relevant, match the established criteria. The indicators measured by these techniques are relevant too. It was also proved that measurements made using these equipments are comparable and the results can be correlated in medical research.

**SECTION № 13**

**MODERN PHARMACOTHERAPY**

## MODERN PHARMACOTHERAPEUTIC ASPECTS OF ALCOHOL-ASSOCIATED POLYNEUROPATHY

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**Introduction.** Alcohol abnormality in the structure of other forms of substance dependence is the dominant. Alcohol-related polyneuropathy is a neurological disorder in which multiple peripheral nerves throughout the body malfunction simultaneously. Alcohol-related polyneuropathy is a chronic and potentially debilitating disease that can be associated with sensory, motor, and autonomic nerve dysfunctions. Alcohol-related polyneuropathy is caused primarily by chronic alcoholism; however, vitamin deficiencies are also known to contribute to its development. The most constant and frequent damage to the nervous system when alcohol abuse is polyneuropathy. Polyneuropathy occurs in people who abuse alcohol, or as a result of the toxic effects of alcohol. It is believed that alcohol impairs the protective barrier of the peripheral nervous system, on the one hand, and can be a risk factor for development of chronic hyperglycemia, breaking the utilization of B vitamins. Timely correction of vitamin metabolism disorders, along with other therapeutic measures, can prevent the development of polyneuropathy or to facilitate its flow. This aspect justifies the relevance of research in this direction.

**Aim:** to study aspects of pharmacotherapy of alcoholic polyneuropathy drug Neyromultivit®.

**Materials and Methods.** Under our supervision there were 87 patients, KRCDTH patients suffering from alcohol addiction for more than 5 years old, male, aged 37 to 67 years (mean age was  $44.6 \pm 2.35$  years). All the patients underwent a thorough clinical and neurological examination with the study of anamnestic data.

**Results and discussion.** Polyneuropathy results confirmed data electroneuromyographic, was observed in 62 (71%) patients with alcohol dependence who were randomized into 2 groups: the main group (n = 30) received Neyromultivit® 1 tablet 3 times a day for 21 days, and a control group (n = 32) that received the standard vitamin therapy (B1, B6, B12) drugs administered parenterally.

In the course of the study in both groups noted a decrease in the severity of pain (clinically and scales). No significant differences in efficacy and safety between the two groups of patients receiving Neyromultivit®, and a group of patients treated with vitamins parenterally received.

**Conclusions.** The study showed the effectiveness of treatment of alcoholic polyneuropathy by Neyromultivit® when dosing regimen of 1 tablet 3 times daily for 21 days as an equivalent replacement of B vitamins for intramuscular injection.



# MODERN PHARMACOTHERAPY FOR NONALLERGIC RHINITIS

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**Introduction.** Today the problem nonallergic rhinitis is relevant. According to epidemiological studies worldwide nonallergic rhinitis affects about 450 million people. Nonallergic rhinitis is not-IgE-mediated disease with chronic nasal symptoms such as nasal congestion, rhinorrhea, sneezing. According to the International Classification (WHO, 1994) nonallergic rhinitis is divided into infectious; vasomotor; drug-induced; occupational; hormonal; gustatory; nonallergic rhinitis with eosinophilic syndrome.

**Aim.** The study of modern pharmacotherapy nonallergic rhinitis according to current standards of care for patients with nonallergic rhinitis.

**Materials and methods.** The analysis of contemporary foreign literature on aspects of pharmacotherapy nonallergic rhinitis, standards of care for patients with rhinitis.

**Results and discussion.** For pharmacotherapy nonallergic rhinitis group of drugs used are nasal anticholinergics, nasal steroids, nasal sympathomimetics and systemic antihistamines. Among nasal corticosteroids are widely used beclomethasone dipropionate, budesonide, fluticasone propionate, mometasone, fluticasone furoate. Among the nasal anticholinergic agents according to foreign sources recommend nasal ipratropium bromide. Among the designated nasal sympathomimetic is oxymetazoline, xilometazoline, nafazoline, tramazoline, tetrazyoline. Among the topical antihistamine azelastine used. Systemic antihistamines such as loratadine, dezloratadine, cetirizine, levocetirizine are used. The choice of drugs for pharmacotherapy depends on the type nonallergic rhinitis. For vasomotor rhinitis, drugs of choice are nasal anticholinergic and sympathomimetic drugs. For pharmacotherapy nonallergic rhinitis with eosinophilic syndrome, nasal corticosteroids and nasal sympathomimetic are recommend. The nasal corticosteroids, antihistamines, nasal anticholinergic and sympathomimetic drugs prescribed hormonal rhinitis. For the treatment of rhinitis occupational shows nasal corticosteroids and nasal antihistamines. Treatment of drug-induced rhinitis nasal corticosteroids is carried out, and the gustatory rhinitis used nasal anticholinergic drugs.

**Conclusions.** Having analyzed the current foreign and domestic sources revealed that drug therapy used nonallergic rhinitis nasal anticholinergics, nasal steroids, nasal sympathomimetics, antihistamines.

## **POLIOMYELITIS VACCINE PROPHYLAXIS**

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**Introduction.** Polio is one of the most dangerous childhood diseases, which can lead to death or severe disability. There were 125 endemic countries in 1988. Today, only two countries in the world Afghanistan and Pakistan are polio-endemic. In 2015, WHO confirmed 2 cases of infection with circulating vaccine-derived poliovirus.

**Aim.** To study the basic aspects of epidemiology, etiology, pathogenesis, clinical manifestations, treatment and vaccination of poliomyelitis.

**Materials and methods.** WHO adopted a resolution to eradicate polio in the world. This marked the beginning of the Global Polio Eradication Initiative. To completely eliminate the incidence of polio has been developed polio eradication strategic plan and the implementation of the final stage in the 2013-2018.

**Results and discussion.** Polioviruses are human enterovirus belonging to Picornaviridae family. Penetrating into the human body, the virus replicates in the oropharynx and the intestine, penetrate the regional lymph nodes. Approximately 1% of the virus from infected blood-brain barrier and overcomes affects nerve cells, predominantly large motor neurons of the anterior horns of the spinal cord and motor nuclei of the brain stem nerve that leads to the development of acute flaccid paralysis of muscles. In rare cases, viral destruction of bulbar cells leads to paralysis of the respiratory muscles and death. The source of infection is a sick person or a virus carrier. Risk group are children under 5 years. The mechanism of transmission are the fecal-oral, possible airborne. Antiviral drugs for the specific treatment of the disease there.

Maximum protection is achieved polio vaccine prophylaxis. Two types of vaccines have been created: oral polio vaccine (OPV) and inactivated polio vaccine (IPV). Today there is an active immunization of children in Ukraine. Vaccination of children for polio prevention is carried out according to the immunization schedule at ages 2 months, 4 months, 6 months, 18 months and 6 years and 14 years. IPV is used for the first two vaccinations, and with contraindications to the introduction of OPV IPV is indicated for all subsequent immunizations. OPV vaccine used for 3-6-th vaccinations (6 months, 18 months, 6 years and 14 years) in the absence of contraindications.

**Conclusions.** Polio is a dangerous infectious disease, the only protection is vaccination.

# THE INVESTIGATION OF RELATION BETWEEN THE ANTI-INFLAMMATORY ACTIVITY AND THE CHEMICAL STRUCTURE OF BIOLOGICALLY ACTIVE COMPOUNDS OF SALIX BARK EXTRACTS

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**Introduction.** Nowadays drugs received from natural plant materials occupy a leading position in present medicine and pharmacy. The key to success is in their quality, safety and proven effectiveness. The main advantage of these phytodrugs compared to synthesized analogues is in the possibility of rational use among all groups of patients. They guarantee minimum side effects in comparison to synthetic medications. And also it is worth noting that they function when there are strict contraindications to synthetic ones. That is why the search for effective and safe herbal medicines with a broad spectrum of pharmacological activity is so promising.

**Aim.** Screening research and proving new-found effective dose of Salix bark extract on experimental anti-inflammatory activity using the model of acute edema.

**Materials and methods.** Anti-inflammatory effect of Salix extracts was demonstrated on normal model of acute inflammatory edema induced by subcutaneous phlogogenic agent – carragenan. The model describes the exudative phase of acute inflammation in the pathogenesis, where biogenic amines, prostaglandins and kinin–kallikrein system play the leading role. In order to eliminate the effects of fluctuations in hormonal levels the experiment was conducted in laboratory through applying to white male same age and weight (180-200 g) rats of the Wistar line. The substances were divided into doses according to animals' body weight and were injected intragastric in an hour after subcutaneous injection of 0.1 ml 1% carrageenan. There were two control groups: water and diclophenac sodium as compared preparation ( $ED_{50}=8$  mg/kg). Every hour measured leg increased in size and was fixed. Anti-inflammatory activity is determined by the degree of reduction of edema in tested animals compared to control groups and expressed as a percentage.

**Results and discussion.** After the screening test the effective dose of Salix bark extract was found in dose 10 mg, in terms of the animal weight the dose was reduced to 2 mg on a rat. It caused inhibition of experimental edema in 55% compared to the compared preparation diclofenac sodium - 93%.

**Conclusions.** The experimental results and argumentative analysis show that Salix bark extract is perspective in founding effective dose for further study of its specific pharmacological activity and safety. And it absolutely could be implemented into the practical medicine in future as effective and convenient way to overcome most dangerous diseases and even warn them at all.

## **EFFECT OF REAMBERIN ON PROTEIN LEVEL IN BLOOD AND URINE IN EXPERIMENTAL ACUTE KIDNEY INJURY**

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**Introduction.** Acute kidney injury by the various chemicals with exogenous and endogenous origin is fairly widespread self-pathology, or is found in the complex pathological processes of multiple organ dysfunction syndrome, failure. Prognosis of acute kidney injury depends on its type: in pre-renal and postrenal - relatively favorable (full recovery of glomerular filtration rate reached more than 90% of cases, and the mortality rate is less than 7.5%), and in renal - complete recovery occurs in 40-50% of cases, partial - 10-15%, mortality rate is 30-40%.

**Aim.** Given that the majority of toxic substances cause the renal form of acute kidney injury, pathogenetic mechanism of which is to defeat the epithelium of the renal tubules from toxic metabolites and inhibition of cell respiration due to ischemia of the renal parenchyma, we investigated effects of reamberin on protein dynamics in serum and urine in experimental acute kidney injury.

**Materials and methods.** Experiment performed on white rats with average weight of 160-200 grams. The experimental animals were divided into 4 groups: intact, the control (AKI), investigated (AKI + Reamberin), referent (AKI + Hofitol). Acute kidney injury modeled using a single injection of a 50% aqueous solution of glycerol, intramuscularly at a dose of 10 ml/kg. Important links of the pathogenesis of this experimental model is the development of rhabdomyolysis, myoglobinuria with toxic both glomerular and tubular kidney apparatus. Reamberin experimental group was administered 14 days intragastrically at a dose of 5 ml. On 14 day of study was carried out the protein concentration in urine and serum.

**Results and discussion.** The findings of research in the control group show a decrease in serum protein level in 1.29 times, and increase of its level in urine by 2.12 times in comparison with the intact group. Application of Reamberin on a background of pathology significantly reduces the level of protein in the urine by 1.7 times, while serum protein increased by 1.11 times in comparison with the control group. Reference drug Hofitol also normalized protein indicators, but without reaching the values of the investigated drug in 1.08 times and in 1.3 times, respectively.

**Conclusions.** Thus, in the experimental data there is a clear positive dynamics of Reamberin complex influence on the serum and urine protein levels in experimental acute renal injury. These values allow to further explore of nephroprotective, antihypoxic properties.

## SECONDARY PREVENTION OF ACUTE RHEUMATIC FEVER

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**Introduction.** Acute rheumatic fever (ARF) and chronic rheumatic heart disease (CRHD) is the complications of nasopharyngitis or tonsillitis caused by beta-hemolytic streptococcus group A (GABHS), which arise as a result of delayed immune response to streptococcal infection. CRHD is a consequence of rheumatic fever transferred to the formation of heart disease as a result of inflammation.

According to WHO, the incidence of ARS ranges from 0.55 to 11 per 1,000 population and most often affects the age group of 5-15 years. Death rates from in the world from CRHD range from 4.5 (in Europe) to 8.2 (in China) to 100 thousands population. In Ukraine, the incidence of rheumatic fever in recent years, ranges 0.03 per 1000 children (aged 0-17 years), the incidence of rheumatic fever is 0.05 per 1,000 children (0-14 years) and 0.07 per 1000 (0-17 years).

**The objective of our research** was to investigate how it's performed secondary prevention of rheumatic fever in the international medical practice.

**Materials and methods.** Secondary prevention is a long-term use of antibiotic therapy in patients who have had rheumatic fever or patients with CRHD to prevent colonization of the upper respiratory tract of GABHS and repeated attacks and rheumatic disease progression.

**Results and conclusions.** The basis of the secondary prevention is the use medications of long-acting penicillin. In accordance with international recommendations, benzathine benzylpenicillin-G is assigned by deep intramuscular injection once every 4 weeks (in some cases, once every 3 weeks). Children weighing 20-30 kg injected a dose of 600 units, and for all other age patient groups injected dose of 1200000 units.

If the patient has allergy to penicillin, macrolides secondary prevention is carried out in cycles of 10 days each month Children who have had rheumatic fever without carditis, secondary prevention is carried out for 5 years or until the age of 21 years old. In the presence of carditis without CRHD, secondary prevention is carried out for 10 years or up to 21 years longer or more. In the presence of carditis with CRHD, secondary prevention is carried out for 10 years or until age 40 or longer.

Unfortunately, the appointment of any pharmacotherapy for the treatment of ARS (except for the treatment of heart failure in the case of necessity) does not reduce the frequency and severity of carditis, but adequate antibiotic therapy and antibiotic prophylaxis is the main factor preventing replay attacks, which contribute to a more rapid and severe heart failure.

# PHARMACOTHERAPY OF HYPERACID CHRONIC GASTRITIS IN CHILDREN

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**Introduction** Chronic gastritis (CG) is a chronic relapsing staging inflammation of the gastric mucosa (GM) and the submucosal layer. This inflammation leads to a violation of the secretory, motor, and often the endocrine functions of the stomach and duodenum. Hyperacidity CG is most often caused by an infection *Helicobacter Pylori* (HP) (in 80-85% of cases).

**The objective of our research** was to investigate and compare the pharmacotherapy of CG-associated with the *Helicobacter Pylori* infection in the international medical practice.

**Materials and methods.** We studied the characteristics of the European recommendations on eradication *H. pylori* in children of different ages.

**Results and conclusions.** Three- or four-component scheme of treatment is used in children up to 12 years. Prescribe colloidal bismuth subcitrate in a dose of 4-8 mg/kg per day in combination with amoxicillin at 25 mg/kg and nifuratel 15 mg/kg for 7 days. In the presence of an allergy to penicillin is used in the scheme clarithromycin therapy at a dose of 7.5 mg / kg. Blockers H<sub>2</sub>-histamine receptors are used in the schema therapy for children up to 12 years. Ranitidine is prescribed for 75-150 mg at twice a day for 20 minutes before eating or for famotidine 10-20 mg twice a day regardless of the meal. The drug is administered for 7-10 days and then the dose is reduced by 2 times and the treatment continues for 2-3 weeks.

In children over 12 years prescribe triple therapy with the aim of eradication of *H.pylori* - amoxycillin combined with clarithromycin in combination with nifuratel. Instead nifuratel is possible appointment of colloidal bismuth subcitrate. Four-component therapy includes nifuratel, colloidal bismuth subcitrate in combination with amoxycillin or clarithromycin. All drugs are prescribed twice a day every 12 hours for 7 days. Azithromycin is prescribed for once a day for three days last week course. As antisecretory drugs in the scheme of therapy can use inhibitors of H<sup>+</sup>/K<sup>+</sup> - ATP-ase inhibitor (PPI). Omeprazole appoint 10-20 mg (pantoprazole 20-40 mg per day) once a day in the morning before eating for 7-10 days.

The general principles of pharmacotherapy of CG-associated with the *Helicobacter Pylori* infection aimed at complete eradication of *H. pylori*. Four-component therapy is indicated for the ineffectiveness three- component therapy of first-line therapy. The drug reduces the acidity of the selected depending on the age of the child.

# COMPARATIVE CHARACTERISTICS OF STATINS IN MODERN PHARMACOTHERAPY FOR ATHEROSCLEROSIS

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**Introducing.** The prevalence of cardiovascular diseases in Ukraine amounted to 56.2 thousand per 100 000 population. The main cause of death, even working age is coronary heart disease due to the development cardiosclerosis. Atherosclerosis is a disease characterized by lesions of artery walls due to the formation of atherosclerotic plaques that have varying degrees of narrowing the lumen, leading to acute or chronic reduction of blood flow to vital authorities. For pharmacotherapy of atherosclerosis use following groups of drugs: statins, fibrates, bile acid sequestrants and other lipid-lowering agents. Of the group of statins are recommend following medication: lovastatin, pravastatin, simvastatin, atorvastatin, rosuvastatin. In addition, cholesterol-lowering statins are used in combination with other lipid-lowering agents: inedzhi (a combination of 20 mg of simvastatin and 10 mg of ezetimibe), and asia-ator (a combination of 10 mg of atorvastatin and 10 mgezetimibu). Quite often, the choice is between atorvastatin and rosuvastatin – modern synthetic statins, has a marked effect lipid-lowering effect. Currently, both drugs are actively studied, have extensive evidential bases. A number of studies have been conduct directly comparing the original atorvastatin and rosuvastatin.

**The aim** of our study was to examine the results of a multicenter study compared the effectiveness of atorvastatin and rosuvastatin.

**Materials and method.** We learned the results of this multicenter study such as STELLAR, URANUS, CENTAURUS COMETS, ANDROMEDA, JUPITER.

**Results and discussion.** Rosuvastatin and atorvastatin have pronounced hypolipidemic effect. Rosuvastatin has some advantage over atorvastatin in lowering total cholesterol and low-density lipoprotein cholesterol. Impact on triglycerides were comparable. It has been proved that long-term use rosuvastatin 40mg reduces the diameter of the atherosclerotic plaque in the vessel. Rosuvastatin had significant advantages over atorvastatin in influencing the level of inflammatory markers, as well as the progression of atherosclerosis. Atorvastatin has the largest list of indications for use for both primary and secondary prevention of cardiovascular disease. Rosuvastatin has registered indications for use - secondary prevention of cardiovascular disease.

**Conclusions.** Having conducted a comparative analysis of the effectiveness of atorvastatin and rosuvastatin in the pharmacotherapy of atherosclerosis, we can conclude that both drugs are approve for use and do not have clear benefits to each other.

# MODERN PHARMACOTHERAPY FOR ACUTE RESPIRATORY VIRAL INFECTIONS

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**Introduction.** Acute respiratory viral infections (ARVI) are the most common infectious disease affecting all age groups. The reasons for temporary disability ARVI ranks first. In Ukraine annually ARVI are sick 10-14 million people. WHO experts say that the most common in the human population group of diseases in recent years, has a constant tendency to increase.

**Aim.** The study of the current standards of care for patients with acute respiratory viral infections.

**Materials and methods.** We analyzed the articles, adapted clinical guidelines based on evidence, unified clinical protocols of emergency medical care for acute respiratory infections, including influenza.

**Results and discussion.** The cause of ARVI is a different group of viruses: influenza, parainfluenza, adeno-, respiratory syncytial, pikorna-, korona-, reo-, entero- and herpesvirus. For each type of virus is the most difficult lesions characteristic of a particular department of the upper respiratory tract with the development of characteristic symptoms. Etiotropic antiviral pharmacotherapy was conduct with influenza (A and B) drugs from the group neuraminidase (oseltamivir, zanamivir). Specific antiviral agents for treatment of other ARVI does not exist. Pharmacotherapy is aimed at addressing the symptoms (symptomatic therapy). Apply the following drugs: antipyretic agents (ibuprofen, acetaminophen), antihistamines for systemic use (chloropyramine, clemastine, loratadine, dezloratadine, cetirizine), decongestants and other drugs for topical application in the case of diseases of the nose (oxymetazoline, xilometazoline, nafazoline, tramazoline, tetrazyoline), antiseptics used for treatment of throat (ambazone, chlorhexidine), expectorants (guaifenesin, marshmallow root, leaf ivy), mucolytic drugs (acetylcysteine, bromhexinum, ambroxol, carbocisteine), antitussive agents (glaucine hydrobromide, okseladyn). A specific vaccine prophylaxis was carry out under the threat of epidemic (pandemic) Influenza. In 2015-2016 years in Ukraine registered the following vaccines: Vaxigrip, Influvak.

**Conclusion.** So we studied and analyzed the current standards of care for patients with ARVI under which causal treatment of antiviral agents recommended for influenza, ARVI in other modern pharmacotherapy aimed at addressing the symptoms, specific Vaccine is indicated for influenza.



## MODERN PHARMACOTHERAPY POISONING OPIATES

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**Introducing.** Opioids – a substance derived from the opium poppy, and their synthetic analogs having similar effects. Examples of opioids are morphine, heroin, tramadol. Opioids have the ability to cause drug dependence and are characterized by a strong desire to use them, they also cause tachyphylaxis, which sooner or later leads to poisoning and overdose. **The aim** of our study was to investigate modern rational pharmacotherapy for opiate poisoning.

**Materials and method.** We was study the adapted clinical guidelines based on evidence, articles, unified clinical protocols of emergency medical care and pharmacotherapy for poisoning opiates.

**Results and discussion.** The main symptoms of acute intoxication by opiates are dizziness, tinnitus, dry mouth, nausea, sometimes vomiting. Observed excitement, alternating with increasing sleepiness. The skin of the face and torso hyperemic or pale, sometimes puffiness of the face, itching and rash. The body temperature is reduce, skin feels wet and cold, cold extremities is observe. Pulse slow, arrhythmic. Pharmacotherapy of opioid addicts consists of three main phases: detoxification (mild withdrawal syndrome); somatoneurological correction of mental disorders and primary preventive treatment; supporting preventive treatment. For the relief of withdrawal symptoms using integrated circuit with psychopharmacological agents, wegetotropic drugs, muscle relaxants, painkillers, treat with prolonged medicated sleep (with the use of anesthesia: thiopental sodium, sodium hydroxybutyrate); replacement therapy with the use of narcotic analgesics and their gradual cancellation (methadone, buprenorphine programs, the legalization of soft drugs and delivery of treated persons drugs addiction), rapid opioid detoxification. The main objectives of the second phase of pharmacotherapy are correction somatovegetativnyh postabstinent violations in the form of asthenic syndrome, vegetative and psychopathological disorders (neuroleptics: haloperidol, periciazine, amitriptyline, thioridazine hydrochloride; antiepileptic: karbmazepin, levomepromazine, analgesics: flupirtine maleate; antispasmodics: drotaverinum; alpha-blockers: pirroxan). The basis of third stage constitute non-pharmacological methods, especially psychotherapy.

**Conclusions.** Thus, the main directions of modern pharmacotherapy of opiate poisoning are detoxification, somatoneurological correction of mental disorders and primary preventive treatment; supporting preventive treatment.

## MODERN PHARMACOTHERAPY FOR ONYCHOMYCOSIS

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**Introduction.** Today the problem of onychomycosis is urgent, due to the prevalence of onychomycosis in the population and their high contagiousness. According to epidemiological data onychomycosis incidence is 20% of the population and 50-70% in the structure of fungal diseases. Onychomycosis – is a generic term that refers to fungal infection of nails feet and hands, caused dermatophyte, mold fungi. The most common causative agents of disease are fungi of the genus *Trichophyton*, *Candida* and *Epidermophyton*.

**Aim.** To study the basic aspects of epidemiology, etiology, pathogenesis, clinical manifestations and modern pharmacotherapy for onychomycosis.

**Materials and methods.** The analysis of foreign literature, modern domestic and foreign standards of care for patients with onychomycosis.

**Results and discussion.** The main clinical symptoms of onychomycosis are changes in color, shape of the nail due to subungual hyperkeratosis and destruction of the nail plate. For the diagnosis of onychomycosis used bacterioscopic and bacteriological methods. Modern pharmacotherapy for onychomycosis includes systemic and topical antifungal therapy. Topical therapy may only be apply in case of damage of less than 30% of the nail plate in the absence or low hyperkeratosis, contraindications to systemic therapy. Local antifungal therapy include using of keratolytics for lysis of the affected nail plate from the nail bed, followed by treatment antifungals for topical use. As keratolytic agents may be used patches containing urea. There form of drugs for the topical application are lacquer, cream, ointment, containing ketoconazole, terbinafine, oxiconazole, miconazole, and undecylenic acid. Systemic antifungal therapy is required to shown at the defeat of more than 50% of the nail plate, a 2-3 defeat of the nail plate, nail plate pronounced changes (hyperkeratosis, onycholysis), the defeat of the nail matrix. Among the antifungal drugs for systemic use recommended ketoconazole, itraconazole, fluconazole, terbinafine. Duration of pharmacotherapy is determined by the severity and nature of the disease, the average course of treatment is 6-12 weeks, sometimes more. Itraconazole can be use also in the form of pulse therapy. Itraconazole administered 200 mg two times a day for 7 days and after 3 weeks of rest. It recommended in the defeat nail plates hands – 2 courses, nail plates feet – 3 courses of pulse therapy.

**Conclusions.** Modern pharmacotherapy for onychomycosis includes combination topical and systemic antifungal drugs.

# STUDY OF EFFECT OF OLIGOPEPTIDES DERIVATIVES ON RATS BEHAVIORAL RESPONSES IN THE "OPEN FIELD" TEST

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**Introduction.** System reaction to stress, which is aimed at eliminating or mitigating negative effects, is accompanied by changes in behavior, autonomic, motor, sensory and other body functions. Behavior stress is an integral part of the overall behavior, thus changing behavioral reactions leads to inhibition of the central nervous system.

**Aim.** The purpose of this work was to study the effect of oligopeptides derivatives on behavioral responses of rats in the "open field" test.

**Materials and methods.** The study objects were oligopeptides derivatives. The study of behavioral responses was performed using the "open field" test. Investigated substances were administered orally in the form of aqueous solutions in doses of 70 and 100 mg/kg in 60 minutes before the experiment start. The animals of control group were injected with the corresponding volume of saline. "Open field" test recorded the following parameters: rear onto its hind legs number - vertical component of estimated response, number of crossed squares - horizontal component; number of explored holes - the hole exploratory behavior that reflects exploratory activity, and the number of defecation, urination and grooming acts - indicator of animal emotion.

**Results and discussion.** The study found that the number of crossed squares was significantly increased after the administration of compound 2 at a dose of 70 mg/kg by 72.2% and at a dose of 100 mg/kg by 56%, compound 4 at a dose of 70 mg/kg by 67% and at a dose of 100 mg/kg by 83.3%. The administration of the compounds was affected to the number of explored holes as follows: compound 1 at a dose of 100 mg/kg, compound 2 at a dose of 70 mg/kg, compound 5 at a dose of 100 mg/kg increased the index by 88.9%.

During the study it was found that the greatest influence on the behavior of rats, such as psycho-stimulant activity, showed the compound 6 which increased the number of crossed squares in 2 times at a dose of 100 mg / kg, the number of vertical racks in 1,7 times, and the number of explored holes in 1.8 times, in comparison with a group of control animals. The administration of the same compound at a dose of 70 mg/kg influenced the behavior of experimental animals such as the number of crossed squares increased by 64.8%, the number of vertical racks by 56%.

**Conclusions.** Among the seven oligopeptides derivatives all substances are characterized by psycho-stimulant activity at a dose of 100 mg/kg. The greatest influence on the behavior of rats showed the compound 6.

## **COUGH MODEL IN THE RATS INDUCED BY 10% CITRIC CITRIC ACID**

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**Introduction.** Cough – a natural reflex defensive reaction that occurs in response to any irritation airway inflammation or something that prevents the passage of air for pneumatic paths. Despite the fact that the cough reflex is natural in our body which main function - cleansing the respiratory tract and restore their patency, severe cough can significantly reduce the quality of life of any person. Drug for the treatment of cough should be safe and highly effective to the patient in a very short time deprived of this disease. Presently it becomes increasingly popular herbal medicine. A promising medicinal plant raw material is *Ledum palustre*. *Ledum palustre* - evergreen shrub heather family (Ericaceae), which includes essential oil (1.5-3%), which is 70% of the sesquiterpene alcohol, the main of which is ledol and palyustrol. In modern medical practice, *Ledum palustre* is used as an antitussive and expectorant.

**Results and discussion.** We have been set up an experiment- cough model in rats induced with citric acid in the vivarium at the Institute of Microbiology and Immunology I.I. Mechnikov NAMS of Ukraine. The experiment involved rats weighing 200-250 g rat was placed in a box, which has been connecting to the nebuliser and inhaled citric acid 10% for 5 minutes. The experiment consists of 2 stages. In the first stage the animals individually tested for reaction intensity citric acid per day prior to administration of the test substance. The experience collected intense coughing rats (15-25 cough attacks within 30 minutes). In the second step (the next day) experienced reference drug codeine (20 mg / kg) which was administered orally through a metal probe 60 minutes before the inhalation of 10% citric acid for 5 minutes. The study gave a positive result- after the introduction of caffeine coughing attacks decreased on 79%.

**Conclusions.** The stated cough model makes it possible to study the antitussive activity and dose dependence of extracts *Ledum palustre*. If it's necessary we can explore the duration of antitussive effect.

# MODERN PHARMACOTHERAPY FOR ATRIAL FIBRILLATION

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**Introducing.** Atrial fibrillation (AF) has strong associations with other cardiovascular diseases, such as heart failure, coronary artery disease, valvular heart disease, diabetes mellitus, and hypertension. It is characterized by an irregular and often rapid heartbeat. AF is the most frequently encountered cardiac arrhythmia. AF is strongly age-dependent, affecting 4% of individuals older than 60 years and 8% of persons older than 80 years. The incidence of AF is significantly higher in men than in women in all age groups.

**The aim** is to study and compare the current recommendations for pharmacotherapy of AF, contained in the Ukrainian protocol, European and American guidelines.

**Materials and method.** We learned Ukrainian Adapted clinical guidelines for treated atrial fibrillation, evidence-based, 2015 and compared with Guideline for the Management of Atrial Fibrillation of the European Society of Cardiology, 2010 and 2014 AHA/ACC/HRS Guideline for the Management of Patients Atrial Fibrillation.

**Results and discussion.** Pharmacotherapy's goals for AF are to reset the rhythm, control the heart rate and prevent blood clots. To reset the rhythm to sinus rhythm using cardioversion, which can be conducted in two ways: electrical cardioversion or cardioversion with drugs. In electrical cardioversion an electrical shock stops heart's electrical activity momentarily. In cardioversion with drugs uses anti-arrhythmics medications: dofetilide, flecainide, propafenone, amiodarone, sotalol. Heart rate control can be achieved through several medications: digoxin may control heart rate at rest, but not as well during activity. Most people require additional or alternative medications, such as beta blockers (metoprolol and atenolol), calcium channel blockers (diltiazem and verapamil). Sometimes medications or cardioversion to control atrial fibrillation doesn't work. In those cases, recommend a procedure to destroy the area of heart tissue that's causing the erratic electrical signals and restore heart to a normal rhythm (catheter ablation). Most people with atrial fibrillation are at especially high risk of blood clots that can lead to stroke. To prevent blood clots recommended anticoagulants: warfarin, dabigatran, rivaroxaban.

**Conclusions.** Pharmacotherapy of AF includes restoring a normal heart rhythm, preventing blood clots from forming, thus lowering the risk of stroke; rate control allows the ventricles enough time to completely fill with blood. With this approach, the abnormal heart rhythm continues, but you feel better and have fewer symptoms. Current recommendations are identical in all investigated sources of information.

# MODERN PHARMACOTHERAPY FOR ALCOHOLIC LIVER DISEASE

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**Introducing.** The spectrum of alcohol-related liver injury varies from simple steatosis to cirrhosis. The incidence and mortality rate depends on alcoholic liver disease (ALD) alcohol consumption per person. Every day due to diseases related to alcohol, killed 40 Ukrainian.

**The aim** of our study is to examine the current guidelines for pharmacotherapy ALD.

**Materials and method.** We have examined the following documents: Unified clinical protocols of primary, secondary (specialized) medical care of alcoholic hepatitis, approved by the Ministry of Health of Ukraine № 826, November 6, 2014; Practice Guideline Committee of the American Association for the Study of Liver Diseases and the Practice Parameters Committee of the American College of Gastroenterology, 2010.

**Results and discussion.** The diagnosis of ALD is based on a combination of features, including a history of significant alcohol intake, clinical evidence of liver disease, and supporting laboratory abnormalities. Decisions regarding treatment are critically dependent on the ability to estimate a given patient's prognosis. It has been suggested prognostic scoring systems used for patients with ALD. Maddrey (modified) discriminant function (MDF) (poor prognosis if score  $>32$ ), MELD score (poor prognosis if  $>18$ ), Glasgow Alcoholic Hepatitis score (GAH) (poor prognosis if score  $>8$ ). Abstinence is the most important therapeutic intervention. The presence of significant protein calorie malnutrition is a common finding in alcoholics, as are deficiencies in a number of vitamins and trace minerals, including vitamin A, vitamin D, thiamine, folate, pyridoxine, and zinc. The most recent metaanalysis demonstrate an effect of steroids in the subgroup of patients with hepatic encephalopathy and/or a MDF score more than 32. Recommended dose of prednisolone is 40 mg/day for 4 weeks then tapered over 2-4 weeks, or stopped, depending on the clinical situation. Patients with severe disease (MDF  $> 32$ ) could be considered for pentoxifylline therapy (400 mg orally 3 times daily for 4 weeks), especially if there are contraindications to steroid therapy. Appropriate patients with end-stage liver disease secondary to alcoholic cirrhosis should be considered for liver transplantation.

**Conclusions.** All patients with ALD should be counseled to completely abstain from alcohol, assessed for nutritional deficiencies; should be considered for a course of prednisolone and pentoxifylline therapy.

## PK-MERZ IN THE PHARMACOTHERAPY OF PARKINSON'S DISEASE

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**Introduction.** L-glutamate - the major excitatory neurotransmitter in the brain of humans and animals. Glutamate is found in the CNS of all, since it is not only a neurotransmitter, but also a precursor of other amino acids.

Excitatory neurotransmitter glutamate can cause damage and death of dopaminergic neurons (DA neurons), and therefore the damaging effect of glutamate on neurons is designated by the term "excitatory amino acid toxicity" or "excitotoxicity". Glutamate excitotoxicity mediated by NMDA-receptors, called for a specific antagonist of N-methyl-D-aspartate. Parkinson's disease (PD) accompanied by neuronal loss due to glutamate excitotoxicity, could be a target for the treatment of NMDA-receptor blockers.

**The objective of our research** was to investigate the clinical efficacy of glutamate blockers in patients with PD.

**Materials and methods.** Amine derivative of amantadine (amantadine, midantan, midantan, PK-Merz) were assigned to patients with Parkinson's disease as antagonists of glutamate in the neurological clinic. Ukraine has registered amantadine sulfate (PK-Merz).

**Results and conclusions.** PK-Merz was recommended as a means to BP initial therapy in patients with a predominance of rigidity and hypokinesia. The starting dose for all members of the class of amantadine is 100 mg per day. If necessary, the dose is increased to 100 mg per week to a daily dose of 300 mg in young and middle-aged patients and not more than 200 mg for elderly patients. A further increase in the dose usually does not lead to clinical improvement, but significantly increases the risk of side effects. The maximum daily dose PK-Merz is 600 mg. Since the PK-Merz has a sufficiently long half-life, the daily dose is recommended to be divided into 2 doses. PK-Merz may be effective as monotherapy in the early stages of PD, allowing the delay time of the appointment of levodopa, and as an adjunct to levodopa in the later stages of the disease, helping to lengthen the action of levodopa, a reduction of hyperkinesia caused by levodopa, cupping akinetic crises. Intravenous amantadine sulfate is effective in cases of akinetic crisis and expressed drugs for complications of levodopa therapy, which is an additional indication for its use.

Thus, based on advanced algorithms treat PD, PK-Merz used in clinical practice in the form of monotherapy, including patients treated previously anticholinergics or levodopa is used for reducing dyskinesias, including in the form of intravenous infusions.

**SECTION № 14**

**PHARMACOECONOMIC STUDIES OF DRUGS**



**ANALYSIS OF RANGE AND ECONOMIC AVAILABILITY  
OF ORAL HYPOGLYCEMIC DRUGS  
IN THE PHARMACEUTICAL MARKET OF UKRAINE IN 2012-2014**

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**Introduction.** Diabetes mellitus (DM) – is the endocrine disease. It is characterized by chronic increase the level of glucose in the blood due to absolute or relative insulin deficiency. This leads to disruption of all types of metabolism, vascular damage, nervous system and other organs and systems. Diabetes mellitus is one of the most common disease, it occupies the main place not only in the structure of endocrine diseases, but also among the diseases of non infectious nature: on a death rate it occupies the third place after cardiovascular and oncologic pathologies. Every year recorded 7 millions of new cases of DM in the world. In 85-90% of cases it is DM of type 2. Prevalence of DM is increasing all time. Diabetes mellitus shortens the life of millions of people on the planet and its complications lead to decreasing in quality of life, disability and increasing of demand in hypoglycemic agents. In this connection the study the assortment of antidiabetic drugs in the pharmaceutical market, that allows us to determine how much the current range of these drugs in Ukraine, is necessary.

**The aim** - to analyze the range and economic availability of oral hypoglycemic drugs (OHGDs) in the Ukrainian pharmaceutical market in 2012-2014.

**Objects.** Register of retrieval information of "Morion" system, Compendium on-line. For analysis the social and economic availability of OHGDs indicator of solvency adequacy (Ca.s.), which shows percentage of patient salary on course dose of the drug, was calculated. The value of average salary in Ukraine during the studied years were found at the website: [www.ukrstat.gov.ua](http://www.ukrstat.gov.ua). According to the value of the indicator Ca.s. all trade names (TNs) of OHGDs were divided into three categories: highly available with  $Ca.s. < 5\%$ , medium available ( $5\% < Ca.s. < 15\%$ ) and low available ( $Ca.s. < 15\%$ ).

**Results and discussion.** In Ukraine in 2014 on the basis of 23 INNs 138 TNs of OHGDs were registered, among them 40 % were domestic and 60% were foreign production. Quantitative analysis of the TNs in 2012-2014 was carried out. As a result of the analysis it was found, that the number of TNs of metformin (biguanide) of domestic production from 2012 to 2014 increased (in 2012 - 8 TNs, in 2014 - 19 TNs), as well as derivatives of sulfanilamide: glimepiride (in 2012 - 10 TNs, in 2014 - 15 TNs), gliclazide (in 2012 - 3 TNs, in 2014 - 9 TNs), glibenclamide (in 2012 - 2 TNs, in 2014 - 6 TNs). In the structure of foreign drugs the tendency their number

reducing in the Ukrainian market has been established. For metformin drugs were determined 32 TNs in 2012 and 29 TNs in 2014, for glimepiride - 20 TNs in 2012 and 17 TNs in 2014, for gliclazide - 3 TNs in 2012 and 4 TNs in 2014, for glibenclamide - 2 TNs in 2012 and 2 TNs in 2014. Also, a comparative analysis of prices was conducted. As a result it was found, that the prices of products both foreign and domestic production increased slightly.

In order to analyze the availability of OHGDs indicator of solvency adequacy (Ca.s.) has been calculated for the 23 INNs. Low value of indicator of solvency adequacy ensures the availability of drugs and guaranteed its sales in low solvency of the population. It is found, that highly available drugs with  $Ca.s. < 5\%$  were metformin, glibenclamide, gliquidone, glimepiride, voglibose, repaglinide, dapagliflozin, izodibut and combinations of drugs: glibenclamide with metformin, glipizide with metformin, metformin with glimepiride, glimepiride with pioglitazone and metformin. Medium available drugs, whose  $5\% < Ca.s. < 15\%$ , were gliclazide, pioglitazone, saxagliptin and guar gum. The low available drugs, whose  $Ca.s. < 15\%$ , were sitagliptin, vildagliptin, combination of metformin with sitagliptin, metformin with saxagliptin and new class of drugs exenatide and liraglutide. These drugs are the most effective and safe. In 2012 in Ukraine an innovative product - liraglutide (Viktoza<sup>®</sup>) was registered, later its analogue exenatide (Baeta<sup>®</sup>) was released in the market. These drugs are the first analogs of human glucagon-like peptide-1 (HP-1) in the world. At the present time liraglutide (Viktoza<sup>®</sup>) and exenatide (Baeta<sup>®</sup>) approved for use not only in the combination with other oral hypoglycemic agents, but also as monotherapy. These drugs can effectively do control the carbohydrate metabolism in patients with overweight and obesity and better influence on the level of postprandial glycemia in comparison with other drugs, have proven effect on reducing body weight, provide low risk of hypoglycemia and favorable impact on the cardiovascular system. Another noteworthy effect of these drugs is reduce blood pressure, which is an advantage of drugs.

**Conclusions.** The findings suggest, that in 2012-2014 the oral hypoglycemic agents in the Ukrainian pharmaceutical market were presented in a wide range. The value of indicator of solvency adequacy (Ca.s.) for different products depends on the manufacturer, ranges from low to high, which makes it possible to select, as well as making treatment available to various segments of the population. Low available drugs were the highly effective and safe drugs of last generation exenatide and liraglutide. It should be noted, that the amount of drugs of domestic production in the pharmaceutical market of Ukraine was gradually increased, that in economic terms was very important factor, because their prices and value of indicator of solvency adequacy were lower than that of foreign-made drugs.

# RESEARCH OF STATINS ASSORTMENT IN THE PHARMACEUTICAL MARKET OF UKRAINE

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**Introduction.** According to WHO data every year from cardio vascular disease (CVD) 17 millions of people dies. According to the date of Ministry of Health of Ukraine from strokes and heart attacks every year 400 thousand Ukrainians dies. In Ukraine the mortality rate from CVD is about 67%, it is the highest rate in the world. 80% of deaths from CVD could be avoided by means of timely treatment and prevention. An important risk factor for CVD is hypercholesterinemia. The main drugs for its correction are statins.

**The aim of research.** Analysis of the assortment of statins in the pharmaceutical market during 2012–2015.

**Materials and methods.** For the analysis information of retrieval «Pharmstandard» system was used, which allows us to analyze INNs, manufacturers, assortment, average retail prices of medicines in a given years.

**Results and discussion.** Statins for years of creation and entering in the pharmaceutical market can be divided into four generations. Statins I generation – lovastatin, pravastatin, simvastatin, II generation – fluvastatin, III generation – atorvastatin, cerivastatin, IV – rosuvastatin, pitavastatin. Last drugs, unlike other statins, act in minimal doses 1–4 mg and do not react with cytochrome P<sub>450</sub> in the liver, so it is safer than other.

During 2012-2015 years the main part of the range of statins was foreign and consisted of 82-87%. The range of drugs gradually increased, starting from 133 trade names (TNs) in 2012 to 153 TNs – in 2015. The prices of statins were increased gradually every year starting from 3.13 UAH in 2012 to 1772.82 UAH in 2015. In 2015 on the basis of 6 INNs of statins (simvastatin, lovastatin, fluvastatin, atorvastatin, rosuvastatin, pitavastatin) 153 TNs were presented in the pharmaceutical market of Ukraine. Among them 28 TNs are drugs of domestic manufacturers and 125 TNs of foreign manufacturers. Prices for drugs varied over a wide range from 7 UAH to 1773 UAH. In 2015 were 44 producers. In the pharmaceutical market mostly was presented by atorvastatin (74 TNs of 27 manufacturers).

**Conclusions.** Statins in the pharmaceutical market of Ukraine presented in a wide range with a wide range of prices for the package, which allows the choice of drug based on their efficacy, safety and financial capacity of patients.

## **ANALYSIS OF RATIONALITY OF PHARMACOTHERAPY OF PATIENTS WITH ACUTE CORONARY SYNDROME**

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**Introduction.** Acute coronary syndrome (ACS) - a group of clinical signs and symptoms of coronary heart disease, which give reason to suspect acute myocardial infarction (AMI) or unstable angina. The annual incidence of ACS in industrialized countries - 6 cases per 10 000 population. Pharmacotherapy of acute coronary syndrome is expensive, so it requires optimization of cost.

**The aim of research** - evaluation of rationality of pharmacotherapy of patients with ACS.

**Materials and methods.** The integrated ABC/ VEN/frequency analysis of drugs prescriptions were used.

**Results and discussion.** The analysis of drugs prescriptions for 100 patients with ACS were conducted. For the patient treatment 110 INNs were prescribed. Number of prescriptions per patient were 11.87, indicating polypharmacy. The results of integrated ABC/VEN/frequency analysis showed, that the group A consisted of 17 INNs, 15.89% of the total number of drugs and 39.34% of the total number of prescriptions. Costs on medicines of group A accounted 80.34% of the total costs for treatment of ACS. From group A 14 INNs were classified as vital (V) and 3 INNs were classified as non-essential (N). Group B consisted of 23 INNs, 21.5% of the total number of INNs and 24.18% of the total number of prescriptions. Costs on medicines from group B accounted 15.13% of total expenses for ACS treatment. Twenty INNs from 23 INNs were classified as essential, three INNs were classified as non-essential metabolic drugs. Most of the costs was spent on vital drugs, which accounted 89.97% of total prescriptions in this group. The least costly group C (4.53% of total expenses for treatment of ACS) consisted of 70 INNs, which accounted 62.61% of the total INNs and 36.48% of the total prescriptions. 56 INNs from group C are classified as vital. 14 INNs or one fifth of drugs (20%) were classified as non-essential.

**Conclusion.** The analysis indicates a high level of rationality of costs and pharmacotherapy of patients with acute coronary syndrome.

## PHARMACOLOGICAL CORRECTION OF ATROPHIC SCARS

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**Introduction.** The problem of correction of atrophic scars is gaining more and more relevance not only in cosmetology but also in dermatology, combustiology, aesthetic surgery today. Atrophic scars arise more often after severe forms of acne, difficult healing of surgical wounds, and burns. The main reason for their formation is a chronic inflammatory process. As a result, destroyed skin area is replaced by connective tissue. For the correction of atrophic scars there are a number of methods currently. For example, grinding, surgical removal, mesotherapy, microdermabrasion, chemical peels, laser correction. These methods are costly and require special equipment. Local treatment remains one of the most convenient methods for patients. The main task of local treatment of atrophic scars is to improve blood circulation, decrease inflammation and itching, prevent the possible growth of scar tissue at the site of injury, reducing the height and size of the scar and clarification it. Drugs make the scar less noticeable, softens it and removes the feeling of tightness.

**Aim.** The aim of this work is the analysis of assortment of pharmaceutical preparations for the topical treatment of atrophic scars.

**Materials and methods.** The analysis of modern pharmaceutical market of Ukraine of drugs for the treatment of atrophic scars is carried out for the feasibility of development of new domestic drugs local action. Analysis of drugs was carried out according to the following algorithm. The first is the range, the following are the manufacturer, composition, dosage form and price.

**The result and discussion.** The results of the analysis of the pharmaceutical market have shown that the range is limited for the local treatment of atrophic scars. Only seven registered preparations, but there is no drugs domestically produced. Foreign pharmaceutical companies produce all medications. Statistics is the next America (14,3%), the Netherlands (28,6%), Germany (42,8%), Russia (14,3%).

Drugs are presented on the market have a combined composition. Cepalin is a extract onion Cepae. It has anti-inflammatory, antibacterial action, stimulates collagen production, improves circulation. Allantoin has anti-inflammatory, antibacterial effect, improves blood circulation, has regenerative and keratolytic effect, retains moisture on the skin surface. Heparin sodium has anti-

inflammatory, antiproliferative action. Antiproliferative effect is characterized by the fact that the drug stops the growth of connective tissue cells and improving their water saturation, which is manifested in the softening of hard scar tissue. Silicone dioxide makes the scars more flat, smooth, soft, and also it has moisturizing and anti-inflammatory action. Urea moisturizes and softens the scar, and improves elasticity. Collagenase split collagen until specific amino acids, which are excreted from the body. As a result, there is a healing scar, scar tissue, and its water-electrolyte metabolism is normalized. It should be noted that drugs that stimulate epidermal type of healing are absent in Ukraine. This problem is not solved in the treatment of atrophic scars. Analysis of dosage forms showed that drugs for the treatment of atrophic scars presented ointments (14.3%), creams (28.6%) and gels (57.1%). It should be noted that gels are the most suitable dosage form. The gels created on the basis of the hydrophilic and have moisturizing and soothing effect, give the elasticity of the scar.

A comparison of the pricing policy of drugs for the treatment of atrophic scars showed that it expensive drugs. The average price of which is 740 UAH. The high cost of making these drugs inaccessible for most of the population in modern conditions of economy of Ukraine. This gives the basis for future development of domestic drugs for the treatment of atrophic scars.

**Conclusion.** The analysis of the preparations showed that the expansion of the range of drugs is rational and expedient in the pharmaceutical market of Ukraine. The development of domestic drugs is promising. These drugs will be more affordable for pricing. The drugs will be competitive in terms of their efficiency and price characteristics. This will ensure the availability of treatment for the population of Ukraine.

# ANALYSIS OF THE COSTS ON PHARMACOTHERAPY OF PATIENTS WITH HYPERTENSION

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**Introduction.** Costs for hypertension treatment are significant, so rationality of costs for pharmacotherapy of patients with hypertension is very actual.

**Aim** - analysis of the costs for pharmacotherapy of patients with hypertension.

**Materials and methods.** The medical cards of 120 patients, receiving care in the hospital of town Gorodok of Khmelnytsky region, were analyzed. ABC-analysis, which provides the distribution of medicines into three groups according to the size of the costs of their using: group A includes drugs, the costs of which constitute 70-80%; group B – 15-20%; group C – 5-10% respectively, were used. Frequency analysis is the distribution of drugs according to frequency of prescriptions was used.

**Results and discussion.** For the patient treatment 175 trade names (TNs) of drugs from 34 pharmacological groups were prescribed. 120 patients received 1164 prescriptions, more than 10 drugs per patient. It indicates polypharmacy. This number of prescriptions can be justified by serious disease and associated pathologic conditions. Combinative ABC- and frequency analysis showed, that group A consisted of 33 drugs, 18.9% of the total number of drugs and 37.7% of the total number of prescriptions. Costs on medicines of group A accounted 79.7% of total costs on hypertension therapy and related diseases. Group B consisted of 46 drugs, that were 26,3% of the total number of drugs and 34,4% of the total number of prescriptions. Costs on medicines from group B accounted 14.7% of the total costs. The least expensive group C (5.4% of the total costs) consisted of 96 drugs, that were 54.8% of the total number of drugs and 27.9% of the total number of prescriptions.

**Conclusion.** The high level of costs expended on frequently prescribed antihypertensive drugs, which indicates the rationality of costs.

# ABC ANALYSIS OF TREATMENT OF NON-VIRAL CHRONIC HEPATITIS IN HOSPITAL

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**Introduction.** Liver disease takes one of the first places on the incidence and the fifth place among the most common cause of mortality in many developed countries. The increased incidence of chronic liver disease called "second epidemic of the century" after the "epidemic" of cardiovascular diseases. In Ukraine during last 10 years the incidence of chronic hepatitis (CH) increased to 76.6%. 356 481 patients with chronic hepatitis have been reported in the country in 2013. Their share in the total number of liver diseases was 4.4%, the prevalence rate - 785.7 per 100 000 of the adult population.

**Aim of this study** - to assess the level of costs for treatment of non-viral chronic hepatitis in a multidisciplinary hospital of Dnepropetrovsk.

**Materials and methods.** In the study a retrospective analysis of cards of 68 patients diagnosed with CH were conducted. Evaluation the rationality of costs for pharmacotherapy was made using ABC-analysis: distribution of drugs into three groups depending on the portion of expenses for their use in the total costs of drugs. Retail prices of drugs were determined by analytical research company "Pharmstandard" pharmaceutical market company "Morion". The period of study 2013 - 2014 years.

**Results and discussion.** During the study period for patients 104 trade names (TNs) were prescribed. ABC-analysis showed, that 19 TNs were included in group A, representing 80,52% of the total costs. Group B consisted of 16 TNs, on which were spent 15.09% of the total cost. The least costly group C accounted 59 TNs, which costs amounted 4.39% of the total costs. The most expensive was a drug Hepa-Merz, the cost of which amounted 16.83%. It is hepatoprotective agent detoxifier. The composition includes L-ornithine, L-aspartate. It reduces the elevated levels of ammonia in the body in particular liver diseases. The drug is related to its participation in the ornithine cycle of urea (formation of urea from ammonia). It contributes to the development of insulin and growth hormone. It improves protein metabolism in diseases, that requires parenteral nutrition.

**Conclusions.** Pharmacotherapy of non-viral chronic hepatitis in hospital of Dnepropetrovsk requires correction. Analysis showed the irrational budget spending. Hepa-Merz was the most expensive drug, which does not included in the World Health Organization guidelines for the treatment of chronic hepatitis.



# DYNAMICS OF CONSUMPTION OF MACROLIDE ANTIBACTERIAL DRUGS IN UKRAINE

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**Introduction.** In recent decades the world has become a serious problem of pathogens resistance to antimicrobial agents. This situation can be seen as a threat to national security and cause a lot of social and economic harm. Microorganisms cause infectious diseases since the dawn of humanity and continue this process despite the scientific and practical progress in their treatment around the world. Macrolides are widely used in clinical practice more than half century and have proven themselves as highly effective and one of the safest antibiotics.

**Materials and methods.** To determine the volume of consumption of macrolides ATC/DDD-methodology and data of volumes of preparations realization in the system "Pharmaceuticals" of company Morion for 2013-2014 years were used.

**The results of research.** In the pharmaceutical market of Ukraine 7 INNs of macrolides and 156 TNs (2014) were presented. In term of consumption DDDs/1000 inhabitants/day (DIDs) on 01.01.2015 the preparations can be arranged in the following order: Azithromycin (1.081) > Clarithromycin (0.321) > Midecamycin (0.041) > Erythromycin (0.036) > Spiramycin (0.025) > Josamycin (0.017) > Roxithromycin (0.005). Also, analysis of the dynamics of macrolides consumption in Ukraine showed, that in the period 2013-2014 it slightly decreased from 1.54 DIDs (2013) to 1.53 DIDs (2014). In comparison with the Russian Federation dynamics of consumption also slightly decreased from 2.439 DIDs (2013) to 2.433 DIDs (2014): Azithromycin (1.576 DIDs), > Clarithromycin (0.572 DIDs) > Josamycin (0.110 DIDs) > Midecamycin (0.092 DIDs) > Erythromycin (0.061 DIDs) > Spiramycin (0.014 DIDs) > Roxithromycin (0.008 DIDs). Annual sales of macrolide antibacterial agents in 2014 were 5 228 664 packages or 25 232 557 dollars. The leader was Azithromycin, which took over 65% of the value of consumption and 74% of the number of packages in Ukraine and in Russia - 26 070 268 packages and 158 273 986 dollars (58% market share of value terms and 69% of the number of packages).

**Conclusion.** In Ukraine consumption of macrolides slightly changed from 1.54 DIDs (in 2013) to 1.53 DIDs (in 2014). Approximately the same trend was observed in the Russian Federation, indicating that the demand for these drugs is preserved. The leader of consumption in both Ukrainian and Russian pharmaceutical markets is macrolide Azithromycin.

**SECTION № 15**

**MANAGEMENT AND MARKETING IN PHARMACY**

# PROCESSING OF APPROACHES TO OPTIMIZATION OF ACTIVITY OF WHOLESALE PHARMACEUTICAL COMPANY

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**Introduction.** The importance of the concept of marketing management as part of business management becomes more important in the study of the theory and practice of marketing policy improvements intermediary companies in today's economy. In the distributive sector should note a rather high concentration and predominant existence of large wholesale companies, which are gradually replacing small. The presence of well developed marketing component in the system of marketing is the key to improving the functioning and competitiveness.

**Aim.** The purpose of our research is to study components of management by of wholesale pharmaceutical company and to develop recommendations to improve its distribution activity.

**Materials and methods.** In our research we have used Methods of marketing research, economical analysis, SWOT-analysis, ABC-XYZ-analysis.

**Results and discussion.** Each organization has on the market some advantages and disadvantages. SWOT-analysis allows to identify the strengths and weaknesses that need most attention and effort for the company. To overall assessment of the company we was conducted SWOT-analysis on the base of expert estimations.

According to expert evaluations biggest advantage of the company is a broad customer base, wide assortment of products, low selling prices and flexible working conditions for clients.

Expert assessments indicate that most of the weaknesses are the lack of control warehousing, order picking low quality in case overload, high transport costs, excessive stock of specific nomenclature position.

The biggest threat is of insolvency of customers and changes in the level of prices, difficult economic situation, reducing the existing contracts with suppliers, recycling of products.

Opportunities of the company that are most important are the optimization of assortment policy, the introduction of FIFO in warehouse logistics, the integration of manufacturers.

**Conclusions.** The results of the SWOT-analysis establish that the investigated company has a number of strengths and opportunities in the pharmaceutical market. It can offer specific strategies of potentating opportunities provided consideration and limit the impact of weaknesses and threats, which will provide the company a competitive advantage.

# MARKETING RESEARCH OF THE PHLEBOTROPIC DRUGS AT THE UKRAINIAN PHARMACEUTICAL MARKET

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**Introduction.** Nowadays, the prevalence of chronic venous diseases (CVD) is an actual medical problem in the world. About 70-80% of population in developed countries has some symptoms of CVD of lower extremities. Varicose veins, post-thrombotic disease and angiodyplasia are the main nosological forms of CVD of lower limbs. CVD is characterized by variety of symptoms, inhomogeneity of flowing and progression. The pathological process may begin in early childhood and due to progression may achieve severe stages until the disability of the patient. Even the initial stages of CVD significantly affect on patients' quality of life, they are accompanied by feelings of heaviness, pain and fatigue in the legs, and edema. High prevalence, progressive and often difficult flow of CVD course necessitate of its early detection and treatment.

Despite the high social and medical significance, as well as sufficient level of knowledge about the pathology of veins among medical and pharmaceutical community, the quality of its diagnosis and treatment remains insufficient all around the world. It is largely due to the fact that the significance of vein diseases is underestimated by society, patients, and medical community. It is believed that venous pathology does not create a threat to patients' life although the disease involving the lesions of deep veins can cause high mortality.

**Aim.** The aim of this study is to analyse market share and factors influencing the phlebotropic drugs market potential in Ukraine.

**Matetials and methods.** We used the data of the State Expert Center of the Ministry of Healthcare of Ukraine, namely the State Register of drugs, instructions for medical use of drugs, the audit data of the pharmaceutical market of the system «Pharmstandart» of the company «Morion».

**Results and discussion.** An important role in the prevention and treatment of CVD plays the level of provision of pharmaceutical market with modern, highly efficient drugs of domestic and foreign production. Recently, in domestic and foreign scientific literature much attention is paid to the medical aspects of phlebotropic drugs. At the Ukrainian pharmaceutical market 53 drugs with phlebotropic action are available. They are produced by 40 pharmaceutical companies from 11 countries. The phlebotropic drugs for systemic use are available in tablets, capsules, drops and injections medical form. Topical phlebotropic drugs are available in gel and cream medical forms. The share of domestic products is 43.4%, foreign – 56.6%.

The largest number of phlebotropic drugs (29 items, or 54.7%) belongs to the group C05C A «Bioflavonoids», which provides 83.3% of sales of phlebotropic drugs in physical terms and 66.7% in value.

The annual sales of phlebotropic drugs in the retail segment of Ukrainian pharmaceutical market is about 8.75 million packs or nearly 390 million grn. The drug Troxevasin®, Actavis Group, Iceland in gel form takes the leading position on the phlebotropic drugs market in physical terms of sales (annual sales of more than 2.3 million pcs.). The drug Detralex®, Servier, France takes the leading position in sales on monetary indicators (annual sales about 74.3 million grn.).

The Herfindahl-Hirschman Index of phlebotropic drugs market in Ukraine is 1,684.4, so this market segment is moderately concentrated. This is due the fact that this market segment has a lot of large players with significant market shares.

The phlebotropic drugs market potential in Ukraine is formed under the influence of many factors of general and specific character. Specific factors include common disease incidence of the population; the level and availability of medical and pharmaceutical care; the attitude to CVD problem of medical and pharmaceutical community and patients; the treatment methods; the compliance of patients; the appearance of new effective drugs. Among the factors favoring the development of venoactive drugs market in Ukraine can be named high number of CVD cases; the majority of female in demographic structure; considerable number of middle-aged and elderly people; the increase of conservative treatment tendencies of CVD etc.

The level of consumption of phlebotropic drugs in Ukraine and market potential of these drugs respectively is growing with implementation of pharmaceutical companies' educational programs for general practitioners and pharmacists; extension advertisement and propagation information materials about CVD and methods of their treatment in medical and pharmaceutical journals and popular websites and information given by medical (pharmaceutical) representatives, and other ways of promotion. Factors restraining the development of phlebotropic drugs market in Ukraine include low income level of the population; low level of CVD diagnostic; underestimation of CVD problems by general practitioners, pharmacists and patients; low level of the patients' compliance. Tendency of Ukrainian population to self-treatment and perception clinical symptoms of CVD as aesthetic problems results in irrational use mostly the topical phlebotropic drugs, cosmetics and special dietary supplements.

**Conclusions.** At the Ukrainian pharmaceutical market there is a wide range of phlebotropic drugs. The group C05C A «Bioflavonoids», in particular foreign products Troxevasin® and Detralex® plays a leading role in the formation of market potential. We assessed the degree of monopolization of the market and described the specific factors influencing the phlebotropic drugs market potential.

## NASAL MEDICINES AT THE PHARMACY

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**Introduction.** One of the symptoms of a cold is rhinitis — inflammation of the mucous membrane of the nasal cavity. There is evidence that in economically developed countries 15-20% of the population suffer from rhinitis. Despite the fact that this disease does not require hospitalization of the patient and does not lead to disability and death, it has a significant negative impact on social life of patients. Nasal means (NM) are one of the most purchased drugs in pharmacies. They are interested in most of the population during the season of colds and epidemics.

**The purpose of the study.** Analysis of the assortment of nasal medicines in the pharmacy.

**Materials and methods.** Content analysis, marketing analysis, logistics analysis, grouping. **The results of the research.** 148 nasal medicines in form of sprays, drops, ointments, tablets, capsules, drops for oral administration, lotions, gels, solutions are registered in Ukraine. Most of this group is over-the-counter drugs. In accordance with the ATC classification NM group R01A Decongestants and other medicines for local application for diseases of the nasal cavity are presented with sympathomimetics, anti-allergic medicines, corticosteroids and other means.

As a result of our analysis of the range of nasal drugs on the basis of one of drugstores of the city of Kharkiv, it was found that medicines of this group are presented only in dosage form (DF) drops (33 titles) and sprays (38 items). NM in the form of drops are sympathomimetics on the basis of naphazoline (9 medicines), Oxymetazoline (5), Xylometazoline (8), phenylephrine and dimethindene (4), including 10 in pediatric DF. The range also includes 2 plant medicines and 2 salt solutions. NM in the form of sprays are submitted more widely by sympathomimetics: simple (20 products, including 3 in pediatric DF) and combined (9 drugs, 2 in pediatric DF); an antiallergic drug (Na-cromoglycate – 1 drug) and corticosteroids on the basis of budesonida (1 medicine), fluticasone (3) and mometasone furoate (2). Also 3 salt solution are in the form of a spray.

Studies have shown that sympathomimetics (drugs) on the basis of Oxymetazoline (Nazivin®, Noxprey, Nazol®), Xylometazoline (Galazolin®, Pharmaton®, Elcatonin®, Aqua) and naphazoline (Naphazoline®, Sanorin) have the greatest demand among nasal drugs.

**Conclusions.** Studies have shown that NM in the pharmacy are presented a relatively wide, however, only in the traditional DF. Therefore, the widening of the range of this group of drugs at the expense of other DF will improve the level of satisfaction of the needs of the population. It is necessary to consider consumers' preferences during forming of assortment.

# THE MARKETING ANALYSIS OF ANTIFUNGALS RANGE IN THE PHARMACEUTICAL MARKET OF UZBEKISTAN

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**Introduction.** In connection with significant growth of fungal diseases, owing to broad application in medical practice of antibiotics of a broad spectrum of activity, immunodepressants and other groups of medicines, a significant segment of the pharmaceutical market are antifungals, which are widely used at treatment of mycoses of various etiologies.

**Aim.** Identification of the main tendencies of development of antifungal drugs (AFD) range according to their consumer value.

**Materials and methods.** In the course of research were used methods systemic, comparative and content analysis. Research was conducted with use of the given "State Register of medicines and products of medical prescription" N20 for 2016.

**Results and discussion.** The studied pharmacological group included all drugs relating to the ATX D01 code – antifungal drugs. Results of analysis are presented in tab. 1.

**Table 1**

Analysis indicators on the provided dosage forms of AFD range

№	Indicators	Preparations (quantity/in percent)			Total
		Foreign	CIS countries	Domestic	
1.	Cream	25/ (23%)	11/(20.3%)	4/(7.7%)	42(19.5%)
2.	Tablets	24/ (22%)	12/(22.2%)	7/(13.5%)	43/ (20%)
3.	Capsules	24/ (22%)	10/(18.5%)	19/(36.5%)	53/(24.6%)
4.	Solutions	19/(17.5%)	3/ (5.6%)	11/(21.2%)	33/(15.3%)
5.	Suppositories vaginal	4/ (3.7%)	9/ (16.7%)	2/ (3.8%)	15/(6.8%)
6.	Gels	3/ (2.8%)	2/ (3.7%)	-	5/(2.3%)
7.	Liofilizates for preparation of solution for infusions	2/ (1.8%)	-	-	2/(0.8%)
8.	Ointments	2/ (1.8%)	5/ (9.3%)	7/ (13.5%)	14/ (6.5%)

9.	Powders	2/ (1.8%)	-	1/ (1.9%)	3/ (1.3)
10.	Shampoo	2/ (1.8%)	-	-	2/ (0.8%)
11.	Balms	1/ (0.9%)	-	-	1/ (0.4%)
12.	Eye drops	1/ (0.9%)	-	-	1/ (0.4%)
13.	Sprays	-	2/ (3.7%)	1(1.9%)	3/ (1.3%)

It is revealed that now the range of AFD in the pharmaceutical market of Uzbekistan is carried out by 215 trade names taking into account producers and dosage forms. Trade names of the studied group were registered by producers from 32 countries. A share of foreign producers of 24 countries is 50.7%, in 7 CIS countries 25.1% of preparations, and domestic have registered 24.2% of the general range of AFD. Out of 109 foreign preparations the greatest number was registered by the Indian producers (46 preparations), 7 preparations producers of France, by 6 preparations – producers have registered of China and Turkey, by the 5 preparations – the Netherlands, the Czech Republic, Romania, by 4 and 3 preparations – producers of Germany and Bangladesh respectively, 2 preparations – producers of Spain, Poland, Belgium, Switzerland, Austria, Italy and Great Britain. Other producers (Bulgaria, Egypt, Hungary, Brazil, Jordan, the United Arab Emirates, Slovenia and Pakistan) have registered by one preparation.

The consumer value of medicine along with its clinical efficiency was defined by convenience of its application that is provided with optimum selection of a dosage form and dosage. Apparently by results of analysis all registered AFD are issued in 13 types dosage forms from which capsules – 24.6%, tablets of-20% and on cream - 19,5% are most presented. At the following stage it was conducted the analysis of the range on active ingredient of preparations – the international non-propriety names (INN). At the same time it was revealed that all AFD are presented by 215 names on the basis of 22 INN – Fluconazole – 85 trade names, Terbinafine – 30, Clotrimazole – 28, Nystatin – 23, Ketoconazole – 13, Miconazole – 8, Itraconazole, Natamycin – 4, Naftifine, Ciclopirox – 3, Sertaconazole, Fenticonazole – 2, Butoconazole, Caspofungin, Chlornitrophenol, Micafungine, Oxiconazole, Tridekanamine undecylenas, Undecylenic acid, Isoconazole, Griseofulvin, Bifonazole – by 1 respectively.

**Conclusions.** It was conducted the marketing analysis of the range of AFD over the manufacturing countries, active ingredient and dosage forms. In addition, detecting to ensure the availability and choice in the treatment of fungal infections of various etiologies, it was revealed the need to develop domestic drugs, based on the following INN- miconazole, natamycin, naftifine, ciclopirox, sertaconazole, fenticonazole. Results of research will be used in the subsequent analysis of the market of AFD.



## COSMETICS PHARMACIES IN UKRAINE AND ABROAD

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**Introduction.** Cosmetic products are in a great demand among the pharmacies visitors in Ukraine. Along with specialized shops beauty products are also distributed on the pharmaceutical market. Given in attention an annual sales increase of cosmetic products, sales of those products in pharmacies are also increased.

Due to this group of products pharmaceutical companies make a significant profit. Also there are a pharmacy network expansion and an pharmacies quantity growth, especially those who have an open form of trade.

Increasing a range of cosmetic products is economically profitable for pharmacy networks because of increased goods turnover, which leads to higher sales and increases pharmacy profitability. Since cosmetics does not treated as medications, the government has not set a maximum value added tax for these kind of products, so cosmetic products are profitable for pharmaceutical organizations.

**Aim.** Goal of this work is to provide study about cosmetic products range on the market. The general cosmetic products characteristic on the market are made during the study.

**Materials and methods.** In the course of our work desk research was conducted at the Department of Pharmaceutical Marketing and Management, National University of Pharmacy, in parallel carried out field research in pharmacies. As a result, on the basis of these studies was carried out a comparative analysis of the range of cosmetics and cosmetic products in the pharmaceutical markets of Ukraine and abroad.

**Results and discussion.** Medical and cosmetic products development trends and market development prospects was made. The medical and cosmetic goods comparative range analysis for Ukrainian and foreign markets was made. As a result of study established that the Ukrainian market has a various cosmetic goods positions, from which 42% of positions are local products, and 58% are foreign products.

**Conclusions.** Cosmetic products volume is higher on the foreign markets in pharmacies and in stock at all. Cosmetic products is very popular among consumers because it occupies an important place in their lives.

## CLUSTER ANALYSIS IN MARKETING.

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**Introduction.** The market research is often connected with the tasks of containing big data. The number of objects of investigation (cases) and the number of features that characterize these objects may be very large. These tasks are the segmentation of the market, the construction of a typology of countries over a sufficiently large number of indicators, forecasting market conditions of certain goods, the definition of competitive capacity of the goods. For these tasks, important applications are cluster analysis methods — multivariate statistical procedures, data collection, containing information on a sample of objects, and then organize the objects in a relatively homogeneous group.

**Aim.** The aim of this study is to investigate the possibility of using the method of principal component analysis to solve clustering problems in marketing research.

**Materials and methods.** Cluster analysis unlike most mathematical and statistical methods does not impose any restrictions on the form of these objects, and allows you to treat a variety of source data almost arbitrary nature. This is important, for example, to predict the conditions when the figures have varied views, difficult to use traditional econometric approaches. If clustering objects are represented as a point in n-dimensional feature space (n – number of features that characterize the objects), the similarity between objects is determined by the concept of distance between the points, since it is intuitively clear that the smaller the distance between objects, so they are similar. The method of calculating the distance between objects and groups of objects reflects the specificity solve applied problems. For example, the euclidean distance can be set in the case of continuous variables:

$$r = \sqrt{\sum_{i=1}^n (X_{ij} - X_{ik})^2}$$

here  $X_{ij}$  – the value of the  $i$ -th factor in the  $j$ -th observation.

Despite much research in the cluster analysis, there are a number of current problems in this area. These include, in particular, multicollinearity is often present in these marketers. The questionnaires in conducting marketing research, as a rule, contain related issues, and the data is usually multicollinearity.

**Results and discussion.** There is an effective method of linear transformation of the space of the explanatory variables, allowing to obtain new regressors, comfortable and effective in dealing with the prediction or recognition problems. It is principal component analysis. It is based on the transition from the initial set of correlated factors  $X_1, X_2, \dots, X_n$  to the new set of explanatory variables  $Z_1, Z_2, \dots, Z_n$  coefficients with zero covariance between:  $cov(Z_i, Z_j) = 0, (i \neq j)$ . New factors (principal components) are selected so that the first principal component had the highest dispersion in the new set of variables, and the second – the dispersion, the next highest, and so on.. Thus, it becomes possible to reduce the number of explanatory variables to the first few principal components thus facilitated visualization of the original data.

The method of principal components is easily implemented in a software environment R, which is controlled via the command line. For this environment, there are numerous additional modules library with open source that greatly enhance its functionality. R has great functionality, including a large range of options for data visualization.

**Conclusions.** The method of principal components is well suited for market research, it allows you to create a new space of explanatory variables with zero multicollinearity, reducing the dimension of this space facilitates visualization of data.

## RESEARCH SUPPORT SYSTEM DRUGS IN POLAND

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**Introduction.** The pharmaceutical sector is an important part of the primary health system its condition depends on the overall level of the industry and the economy as a whole. However guarantee level free medical care to the patients is a problem carried out the most difficult and hardest.

The availability of drugs is determined by their presence in the pharmaceutical market and economic accessibility that is to say price regulation and compensation of spending on medicines through compulsory health insurance.

**Aim.** To analyze the current state of pharmaceutical care in Poland and establish a mechanism reimbursement cost of medicines.

**Materials and methods.** Materials of scientific literature, statistics. Used analytical, statistics and structural methods.

**Results and discussion.** The volume of drugs spending is based on the consumption per person in Poland is 114 euros, which is one of the lowest rates among the member states of the EU. The average expenditure on drugs is based on one person in the EU is estimated at 218 euros. In addition, the weighted average cost of 1 package of drugs in Poland is 3.6 euros. It is the low level of spending per person in EU also.

Providing drugs population of Poland through pharmacies. Implementation of medicines carried out recipes mostly. Some drugs are used to remove symptoms that are easy to identify, such as: painkillers, antipyretics, vitamins, homeopathic medicines can be bought without a prescription. In other cases - you need to see a doctor. Each patient is insured in Poland has the right to discount the price of the drugs. A specific kind of discounts approved for some drugs by legislation. The cost compensation was going through the National Health Fund (Narodowy Fundusz Zdrowia (NFZ). The process of compensation – refundacja (reimbursement).

There are 4 levels of reimbursement of drugs:

- ♣ 100% free (bezpłatny (B) dispensed medicines used to treat severe, chronic diseases such as cancer, tuberculosis, infectious diseases, mental disorders, seizures, etc.;

- ♣ 100% reimbursement for long-term use of drugs (ryczałt (R) – a special purpose drugs used, usually 30 days, for example - insulin for diabetics;

♣ 50% of the cost subject to reimbursement for drugs that are take less 30 days, for example, antibiotics;

♣ 30% of the compensation provided for other drugs that patient takes the above-mentioned groups.

It should be noted that the award is calculated not on the retail price, and according to the so-called limit financing (reference price) determined NFZ. Where the retail price is higher than the set limit for financing, the patient must pay the difference between the retail price and size limit funding.

For discounted prescriptions mainly released generic drugs because their price is much lower than the original. So according to IMS Health and DSM Group data in the global pharmaceutical market share to generic medicines account for 77 to 88% in-kind of a tendency to increase. In Poland this percentage is about 85%.

In the case of the introduction of the first generic drug to limit the group, its price will be not more than 75% of the original drug price. At the end of patent protection, the manufacturer of the original drug should reduce the price by at least 25%, even if his group does not include any generic drag.

Draws attention to the fact that the purchase of drugs can use and prescription prescribed in another country. But Specification should always be written in Latin.

If some medicines that prescribed in the recipe are absent, pharmacist can represcribe them for a patient, and leave the old prescription at the pharmacy. One prescription forms are allowed to issue up to 5 drugs on; the prescription valid 30 days usually. If the prescribed antibiotic – a valid term of 7 days only. For some, complex diseases, the recipe can be valid for 120 days. The doctor prescribes medicines in an amount such that enough for 3 months of treatment. To continue treatment need to re-apply to the doctor by appointment.

According to statistics, the price of drugs in Poland for the last 20 years steadily increased, but still they are three times lower than in other European countries. Established, the average trade margin on drugs Poland is only 17%, and in most European countries – almost 30%.

**Conclusions.** The provision of medical and pharmaceutical care for the population of Poland is in the form of compulsory social health insurance was determined. Medications are dispensed from pharmacies in most cases by prescription. Compensation cost of drugs depends on the drugs, it pharmacotherapy and limit the size of the fund, which is set by NFZ. There are four compensation levels can be carried out on: the full amount (100% – chronic and prolonged) or partially (50% – treatment of the disease for 30 days, and 30% – other by defined list).

# ANALYSIS FOR MARKETING STRATEGIES OF PHARMACEUTICAL COMPANY

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**Introduction.** Today the pharmaceutical market is undergoing significant changes occurring managerial and organizational transformation. This makes it necessary to improve the activities of retail pharmaceutical enterprises on the basis of modern management techniques with the use of marketing tools. Marketing strategy to promote the company acquire particular relevance in terms of competition for the market.

**Aim.** Analyze the marketing strategies of pharmaceutical companies.

**Materials and methods.** The object of research is the process of formation and development of marketing activities of pharmaceutical companies in the current economic conditions. Theoretical generalization method, the method of analysis and synthesis, comparison method, statistical methods, methods of market research are used in the research process.

**Results and discussion.** There are one, two or multiple market segments that may be chosen by marketers of pharmaceutical company, and the options are between three broad approaches to the market: concentrated marketing, differentiated marketing and undifferentiated marketing.

Products have not set the position, although market segmentations have been chosen. In customers' mind, the buying power is quite much affected by brands or product's position. The first thing that companies need is to explore whether the product are taking a place in customers' mind. To the question: Why did you buy the drug of this firm? 70% of respondents answer - low price. From this we can conclude that the decisive role in the choice of the drug plays its price. Also, the brand plays an important role. 60% of people (especially older people) choose the drug is already well-known brand and reluctant to buy pharmaceutical product unfamiliar or unknown new brand, even if the product price is lower than that of the well-known competitor.

Marketing strategic planning is a useful management tool to help the company does better work and learn how to compete in the future.

**Conclusions.** The marketing strategies of the pharmaceutical companies were analyzed. The components of complex pharmaceutical enterprise competitiveness factors identified. It was found that a favorable image, own brand increases the competitiveness of enterprises, attracting partners, customers, end users, increases sales volumes and facilitates the exercise of any commercial operations.

# ANALYSIS OF THE ASSORTMENT OF NONSTEROIDAL ANTI-INFLAMMATORY DRUGS PRESENTED AT UKRAINIAN PHARMACEUTICAL MARKET

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**Introduction.** Nonsteroidal anti-inflammatory drugs (NSAIDs) are among the most widely used medications in the world because of their demonstrated efficacy in reducing pain and inflammation. Their efficacy has been documented in a number of clinical disorders, including osteoarthritis, rheumatoid arthritis, colds, flu, dysmenorrhea, dental pain and headache. Thus, worldwide more than 30 million people have to take NSAIDs regularly, and 300 million consume them short courses. Thus is of concern the fact that about 200 million patients are able to buy drugs in pharmacies without a prescription and medical supervision. Therefore, the analysis of the range of NSAIDs on the pharmaceutical market of Ukraine will determine the possibility of their real use.

**Aim.** On the basis of the above mentioned, the aim of our research is the analysis of the presented in the Ukrainian pharmaceutical market assortment of the NSAIDs.

**Materials and methods.** During the research we used a systematic, logical, graphic methods and content analysis of the State Register of Medicinal Remedies.

**Results and discussion.** According to the State Register of Medicinal Remedies it is determined that the assortment of the NSAIDs is presented by 397 trade names of medications. The investigated group of drugs represented by 28 INN, among them only 1 INN found in combination and 18 INN were a monotherapy.

The analysis of the amount of the medications presented in the Ukrainian market according to the countries-suppliers has shown that NSAIDs is provided by 39 countries of the world. Part of registered NSAIDs of Ukrainian manufacture in relation to imported medications presents 34% (which makes 135 stock keeping unit) against 66% (262 trade names of medications).

It was established that the considerable volume of products to the internal pharmaceutical market comes from European countries, medications of which make 45.3% of general assortment of NSAIDs, among which the first place belongs to Germany (6.8% of the assortment of medications), Slovenia is second (3.8%), Poland is third (3.0%). The least amount of stock keeping units in the pharmaceutical market of Ukraine is presented by Bulgaria, Great Britain and Spain, each of which supply 2.3% of NSAIDs, presented in the Ukrainian pharmaceutical market.

**Conclusions.** According to the data received it was determined that home pharmaceutical market of NSAIDs mostly presented by import medications that all together make 66% of drugs.

## METHODS OF EVALUATION OF CUSTOMERS' LOYALTY

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**Introduction.** Evaluation of customers' loyalty (CL) to brand (trademark) is an important component of the pharmaceutical company activity. Due to the correct formation of relationship between the end user and enterprise, products of this company may compete at a decent level of medicines-analogues. The image of the company and the high level of customer loyalty guarantee a competitive advantage on the market. Therefore, pharmaceutical companies use and attach great importance to various loyalty programs.

The **aim** of the study is to analyze the methods for evaluating customer loyalty.

**Materials and methods.** Content-analysis, logical analysis, grouping.

**Results.** There are two approaches to determining customer loyalty in marketing theory. The first one is based on loyalty as a certain type of customer behavior, resulting in long-term cooperation with the company and repeated purchases. Long-term relationship of customers and enterprise is formed during repeatedly interaction of parties. If both sides have an obligation to each other, trust each other and are aimed to long-term cooperation, which has a direct impact on the formation of CL, which depends on their degree of satisfaction with the quality of trade services. Another approach considers loyalty as customers' preference, formed as a result of synthesis of feelings, emotions, and thoughts about the company, product or service.

Usually there are three types of loyalty: transactional (considering changes in the bp Perceptual (emphasizing subjective opinion of the consumer and evaluation of products, this type of loyalty is measured by consumer surveys) and complex (this type of loyalty includes 4 subtypes). The first subtype "true loyalty" occurs when a buyer buys the medicine and really satisfied with it. The second subtype "false loyalty" occurs when a consumer buys the medicine but not satisfied with it. The third subtype "latent loyalty" occurs when a consumer appreciates brand but is unable to buy it, and when there is opportunity, always buy this brand. A fourth subtype "lack of loyalty" when the consumer is not satisfied with the brand and does not buy it. Types loyalty are allocated on the base of the following conditions: consumer emotional attachment to the brand, insensitivity to the actions of competitors, the regularity of purchases, and the time factor.

The most preferred type of CL for pharmacies is just a complex (mixed) type, i.e. commitment and loyalty. This type of CL is based on long-term and mutually beneficial relationship based on trust between the consumer and pharmacy and brings



long-term benefits for both sides. CL is one of the main indicators of the competitive advantages of the pharmaceutical company.

Methods of assessment of customers' loyalty are selected depending on investigated kind of loyalty. Most authors include to methods for assessing the loyalty: the method of "separation of needs" (the essence of the method is that the loyalty of the consumer is defined in numerical terms), the traditional approach (the basis of this method is the definition of "intent to purchase" of the certain brand just before making a purchase) and conversion model (using 4 major indicators: satisfaction with brand, alternatives, the importance of brand choice, the level of uncertainty or ambiguous attitude). Also method of F. Rayheld «Net promoter score» is very popular. It is based on two questions: "How would you recommend the company to your friends on a scale from 0 to 10?" And "Why did you put this mark? Comment please."

According to the results of all answers, respondents are divided into "promoters" (those who put the mark 9 - 10), "neutral" (mark 7 - 8) and "critics" (mark 1 - 6). Therefore, "promoters" are a loyal customers and they would recommend the brand; "neutral" are passive customers, they generally satisfied with the company, but would not recommend and "critics" are not satisfied and they will not recommend the product. Actively used such methods as: RFM-analysis (segmentation enterprise's customer according to frequency of purchases, the number of purchases and money spent for the purchase by the customer), Brand Keys Customer Loyalty Engagement Index (combination psychological assessment that helps identify the relationship between brand of the pharmaceutical company and a consumer), Preference - Behavior Model (gives an idea of number of customers who have purchased a brand they prefer in the past) and model RAPID (allows to assess the prospects for growth of the company evaluating indicators such as willingness to buy again, willingness to recommend, intention to buy more and more); AC Nielsen I - Can Loyalty & Repeat product (compare one brand to another within the same category during the specified time), Secure Customer Index (SCI) (respondents are classified as "faithful" if their level of satisfaction with the brand is high and they are ready to continue cooperation and "not right" these consumers are not value for the company).

**Conclusions.** Each method has own indicators for assessing the level of customers' loyalty. Consideration of these indicators together gives an opportunity to get a more accurate idea of customers' loyalty from different perspectives, and to reduce the disadvantages existing in the methods for making the correct decision. It is important to consider a customers' loyalty comprehensive and to conduct research in order to regulate the process. After all, it will enable to increase the number of clients and sales for pharmaceutical companies.

## AN EXPERT EVALUATION OF THE GENERATIONS THEORY IN THE CONTROL OF THE PHARMACY ORGANIZATION

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**Introduction.** Application of the generations theory in staff management, including the pharmaceutical industry, has recently become widespread in Ukraine. There are such types of generations (years of birth are indicated in parentheses): The Greatest Generation (1900-1923), The silent generation (1923-1943), The Baby Boomers generation (1943-1963), The X Generation (1963-1984), The Y Generation (1984-2000), and The Y Generation (with 2000). Like many other industries, pharmacy faced a new challenge, the change of generations. The Y Generation came at the scene. It turned conventional ideas about management and selling. It is not easy to find approaches to young people, but there is a need to do it as soon as possible, because the next generation grows up, the Z one, which is not yet participating in a labor market. **The aim** of the study is to evaluate the generations theory in personnel management on an example of pharmacies in Ukraine, Belarus and Poland.

**Methods:** expert evaluation. The experts related to the pharmaceutical industry specialists. They were all members of the X, Y and sub-Y (people born from 1990-2000) generations. The analysis was conducted in regard to the following characteristics: personal qualities, professional quality, compliance with the corporate culture. Different generations were represented by groups of such specialists: interns (work experience up to 1 year, the sub-Y Generation); professionals (work experience of 1-5 years, the Y Generation); professionals (work experience of 5-10 years, the X Generation); specialists with experience of over 10 years (the X Generation). A total of 213 respondents were interviewed. Some questionnaires were rejected due to not fullness. Therefore, 199 questionnaires were used for a further analysis. The sample was biased towards females, due to the specificity of the pharmaceutical industry. All participants under study gave a written consent. Professional and personal qualities for each group of respondents were evaluated by a 5-point scale. **Results.** Data obtained during the research, meet the basic statements of the generations theory. Thus, representatives of the sub-Y Generation have a minimum level of professional commitment, they are the least resistant to stress, are less able to work in a team, have a low attention and feasibility. Representatives of the Y Generation are the most resistant to stress, more executable and neat, punctual, and have a high cultural level, they are the least conflict. Representatives of the X Generation have a high level of professional commitment, they are the most attentive, but are less punctual and executed and more conflict.

# STUDY OF COMPETITIVENESS OF UKRAINIAN PHARMACY NETWORKS

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**Introduction.** As studies have shown, in the national pharmacy network's system is not fully use modern tools of management of strategic competitiveness. Moreover the majority of pharmacy networks have not in the management system of such an important sub-system as «monitoring, assessment and management of competitiveness». Despite the presence of a considerable information database, the various methods of a comprehensive analysis, the statistics of pharmacy networks currently does not offer competitive use forecasting techniques of competitiveness, and accordingly does not involve analysis of the trends of competitive advantages in this segment of the pharmaceutical market. Implement in such circumstances, an adaptive marketing strategy is very difficult and sometimes impossible.

**The aim** is to study the competitiveness of Ukrainian network's pharmacies.

**Materials and methods.** The methods of peer review has been used in study.

**Results and discussion.** According to a survey of employees of network pharmacies different regions of Ukraine: Kharkiv, Chernihiv, Sumy, Lugansk, Donetsk, Cherkassy, Poltava, Zaporozhye, Vinnitsa, Kirovograd, Ternopil, Dnipropetrovsk, Mykolaiv, Kyiv, Kherson, Lviv, Odessa 402 questionnaires were analyzed by us. In the process of investigation it was of interest information about the changing trends parameters of competitiveness of network pharmacies in the dynamics of the last five years. It was found that 51% respondents of studied network's pharmacies reported an increasing of the competitiveness of their companies in the last five years, which indicates their effective work, with 37% of the experts pointed out that the competitiveness of their network's pharmacies hasn't changed and 12% – has been declined. There were parameters identified on which declined the competitiveness of the network's pharmacies: 29% experts reported a decline in individual competitiveness parameters, 20% respondents indicated a decrease in the number of the strengths of the network's pharmacies and the reduction of the integrated indicator of competitiveness of pharmacy, 16% experts noted increasing the number of weaknesses of pharmacies, in particular increasing labor turnover, threat of takeover by larger pharmacy networks, 15% of experts pointed to the reduction of satisfaction degree of customers of pharmacy's work.

**Conclusions.** Thus, the dynamics of changes of competitiveness network's pharmacies has been determined and the parameters by which declined the competitiveness of the network's pharmacies have been highlighted.

# MARKETING ANALYSIS OF THE MARKET OF ANTIMICROBIAL MEDICINES USED IN OPHTHALMOLOGY

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**Introduction.** Eye Injury or just getting an infection in the eye often causes contamination of the organ of vision, requiring the use of antibiotics.

Market monitoring task of ophthalmic antimicrobial medicines is an urgent task in the context of increasing strains of microorganisms resistant to antibiotics and in connection with it of ineffectiveness certain drugs.

**Aim.** To research market of ophthalmology antimicrobial medicines in Ukraine.

**Materials and methods.** The research objects were the data of the State Register of Medicinal Products and ATC code. The methods of information retrieval and marketing analysis were used.

**Results and discussion.** According to the ATC classification system all medicines used for the treatment of eye diseases are a group of S - «Sensory organs» and form group S01- «Ophthalmologicals». Antiinfectives form S01A- "Antimicrobials" subgroup, and included in the subgroup S01S - "Combination pharmaceuticals products containing an antimicrobial and anti-inflammatory medicines." The latter subgroup form medicines S01C A- «Corticosteroids in combination with antimicrobials." Directly subgroup S01A are 5 pharmac-therapeutic groups (S01A A- «Antibiotics», S01A B- «Sulfanilamides», S01A D- «Antiviral medication», S01A E- «Flyuorokvinolons», S01A X- «Other antimicrobials") and 13 positions of pharmaceuticals product. A group S01A E- «Flyuorokvinolons", which consists of 5 items of medicines is the greatest weight.

According to the State register of medicines, as of January 1, 2016, 21 trade names of antimicrobial agents used in ophthalmology registered in Ukraine. Of these, a group of antibiotics are only 4 drug. 18 trade names are presented in the form of eye drops, which is a significant market share (85.7%) and only three positions are shown in the form of ointments.

The range of antimicrobial medicines for ophthalmology is formed mainly due to foreign-made products (62.1%), while the share of domestic products is 37.9%.

**Conclusions.** The range of ophthalmic antimicrobial products is not enough in Ukraine. There are many flyuorokvinolons foreign production and the market is very little development in the form of eye ointments, which can not meet the demand in full. It is only 3 drugs with tetracycline, ofloxacin and bibrokatol that can not meet the demand in full.

# ESTIMATION OF MANAGEMENT EFFICIENCY OF THE PHARMACY

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**Introduction.** The orientation of the economy on market development provides an objective necessity of marketing orientation, including pharmacy institutions. Current conditions of increase the dynamism of the environment of pharmacy operation, strengthening the fight for the consumer make special attention to focus on the problem of increasing the efficiency of economic activity. Under such conditions, it is necessary to develop areas of improvement of activity based on marketing, which makes it possible to increase sales volumes of medicines in the target satisfaction of consumers needs.

The **aim** of our work is to study the efficiency of business and management in the pharmacy.

**Materials and methods.** Methods of economical analysis, marketing research, statistics and forecasting were used in our research.

**Results and discussion.** The most important condition for performance of estimation of efficiency is to create in the pharmacy monitoring system of current activity, which is defined as the constant monitoring of the most important results of current economic activity. Management of the pharmacy must ensure full use of all available resources, which will lead to the achievement of high results in pharmaceutical business.

To achieve the aim the following tasks have been formulated: to analyze the impact of internal and external factors on the pharmacy; to determine the contribution of individual medicines in the total turnover of the pharmacy; to analyze the ratio of buyers to the pharmacy; to study the dynamics of the major indicators of the pharmacy business.

During our studies such indicators were calculated as: profitability of assets (property) (shows how much profit brings each cost one of assets), the value of the balance of the outcome at the beginning and end of the year, the profitability of current assets (indicator calculated for current assets); return on equity (this indicator measures the efficiency of use of the pharmacy capital, including charter and additional capital funds, reserves and retained earnings).

**Conclusions.** All margins are no normative value. Therefore, analysis of profitability ratios is useful only in the case when they are compared with previous years or with industry averages.

According to the results of the study have been developed recommendations aimed at optimizing business of the pharmacy in future.

## RELATIONSHIP MARKETING IN PHARMACY

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**Introduction.** In recent decades, relationship marketing concept (RMC) has great development. It provides for the process of creating, maintaining and direction of marketing activity of the enterprise to establishment of long-term, constructive and privileged relations with the most important for the enterprise market participants. The implementation of this concept will improve the pharmaceutical customer service and increase the efficiency of enterprises according to the client-oriented focus of the pharmaceutical companies.

**The goal** of our research is to justify the basic components and RMC tools for pharmaceutical companies.

**Materials and methods.** Content analysis, logical analysis, grouping.

**Results.** Studies have shown that the RMC feature is its direction not on a separate organization, but marketing network that is to the company with the surrounding market participants. The RMC in pharmaceutical activity is a continuous process of creating a long-term relationship of the pharmaceutical company with end-consumers who purchase pharmaceutical products for their own use and family members, patients and organizations-consumers, intermediaries, suppliers, distributors, competitors, contact audiences (investors, shareholders, banks, insurance companies, government agencies, universities and others) and realization of internal partnerships (relationships between functional units of the company, employees, business-units of the enterprise and relations between pharmacies for pharmacy network) to establishment of long-term privileged relationships. The aim of RMC is to create a unique intangibles asset of the pharmaceutical enterprises - marketing business network. Main components of M.c. in pharmacies are: the formation of the range of products to meet customer needs; orientation of pricing policy to consumers; provision of additional services; use merchandising opportunities; the formation of customer loyalty; management by behavior and consumer complaints; the formation of CRM-system; development of internal partnership and production culture.

Priority in the M.c. is given to formation of customer loyalty. Loyal customers are considered as the main source of competitive advantages of the pharmaceutical company, therefore M.c. is aimed to retaining of existing customers by providing a personal relationship with them.

**Conclusions.** M.c. concept, which is aims to creating a marketing business network and formation of customer loyalty allows to realize fully the social role of the pharmaceutical companies and as a result, to improve their economic efficiency.

## RESEARCH OF DOMESTIC PHARMACEUTICAL MARKET OF DRUGS FOR THE LOCAL TREATMENT OF BURNS

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**Introduction.** The problem of treatment of burn injuries is very important and one of the most common and severe types of lesions in the whole world. Burns are occupied the third place in the overall structure of injuries.

**Aim.** The aim of our researches was analysis of all registered on the pharmaceutical market of Ukraine drugs used for local treatment of burns (LTB).

**Materials and methods.** The object of study was the information about registered drugs, posted on the website "Regulatory and legislative documents of the Ministry of Health of Ukraine".

**Results and discussion.** The assortment of wound-healing drugs on the pharmaceutical market of Ukraine in 2015 is 54 preparations. Most of drugs are presented by mild dosage forms (DF) – 78% and liquid DF– 10%, solid DF and DF that are sprayed are equally occupying 6%. All drugs for LTB were divided by spectrum of usage in accordance to the ATC classification. The largest number of registered drugs belong to means for treatment wounds and ulcerative lesions (D03 – 42%), much smaller amount to antibiotics and chemotherapeutic preparations for use in dermatology (D06 – 26%), and also antiseptic and disinfectant means (D08 – 18%). To another categories of drugs for the LTB – 14%. In the percentage ratio the difference between the imported and domestic preparations for treatment burns in Ukraine is insignificant, and is 51.85% and 48.15% respectively. The main countries importing drugs for the LTB are Germany, Russia and Poland which import 25%, 14.28% and 10.71% of drugs of study group. As for Ukrainian manufacturers, so the top three leaders are pharmaceutical companies such as PJSC “Lubnyfarm” (19.23%), PJSC “Darnycya” (11.54%), PJSC “Viola” (11.54%) and joint Spanish-Ukrainian enterprise “Sperco Ukraine” (11 54%). In the process of research conducted analysis of arithmetic average wholesale prices at the beginning of 2016. The wholesale value of drugs of domestic production ranges from 6-7 UAH per package to 60.60 UAH, while the cost of imported preparations is from 21.96 UAH to 294.90 UAH per production unit. It should be noted that the price of imported drugs more than three times higher than the price of domestic analogs.

**Conclusions.** There is practically no effective domestic drugs for the LTB on the base of domestic substances. That’s why the development and implementation into the practice of new drugs for the LTB is an important and will enhance the increase of effectiveness of the treatment.

**SECTION № 16**

**SOCIO-ECONOMIC RESEARCH IN PHARMACY**



# THE ANALYSIS OF MEDICINES ACCORDING TO THE ATC CLASSIFICATION IN THE STRUCTURE OF THE PHARMACY ASSORTMENT

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**Introduction.** Providing the population with medicines and medical supplies is carried out through. The pharmacy assortment includes about 20 major pharmacological groups used for different nosologies today. These groups are ranked according to the ATC classification on several levels.

**Aim.** Analysis of assortment policy of pharmacies in Ukraine and in the pharmacy network in Kharkov according to the ATC classification.

**Materials and methods.** We used such methods of analysis as the system - overview, analytical, structural and logical.

**Results and discussion.** Performed structural analysis of medicines in the pharmacy assortment according to the ATC classification in Ukraine found that leaders are the following groups: A - medicines that affect the digestive system and metabolism – 18.29% (of the total); C - medicines that affect the cardiovascular system – 14.65%; N - medicines that affect the nervous system – 12.55%. We have also analyzed the manufacturers of medicines in the structure of the pharmacy assortment in the pharmacy network. It was found that a slight advantage have domestic manufacturers – 52.63% The share of foreign manufacturers amounted to 47.37%. Results of retail sales showed that the leaders are medicines of C group, namely medicines containing amlodipine - 51325 UAH (17.04% or 61 tradename); group N, namely medicines containing salicylic acid and it's derivatives, and medicines containing cinnarizine - 50481 UAH, (16.76% or 60 trade names), group A drugs medicines containing famotidine - 49638 UAH (16.48% or 59 trade names).

**Conclusions.** Thus, during the analysis it was established that according to the ATC classification group A takes the leading position – 18.29% and C – 14.65% in Ukraine. The analysis of the manufacturers found that a slight advantage have domestic manufacturers – 52.63%. This fact indicates a positive trend of import substitution in the pharmaceutical market in Ukraine. The analysis of sales of medicines found that a large portion of medicines are groups C – 51325 UAH (17.04% of total sales), N – 50481 UAH (16.76%), A – 49638 UAH (16.48%) in the pharmacy network in Kharkiv.

# THE RESEARCH OF EMPLOYER REQUIREMENTS TO THE PHARMACEUTICAL SECTOR SPECIALISTS

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**Introduction.** Today employers have set rather high requirements for pharmaceutical specialists; that results in improving of the education quality and in the formation of the respective competences because of educational services of the university. Along with this, pharmaceutical care assumes social interaction, it is to build relationships with both therapeutic and human orientation. Consequently especially actual is formation and development, along with the basic competencies, of future specialists moral potential, according to the sector specifics.

**Aim.** The study aimed to analyze the set of competence characteristics, which are the most important in achieving the goal of providing educational services.

**Materials and methods.** As the research method was used sociological research method - questionnaire. Developed questionnaire for professional activities requirement evaluation by the respondents includes 4 blocks of indicators. The maximum score for each indicator amounted to 5 points, the minimum - 1 point. The mathematical processing of the data was performed using Microsoft Exel software.

**Results and discussion.** In the first phase of our research were analyzed personal data of 160 respondents, including practical pharmacy specialists with complete higher pharmaceutical education, junior specialists and applicants of educational qualification level Master of Pharmacy. Based on the results of personal data analysis it was defined that the vast majority of respondents are representatives of the pharmaceutical industry retail sector - 87.61% of respondents. In pharmacies with the right of extemporal drugs manufacturing works 4.38% of the respondents. Industrial enterprises employees of the pharmaceutical sector and medical representatives amounted to 1.87% of the respondents, and employees of pharmaceutical wholesale companies - 1.25%.

According to the analysis of the first block of indicators, which reflects the views of the respondents about *the education quality at the University*, determined that, according to junior specialists and pharmacists practicing, the highest score is the item "ensuring proper storage of medicines" (4.04 and 3.82 points accordingly). At the same time, level of foreign language proficiency was assessed only in 2.81 points. As the best University preparation links Master's degree students evaluate knowledge of the pharmaceutical activity legislative base - 4.24 points and working with prescriptions - 4.16 points, while as the problem area they designate the level of foreign language proficiency and skills of premedical first aid giving - 2.52 and 2.60 points accordingly.

The second set of indicators suggests an assessment of survey participants opinion about the importance of competencies in professional activities. Drugs preparation in pharmacies/pharmaceutical enterprises and the level of foreign language proficiency was estimated by junior specialists at 3.42 and 3.69 points accordingly. It was found that the most commonly used in professional activity, according to respondents, is the document maintenance (cash transactions, account of inventory), level of personal computer proficiency, assessment of symptoms, isolation of cases, when you need access to a doctor and providing advices on the rational use of drugs. According to pharmacists practitioners, lowest value have the drugs preparation in pharmacies/pharmaceutical enterprises (3.55 points). As the most important competencies they designate level of personal computer proficiency (4.91 points), knowledge of OTC and prescription drugs, medical equipment and related products selling (4.82 points), the document maintenance (cash transactions, account of inventory), and providing advices on the rational use of drugs (4.77 points).

According to data obtained from the analysis of the third block indicators, which reflect the most important personal characteristics of the pharmaceutical worker, the least attention professionals and, accordingly, employers pay to creative and innovative component of the professional activity - 3.90 points. Should be noted that specialists with complete higher education distinguish along with discipline and diligence, communication skills (4.86 points), and speed of the service (4.82 points). The most important for junior specialists and Master's degree students are responsibility and organization (4.73 and 4.96 points) and discipline and diligence (4.66 and 4.92 points accordingly). It should be noted the importance of self-education and professional development for junior specialists (4.66 points), and for Master's degree students - the level of compliance with professional ethics (4.92 points).

According to the results of the fourth block of questions analysis, which represents *comparative evaluation of theoretical, practical and educational aspects of teaching at the University*, skills level, according to respondents, is valued at 3.26 points. University's contribution to the formation of pharmaceutical worldview and personal qualities education of the graduates necessary for realization of professional activity, reaches the highest average value - 3.77 points.

**Conclusions.** In the process of determining the importance of the professional competencies and personal and humanistic qualities blocks, was identified the trend towards all respondents comprehension of the social aspect importance of pharmaceutical sector specialists activity. The study identified the problem areas of the educational process and priority professional activity competencies. Among the recent competencies the principal are: responsibility and organization; discipline and diligence; the level of compliance with professional ethics; providing advices on the rational use of drugs; communication skills; stress, emotional stability and self-control; adaptability, mobility, level of service speed.

# THE MATHEMATICAL MODELING AS THE BASIS OF FUNDAMENTAL KNOWLEDGE FOR THE STUDENTS OF MEDICAL AND PHARMACEUTICAL SPECIALTIES

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**Introduction.** Mathematical modeling as a method of scientific cognition was started using by the humanity many centuries ago, from the moment when the foundations of the differential and integral calculus were laid. The first mathematical model was developed in the XII century by Italian mathematician Fibonacci. Since the 40s of the last century, some mathematical methods penetrated into the medicine and biology through cybernetics and computer science.

**Aim.** Undoubtedly, the modeling in medicine has received some independent functions and is becoming more necessary in the process of the experimental research. Nowadays the modeling in medicine is the tool that allows having the profound and complex relations between the theory and experiment.

Mathematical models – are a set of formulas and equations that describe the properties of a studying object. As a rule, in the models we use the system of differential equations that describe dynamic processes characteristic of wildlife, as well as the systems of linear and nonlinear algebraic equations or inequalities.

Nowadays mathematical methods are widely used in biophysics, biochemistry, genetics, immunology, epidemiology, physiology, pharmacology, medical device manufacturing, whilst the creation of biotechnical and etc. The development of mathematical models and methods promotes the expansion of estimation filed in the medicine, the emergence of new highly efficient methods of diagnosis and treatment, the creation of some medical equipment. In recent years, an active implementation in the medicine the mathematical modeling and creation of automated, including computer, system has greatly enhanced the diagnosis and treatment of diseases.

**Materials and methods.** The method of mathematical modeling allows to eliminate the need for making bulky physical models related to the material costs; to reduce the time of defining characteristics (especially the calculation of mathematical models using computer technology and efficient computational methods and algorithms); to study the behavior of the object modeling for different values of parameters, predicting the nature of the changes due to the analysis of mathematical models.

In addition, the research of the modeling object and drawing its mathematical description is to establish links between the characteristics of the process, revealing

its boundary and initial conditions and formalize the process in the form of mathematical relations.

**Results and discussion.** Compositions of the models are produced due to a given scheme. At first we should formulate an objective of the modeling, and then express the hypothesis that represents a qualitative description of the system, after it, we should select the type of models and mathematical methods of description depending on the purpose and type of information. The final step is to create a model and compare it with the system-object to identify it.

All these stages of the models creation in biology and medicine should be accompanied by the experts of medicine and pharmacy. Therefore, knowledge of modeling for physicians and pharmacists is a powerful tool to achieve new results. On the basis of mathematical modeling as a means of the future research, doctors and pharmacists are acquainted in the study courses of medical and biological physics, higher mathematics, medical informatics, information technology in pharmacy. The curriculums of the aforementioned disciplines involve the study by mathematical modeling of the kinetics of chemical reactions, processes of dissolution of drugs from tablets, the study of the population developing processes, theory of epidemics, immunological processes, pharmacokinetics and some others.

To describe deterministic, variable in time, events differential equations are most frequently used. Within the classes in mathematics, for example, teachers explain how to solve differential equations of different types, which are the mathematical models of the above processes. Students gain an understanding of the main advantages of analytical methods of solving equations – the speed of getting functional patterns for the studying process.

In the second year of studying the medical students and pharmacists get acquainted with the formation of the computer models. At this stage, students have the opportunity to realize and explore models among the spreadsheet using differential equations solving skills acquired in the course of mathematics or medical and biological physics. Using some spreadsheets while working with the mathematical models allows researchers - beginners to receive and analyze the results of the dynamic changes in the parameters of the model.

**Conclusions.** The possibility of a personal modeling of the changing processes in the concentration of the drug in the cells of the body, depending on the methods of its administration, creation of automated decision support systems and systems that are similar in structure to the expert systems, work with the optimized models, a number of statistical methods creates a future specialist awareness of the place of the mathematical modeling of the research structure in biology, medicine and pharmacy. Thus, a great importance is to the question of the possibility of more in-depth study of the modeling techniques as the parts or individual courses.

# STUDY PHARMACEUTICAL CARE OF THE POPULATION IN EMERGENCIES IN TURKMENISTAN

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**Introduction.** Providing guaranteed protection of citizen life and citizen health is the goal of the state policy in the field of protection of population and territories from emergencies. Creating a stable and efficient system of medical and evacuation support of the affected people and organization of full and timely provision of population with medicines and medical devices is one of the main directions of state policy in the field of security of the population and territories from emergencies.

**Aim.** Study pharmaceutical care to the population in emergencies in Turkmenistan.

**Materials and methods.** Laws of Turkmenistan. Document search.

**Results and discussion.** Currently 5.5 million people live in Turkmenistan. The urban population is 50.7% of the population, 49.3% - in rural areas. There are two laws of Turkmenistan "On public health protection" and "On the drug provision" in the sphere of health protection and care. In article 29 of the Law of Turkmenistan "On public health protection" on May 23, 2015 recorded the citizens' right to health in case of an emergency. Citizens have the right to receive free medical care, and rehabilitation treatment, carrying out hygienic and anti-epidemic measures to overcome the effects of an emergency.

Free treatment, including rehabilitation guaranteed to citizens who have suffered while on duty at the time of saving people, health care, medical services in emergencies. However, in Turkmenistan as of today there is no clear organizational structure of pharmaceutical care to the population in case of emergencies. Emergency medical care and specialized ambulance care performs the functions of service of Disaster Medicine. Providing pharmaceutical care to citizens is carried out in accordance with Article 40 of the Law of Turkmenistan "On protection of public health." Nation-wide stocks of medicines for case of emergency is formed in the manner determined by the Cabinet of Ministers of Turkmenistan.

The prerequisites for the creation of the country's central services to assist the population in emergency situations, which combine the functions of the system of civil defense and emergency services were created.

**Conclusions.** Evaluation of the organizational structure of pharmaceutical care to the population of Turkmenistan in case of an emergency carried out. It was determined that as of today in Turkmenistan a clear organizational structure of pharmaceutical care to the population in emergencies is not the case.

# SOCIO-ECONOMIC RESEARCH PHARMACEUTICAL SOFTWARE PREGNANT

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**Introduction.** Childbirth – a complex multi-physiological process that terminates pregnancy and is accompanied by birth. From the correctness of delivery depends largely on their outcome for both mother and fetus. According to the data of literature, most complications develop during pregnancy, it can prevent proper training, in particular through the introduction of a set of measures: prevention of vitamin deficiencies, timely examination and diagnosis of possible disease states and their correction.

**Aim.** Given the shortfall in health care and low solvency of the majority of the population become important pharmacoeconomic research.

**Materials and methods.** So the results of pharmacoeconomic studies in pharmaceutical expenditure to ensure women during pregnancy and childbirth will determine the list of medicines and directions for their sustainable use. To implement this goal by following objectives: to analyze and summarize the literature data on the total costs of maternity leave as abroad and in Ukraine; conduct a survey of women who had been registered with the consultation centers and maternity hospitals of Kharkiv to determine the actual expenditure; to calculate solvency adequacy ratio average cost of delivery for the citizens of Ukraine, Germany and the United States; determine the list of insured drugs required during pregnancy and childbirth.

Analysis of the literature on the overall cost of women during pregnancy and childbirth in Ukraine and abroad showed that in Ukraine a higher percentage are in other costs are almost 70% of the total cost, while abroad the average direct and indirect costs are almost the same, because under normal they relate to labor as 45% to 55%, while cesarean section 52% and 48% (respectively). Therefore, we were still carrying out a detailed study of the costs of pregnancy and childbirth in these countries compared to costs in Ukraine. And calculated solvency adequacy ratio or the availability of training facilities for childbirth.

For this we had to analyze the average salary of citizens of different countries and calculate solvency adequacy ratio. For German citizens rate is about 2.2 births if they are normal, and if cesarean section - 3.84 to US citizens and 3.34 and 4.07 respectively for citizens of Ukraine it is 3.64 and 4.27. Certainly factors (especially caesarean section) to some extent, about the same, but the quality of software systems

provided and the rational use of medicines in the countries studied are very different. Then we analyzed the lists of medicines and medical products needed experts in childbirth.

**Results and discussion.** As a result of the pre-research was compiled in accordance with current clinical protocols for medicines and medical appointments, which is considered necessary during childbirth. It included 12 kinds of medicines and medical devices 15.

Then we calculated the total average cost of these lists. So drugs need almost UAH 350. And medical devices almost 205 UAH. The results of the survey analysis found that for almost 60% of births were used only 35% lists names of drugs and medical devices. Further, we have identified lists of medicines and medical supplies that were needed in childbirth and their calculated value. So the cost of essential medicines in 60% of births is 113.4 UAH, and medical devices to 81.15 UAH. That is almost 65% purchased in the pharmacy pharmaceuticals were not needed, which is almost 360 UAH.

**Conclusions.** Analysis of the literature and a survey of the overall costs of women during pregnancy and childbirth in Ukraine and abroad showed that in Ukraine a higher percentage are in other costs are almost 70% of the total cost, while abroad the average direct and indirect costs almost the same for under normal births are related as 45% to 55%, while cesarean section 52% and 48% (respectively).

Our calculation of solvency adequacy ratio showed the average cost of labor, more affordable value for citizens of Germany (average rate - 3), followed by the US (3.7) and slightly worse than the citizens of Ukraine (almost 4). But quality of service significantly differentiated.

Studies have shown that the complex program of preparation for delivery and use of medicines during pregnancy and childbirth are not rational and do not fully meet the actual requirements of women.

With a view to the rational use of drugs and medicinal goods must hold at every nursing home Minimum reserve, which is required for delivery and carry a card costs every birth. The total cost, according to the card compensate by health insurance.



# ANALYSIS OF PHARMACEUTICAL SECURITY IN LEBANON AND THE WORLD

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**Introduction.** The financial condition of the enterprise is characterized by a set of indicators that reflect the process of formation and use of its funds. In a market economy, the financial condition of the enterprise in fact reflect the final results of its operations. That is the end results of the company interested in the owners (shareholders) of the company, its partners and the tax authorities.

Retail and hospital pharmacies are working around the world to ensure patient access to medicines and to assist in their mission-critical applications. According to FIP pharmacy concept - a health institution, which provides pharmaceutical services. These include the traditional holiday of medicines, and the provision of additional services.

**Aim.** The purpose of research - an analysis of financial and economic activity of pharmacies in Lebanon.

**Materials and methods.** To implement this goal were defined tasks:

1. To analyze the main methods and approaches to the analysis of the main sections of the "Report on financial and economic activity of the pharmacy."
2. To analyze the factors that affect the financial and economic activities of the pharmacy: an analysis of human resources, financial results, business efficiency and profitability.
3. To analyze the financial and economic activities of pharmacies in Lebanon.
4. The ways of improving the financial condition of the studied pharmacy.

The main objectives of the economic analysis of the financial condition of pharmacies are an objective assessment of the use of financial resources at the company, identification of internal reserves to strengthen the financial position, as well as the improvement of relations between enterprises and external financial, credit, and other supervisory bodies.

**Results and discussion.** In the first phase of our research have been analyzed main indicators studied pharmacy operations for 2014 and 2015. The analysis showed that revenues from sales decreased by almost 540 thousand UAH in 2015. The number of employees decreased by 4 persons. The cost of fixed assets increased by a little more than 600 thousand. UAH. Productivity decreased by 8 thousand UAH.

In the next step we analyzed the total turnover, trading and blending costs. The analysis showed that retail sales in 2015 decreased by 26% and wholesale by 17%. Realized trading overlay by 37% at the same level of trade overlays decreased by

4.7%. The amount of expenses decreased by 17% with the amount of wages increased by 29%.

The next stage of our research was conducted analysis of the main economic indicators of the pharmacy operation, such as earnings and profitability. Analysis has shown that these figures have decreased sharply in 2015. Profitability decreased by almost 15%.

So the next step was to analyze the business activity of the pharmacy study. It is to study the levels and dynamics of various factors - turnover figures.

The analysis showed that in terms of the turnover of the pharmacy study: return on assets ratio in 2015. increased by 2 times; ratio of receivables turnover shows an increase in commercial loans, provided the study drug store, which grows over the entire study period, indicating a poor performance with debtors, as well as term accounts receivable turnover has a strong tendency to decrease to 1.49 in 2015.

Accounts payable turnover period indicates the growth in accounts receivable by up to 172.71 days in 2015.

**Conclusions.** he analysis showed that to improve the financial condition of the enterprise in terms of improving the efficiency of use of circulating assets is recommended to take measures to increase the rate of turnover of receivables, it is necessary:

- make an inventory of accounts receivable;
- keep records of accounts receivable by maturity of its occurrence;
- determine the maximum amount of sales of goods on credit;
- carry out a systematic analysis of receivables.

The analysis showed that it is recommended to periodically review the prices established for similar products by other companies pharmacy sphere, in order to establish competitive prices for retail goods.

The analysis showed that it is necessary to increase the turnover expansion of the retail network, namely the increase in the number of outlets.

The analysis showed that it is necessary to carry out measures to improve information provision. In the process of financial and economic activity of the studied pharmacy one of the negative factors is the lack of strategic information you need: the lack of a database on the market.

In most countries the dispensing of medicines is allowed only at the pharmacy. However, a fairly common practice is to implement a resolution of medicines OTC status in other retail outlets (such as supermarkets, gas stations, etc.). This policy is due to the fact that in the developed countries to the issue of assigning the status fit enough carefully. In order to remedy received OTC status, applicants must provide regulators convincing evidence of its safety for the patient (including the self-medication). In other words, the OTC drug status is a guarantee of security.

# THE RESEARCH ACTIVITIES OF WHOLESAL PHARMACEUTICAL COMPANY "PHARMALINE" IN LEBANON

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**Introduction.** The drug provision of the population and medical institutions is one of the priorities of the social policy of any state at the present stage.

Therefore, the **aim** of our research was: an analysis of the main indicators of the pharmacy operation.

**Materials and methods.** Analysis of Principles for the Treatment of state regulation of medicinal products in the domestic and foreign pharmaceutical legislation shows that the main component of the regulatory policy system is the licensing of pharmaceutical activity, pharmacy law, the pricing of medicines and reimbursement (compensation value). In general, the requirements for the implementation of the retail sale of medicinal products can be divided into: - Requirements for obtaining a special permit (license); - Requirements regarding the number of pharmacies for a certain number of the population; - Requirements for the owners; - The place and the sale procedure requirements drugs (eg in Denmark, Germany, the Netherlands, Norway and the United Kingdom is not some prescription drugs can be purchased not only in licensed pharmacies, but also in conventional retail stores, supermarkets or licensed pharmacy (drugstore);

- requirements regarding the sale of pharmacy (pharmacy).

Virtually every country in Europe is regulated by the issue number of pharmacies, their location and the requirements for holders. Only in countries such as Belgium, the Czech Republic, the Netherlands, Norway, Poland, Russia, Sweden, Switzerland, the Baltic countries, Ukraine and the UK there are no legal restrictions, which explains the significant growth of pharmacy chains.

In all EU Member States pharmacy (pharmacy) must undergo mandatory licensing procedure. The bodies responsible for this procedure vary depending on the country. Yes, for example, in France it is the relevant department in the Netherlands - Inspectorate for public health control in Norway and Finland - The National Health Agency, Department of National Health and in countries such as: Belgium, Denmark, Portugal, the UK Commonwealth Pharmaceutical.

**Results and discussion.** In the first phase of our research we have identified the primary indicators of pharmaceutical firm work. So turnovers made in terms of the monetary unit of Ukraine in 2013, 1.143 million, it increased by 2% in 2014 and 16.6% in 2015. The costs in 2013 amounted to 232 thousand 600 UAH., In 2014, they increased by 2% and decreased by 6.5% in 2015. Thus the cost level was

constant and was equal to 20.4%. In our view, the study pharmacy, the figure was analyzed and planned in the first place. Every year the amount of the realized sales overlays.

We have calculated the indices increase or decrease of these indicators. On average, the turnover increased by 7%, costs decreased by 3%, the imposition of trade decreased by 3.35%

Since our analysis of the consistency level of costs has been observed, we conducted an analysis of the major cost items. The analysis showed that 49% of the total cost goes to pay, 29% on social charges Article, all other expenses amounted to 22%.

We also growth factors or loss cost items were calculated. The analysis showed that payroll decreased in 2014 and increased in 2015. This was due to an increase in staff in 2015.

The analysis of dynamics of average study pharmaceutical firm costs for items of fixed costs has shown that most of the articles have increased slightly, while other expenses decreased.

At the last stage of our research we calculated the main indicators studied pharmaceutical firm work. An analysis of these calculations showed that every year due to a decrease in the level of trade overlays profitability decreased to 0,8%, which is very low, but in 2015 the amount of profit by increasing turnover increased. Thereby not allowed to be loss-making in 2015.

**Conclusions** were drawn from the research. We have found that trade study pharmacy during the analyzed period increased an average of 1,078 times (7.8%). The costs pharmaceutical firm for the same period decreased an average of 0.972 times (2.8%). Trade imposing the same time dropped to 0.938 (6.2%).

The analysis studied pharmaceutical firm allowed to confirm the constant growth of expenses. Among the main reasons for this growth is the increase in wage costs (92.50%), utilities (83.75%), rents (36.25%) and electricity (35.00%).

It was found that the largest share in the total expenditure of pharmaceutical firms serving the public are wage costs - 49.0% and social activities - 17.0%.

It was determined that the highest growth rates have heating costs 1.27 times (an average of 27% per year) and rental of fixed assets in costs for pharmacies - 1.1700 times (an average of 17% per year). Also significantly grew on water costs - 1.14 times (an average of 14% per year). Less growth factors are energy costs, which have grown in 1.0931 times (an average of 9.31% per year) and the cost of labor - to 1.0103 times (an average of 1.03% per year) and related their costs at social events - in 1.0064 times (an average of 0.64% per year).

# THE RESULTS OF THE ANALYSIS OF "WILLINGNESS –TO–PAY" FOR THE USE OF INNOVATIVE TECHNOLOGIES IN THE TREATMENT OF PATIENTS WITH DEPRESSIVE DISORDERS

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**Introduction.** Currently, the organization of effective medical and pharmaceutical care of patients suffering from depressive disorder in Ukraine is of great socio-economic importance. The introduction of modern multimodal antidepressants into the treatment of patients with depressive disorders allows using them for a long time to achieve full recovery and supports the premorbid level of social functioning. Innovative drug Vortioxetine corresponds to the important contemporary requirements which are put forward for the treatment of depression, has not only a high efficiency in relation to affective symptoms, but also unique properties to enhance cognitive functioning and, consequently, the quality of life of the patient. However, the application of new approaches is complicated by the problem of its high cost.

**Aim.** To make the analyzes of "willingness-to-pay" in the organization of treatment of patients with depressive disorders in Ukraine.

**Materials and methods.** The object of the research was the survey data of psychiatrists (55 persons) and family members of patients with severe depression (75 people), which was conducted during 2015 in Zaporozhye. The questionnaire worked up for physicians consisted of two parts, in the first part it was necessary to specify personal data (age, place of work, position, work experience in the position, etc.), and the second contained the special block of questions on the monitored problem. The aim of the second unit was to establish the attitudes of respondents towards the "willingness-to-pay" at the expense from personal funds and rationality of the real cost of treatment with the drug Vortioxetine from the perspective of the health system as a whole. The purpose of questioning of other suffering from depressive disorders patients was to identify the "willingness-to-pay" opportunities by private funds (before that, the respondents indicated the average monthly income per 1 person in the family ), the rationality of the real costs for the treatment with the medicine Vortioxetine from the standpoint of the patient (indicating the cost of its implementation) and determining the maximum "willingness-to-pay" for the expense of personal budget and the rationality of the real costs from the position of health care organization.

**Results and discussion.** In the last decade, the results of pharmacoeconomic analysis is widely used in the health care system of the developed countries, while taking such management decisions as registration of medicinal products, development of forms and clinical guidelines (recommendations, standards of conducting patients), to draw up a restrictive list of medical technologies, which should to be paid from the expense budget or social insurance. The most valuable for the decision makers, are considered

the results of the analysis "cost-effectiveness" and "cost-utility". The analysis of "cost-benefit" remains quite attractive for economists in the field of health care organization because only it gives an indication of economic (monetary) benefit of the technologies contributing to the restoration, preservation or promotion of health. In addition, the results give us an insight into the preferences of the population (potential market) and at the same time can be used for economic justification of the use of medicines. 83.1% of physicians managed to evaluate "willingness-to-pay" without knowing the cost of treatment Vortioxetine and its effectiveness (to provide a monetary evaluation of medications conducive to everyday functioning and reduce the risk of suicide) at the expense of personal funds; 93.4% of doctors did the same at the expense of the health system. Among others patients the proportion of responses to questions was higher than that among health care workers – to assess "willingness-to-pay" for the personal expense without knowing the cost of treatment with Vortioxetine could 91.9% of others patients. After the respondents were informed about the cost of the treatment, to evaluate "willingness-to-pay" could only 79.3 %. The study calculated the ratio of the absolute difference of the benefits and costs depending on the size of «willingness-to-pay» for pharmaceutical ensure of different groups of respondents. It showed significantly different results among themselves. If we consider the responses of doctors, the use of Vortioxetine is obviously beneficial. But taking into the consideration the opinion of the patients' significant additional monetary investment is needed. Evaluation of "willingness-to-pay" which was conducted among physicians showed that 51% of respondents believe that all the expense for the treatment are to be carried out by the health care budget. 68% of physicians welcomes if the budget pays only 75% of the cost of treatment, 91% of doctors are for the payment of the half the cost of the treatment, and only 28% respectively are for the quarter of the budget payment. One of the important issues was to assess the feasibility of the real costs of Vortioxetine. The answer was given after the respondents recognized the real costs to treat depression using Vortioxetine. Among the asked whether it is appropriate to apply Vortioxetine considering its real value and efficiency, responded "no" only around 17.6% of patients and 3.7% of physicians.

**Conclusions.** Thus, the results of the study found out that the most "willingness-to-pay " for effective treatment was practitioners than average patients with depressive disorders. Considering the peculiarities of the health care system of Ukraine and the level of current financing, to ensure access of patients with depressive disorders it is necessary to conduct pharmacoeconomic analysis by the method of "risk sharing". Its results will justify a state procurement and establishing the price of the drug depending on the quantity (number of packages) for the treatment of depression, considering the limited financing of the branch. The scheme of partial state financing can also be implement for the expensive treatment involving 3 participants (the government – manufacturer – patient). It is only necessary to determine the percentage of reimbursement of expensive drugs in the case of the introduction of health insurance to ensure access of patients to high-tech means and methods of treatment.

## **SOCIAL AND ECONOMIC ASPECTS OF FRANCHISE CONCEPT AT MANDATORY MEDICAL INSURANCE**

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**Introduction.** Medical insurance - a form of social protection in the interests of public health, resulting in a guaranteed payment of medical care in the event of an insurance case, due to the accumulated byinsurerfunds. Medical insurance can guarantee the citizen to provide a certain amount of free medical services in the event of an insurance case, in the presence ofcontract with the insurance company (IC), which specializes in medical insurance. IC covers the cost and the payment in case of medical care after paying the first installmentby citizento the appropriate foundation. In economically developed countries, mandatory medical insurance (MMI) forms the basis of social protection of citizens and ensures two levels of insurance protection depending on the amount of insurance payments of insurance contracts. The situation prevailing in the Ukraine in the field of public health requires immediate action. Principal among these measures is implementation of the MMI system. It should be based on already elaborated positive Ics working principles of the voluntary medical insurance (VMI).

**Aim.** The aim of this study was to determine the possibility of extrapolating the ICs experiencein the VMIon the MHI system, provided its implementation in Ukraine, namely economic and social meaning of the franchise concept.

**Materials and methods.** The study used meta-analysis and methods of cabinet and field research to collect materials and data of franchise usebyvarious ICat VMI.

**Results and discussion.** According to Article 9 of the Law of Ukraine “On insurance” franchise - a part of the losses which is not compensated by the insurer under the insurance contract.

The quality of insurance services VMI depends not only on the work of the insured, but also on the work of its partners - health care facilities (HCF) and pharmaceutical companies, because medical insurance is not just payment of certain insurance money under the contract, provided the insurance case, but also guaranteed and directly provide medical care.

Our analysis experience with private IC withVMI showed that they set a franchise level, depending on the category of HCF. Table 1 shows the classification and characterization of the HCF, under which the IC categorize HCF.

**Table 1**

## Classification of medical establishments by category

Category	Description of the health care facilities
0 category	pharmacies, health improvement institutions;
1 category	medical facilities with very high prices – branded, private;
2 category	medical facilities with high prices - private;
3 category	medical facilities with average prices - mainly private, expensive departmental;
4 category	medical facilities with low prices - mainly state, departmental, cheap private.

IC calculated the size of the franchise according to HCF characteristics and category (Table 2).

**Table 2**

Health care facilities category provides by insurance option	The size of the franchise according to health care facilities category			
	1	2	3	4
1, 2, 3, 4	0%	0%	0%	0%
2, 3, 4	20%	0%	0%	0%
3, 4	40%	20%	0%	0%
4	80%	60%	30%	0%

For example, if the insured elected to service the medical institutions of the 3rd, 4th category, and assistance was provided in the institution 1 category, the franchise will be 40%. In this case, the insured person has their own reimburse 40%, and the insurer pays 60% of the cost of services.

**Conclusions.** However, the MMI is not the main income of the insured or additional opportunities to improve material and technical base of health care facilities and provision of guarantees insured citizens to quality health care. According to this statement, as well as the experience of the MMI in the developed two-tier insurance system to guarantee the citizens social protection without setting a franchise for the poorest sections of the citizens and establish a franchise level in the provision of health services in health care facilities with very high prices for the citizens of middle and high level software.



## **MODERN ASPECTS LEGAL LIABILITY OF HEALTH PROFESSIONALS**

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**Introduction.** The development of medical science, improvement of living standards and the establishment of democratic institutions contributes to the requirements of health workers and increasing cases of disciplinary measures for improper performance of professional duties.

Errors in medical practice is quite common even in developed countries. But the sad statistics of medical errors is observed in Ukraine too. It almost hidden, only a few cases are known to the public. Domestic jurisprudence of this category of cases are not made public, while in the US system of informing the public about the problems in the medical field is open. However, health workers can potentially be held accountable for crimes under twelve articles of the Criminal Code of Ukraine, the Code of Ukraine on Administrative Offences and Civil Code of Ukraine.

In the public mind, and formed a long time maintained naturally thought of the enormous responsibility of doctors for life and health. However, the reality of the last decade in Ukraine indicate that the urgency of the consideration of legal liability in medicine confirmed by the increasing number of claims with regard to various disorders during treatment.

**The aim of the study** is to clarify aspects of the modern application of legal liability for health workers in Ukraine and abroad.

**Methods:** a comparative and systematic.

**Results and discussion.** It should be noted that the Basic Laws of Ukraine on Health of 19 November 1992. Art. 6 among the rights that make up the structure of the human right to health, recognizing the right to compensation for damages to health. In Art. 8 Basics guaranteed state protection of the right to health, and it provides that in case of violation of legitimate rights and interests of health relevant State or other bodies, enterprises, institutions and organizations, their officials and citizens shall take measures to restore the violated rights, protection of legitimate interests and compensation for damages.

In the modern Australian law there are two models of responsibility - objective and relative. The first is that medical officer responsible for injury victim, if the terms of an objective assessment of the average observer behavior is influenced by the doctor on the natural course of events. Instead, the relative responsibility model is

used when there is material damage caused as a result of treatment. The criterion for such damage is the general rules on goods, services, securities, profits and such others. In the US, compared to other countries, significantly simplified procedure for proving guilt of doctors. It can be assumed that a significant number of medical claims in this country, a large number of legal conflicts in the area of medical practice in conjunction with the world's largest number of "classical" lawyers and lawyers specializing in medical law and with increased measures to respect patients' rights - is the direct consequences of this approach.

In Ukraine, a long time it was mainly about the criminal methods of influence on offenders in medicine. The adoption of the new Civil Code of Ukraine, development of legislation on health care, the formation of judicial practice in cases of prosecution of health professionals indicates the presence of four fundamentally different types of doctors liable for offenses committed: criminal; civil (property); administration; disciplinary.

Today, according to various sociological studies, doctors are more competent in matters of criminal liability, but increase in the prosecution of doctors to other types of liability causes to focus on their education. The key to quality of legislative work directed towards the improvement of legislation on health care, is a qualitative theoretical framework which should be formed as a result of comprehensive research involving lawyers, health care, doctors, practitioners and representatives of other interested parties.

**Conclusions.** Therefore, we should focus on the need to provide effective remedies in domestic science and practice to address issues of accountability for health workers or that the damage caused to the health of the patient. Thus, physicians should clearly understand the responsibility that comes in the case of offenses and patients to be sure that the protection of rights and legitimate interests guaranteed by the state and society in law.

**THE STUDY OF LEGAL AND ETHICAL ASPECTS  
OF THE ROUTINE CHILDREN'S IMMUNIZATION IN UKRAINE  
BY USING A QUESTIONNAIRE SURVEY OF PAEDIATRICIANS**

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**Introduction.** The problem of full and timely immunization coverage of children's contingent of the population is highly important for Ukraine at the present stage. According to the recommendations of the experts of the World Health Organization (WHO) immunization coverage for each of the recommended nosologies must be equal to at least 95%. However, in recent years there has been a significant discrepancy in the existing results to the needed indicator, one of the reasons of which is a lack of reliable information for the population about the effectiveness of vaccination in the prevention of infectious diseases and contradictions of its legal nature, which causes distrust of the population to this measure and the refusal of parents to vaccinate their child.

**Aim.** Considering the above, the aim of our study was to investigate the views of pediatricians, who among healthcare workers are the most involved in the process of children's vaccination, about legislative and ethical aspects of the children's routine vaccination.

**Materials and methods.** During the work the method of questionnaire survey, that is widely used in research of organizational and economic nature, was used. For processing 381 questionnaires, which were framed properly, were selected. The questionnaire was carried out among pediatricians from Kharkiv, Sumy, Poltava, Kyiv, Cherkasy regions of Ukraine.

**Results and discussion.** As is well known, today the level of immunization of children in Ukraine is much lower than in the countries of the WHO European Region, which proves ineffective functioning of the national system of routine vaccination. The relevance of the problem is also confirmed by the answers of respondents. Only 18.64% of the interviewed pediatricians believe that the system of planned vaccination of children in Ukraine is functioning effectively, and the vast majority – 81.36% of respondents – speak about the need to improve it.

Answering the question about the satisfaction of normative legal regulation of the process of planned vaccination only 9.97% of the respondents gave a positive answer, and 90.03% of respondents noted that the situation of regulation is not satisfactory and needs improvement.

Significant disputes in society are caused by a presence in the domestic legislation of norm fixing mandatory vaccination of children, which is not typical for most European countries. The respondents' opinions on the need of such a norm were divided about equally. For the necessity of such norm 38.06% of the respondents speak out; 43.83% of the respondents consider it unnecessary; 18.11% of respondents cannot answer to this question.

One of the main tasks of this study was to investigate the specific reasons for the rejection of a routine vaccination and identification of possible ways to eliminate this problem.

It should be noted that each of the surveyed pediatricians in their practice faced with the refusal of parents to carry out a routine vaccination to the child. In particular, 47.77% of respondents often faced with it in their practice, sometimes – 52.23% of respondents.

One of the reasons of the parents' refusal to vaccinate their children serves their lack of reliable information about the benefit and risks of vaccination, which was noted by 31.50% of pediatricians, and 34.91% of respondents consider that the information possessed by parents is incomplete. The percentage of respondents, who believe that the availability of information on vaccination is complete, equal to the 33.60%.

There is no doubt, that today the priority of health care system is to ensure the maximum level of vaccination coverage of children. According to the opinion of 67.98% of the surveyed pediatricians the most effective approach to ensure a high level of vaccination coverage is the implementation of an active awareness of the population on high efficiency of vaccination in the prevention of infectious diseases. The effectiveness of the legal obligation to maintain preventive vaccination for high vaccination coverage levels is supported by 10.24% of respondents. The feasibility of combining these two approaches is supported by 21.78% of respondents respectively.

The fact, that 98.69% of respondents said about the implementation of the regular explanatory work among parents regarding the necessity of preventive vaccinations for children, says about the active involvement of pediatricians in educational work on vaccination effectiveness. The share of doctors, who only sometimes carry out explanatory work, amounts to 1.31%.

**Conclusions.** Thus, it can be argued that one of the ways to increase the level of immunization coverage of children in Ukraine is an active explanatory work among people about the effectiveness of the method of routine vaccination in the prevention of infectious diseases with involvement for it not only pediatricians, but also other medical and pharmaceutical workers and the mass media.

# **SOCIALLY DANGEROUS DISEASES IN UKRAINE: LEGAL, MEDICAL AND SOCIAL ASPECTS**

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**Introduction.** The current stage of development of Ukrainian society is characterized by adverse trends in the development of the economy, a significant deficit financing of the health system, increasing morbidity and mortality among working-age population. In such circumstances, the effectiveness of the organization of medical and pharmaceutical care is largely dependent on the choice and justification of the main vectors of health care reform in the aspect of public funding, depending on the social importance of diseases and patients.

**Purpose of the study.** In view of the foregoing, the aim of our study was to analyze the legal, medical and social aspects of the organization of pharmaceutical care to patients socially dangerous diseases in Ukraine.

**Materials and methods.** We used the methods of scientific analysis, in particular the comparison of techniques and categories, content analysis, statistical research methods.

**Results.** Based on the results of the analysis of the existing regulatory framework for the organization of medical and pharmaceutical care in Ukraine, we have established the absence of a legal definition of the classification of diseases according to their social significance. However, in the structure of Ukrainian Ministry of Health operates the National Council on TB and HIV / AIDS, the Ukrainian operating control center for socially dangerous diseases Ministry of Health of Ukraine. According to the classification of the last socially dangerous diseases in our country are: tuberculosis, HIV / AIDS, opioid addiction, hepatitis B and C infections, sexually transmitted diseases. The fight against these diseases as defined by WHO as a strategic goal of global health. The results of the analysis of health statistics in Ukraine for the period 2013-2015 gg. suggest stability prevalence ( $\approx$  300 persons per 100 thousand..) and mortality (12 thous.) HIV / AIDS, with 65% of patients of the working-age population aged 49 years and 20% respectively - children up to 14 years. Also today, you can not reach the national health care a significant reduction in the prevalence rate of tuberculosis, the target for this indicator is nosology 36 people per 100 thousand. people.

**Conclusions.** The necessity of determining the classification criteria and the list of diseases in Ukraine related to the social and dangerous. This approach allows to optimize the health and resources of society as a whole for effective medical, pharmaceutical and social assistance to the most needy sections of the population and patients with socially significant diseases.

## RESEARCH OF THE OFFERS OF ANTIPRURITIC MEDICINES IN THE PHARMACEUTICAL MARKET OF UKRAINE

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**Introduction.** Skin diseases are on the fourth place among the reasons of non-fatal diseases. The prevalence of skin diseases in the world isn't identical; it depends on the region and fluctuates within 14-50% (the average value of prevalence makes about 25% of the general population).

A big group of dermatoses (allergic dermatitis, eczema, neurodermatitis, atopic dermatitis, urticaria) is caused by a sensitization – hypersensibility of an organism. Antipruritic medicines have a symptomatic effect, reducing the itching sensation in the skin, and are often used for self-medication, that has caused the choice of the direction of our research.

**Aim.** Research of offers of antipruritic medicines in the pharmaceutical market of Ukraine.

**Materials and methods.** During the research we used data from the information retrieval system «State Register of Medicines in Ukraine» and the reference book «Compendium 2015 – Medicines». The analytical, statistical methods and methods of marketing analysis were applied.

**Results and discussion.** The assortment of antipruritic medicines (D04A) at the pharmaceutical market of Ukraine (as of March, 2016) is presented by 11 trade names, taking into account the pharmaceutical forms and without dosages.

The subgroup of antihistaminic medicines (D04AA) is presented by 4 import preparations («Fenistil gel», «Fenistil emulsion», «Psilo-balzam®» and «Dermadrin»); the subgroup of topical anesthetics (D04AB) – 1 import preparation («Lidocaine») and 1 domestic preparation («Lidokain-Zdorovye»), the subgroup of other means (D04AX) – 4 import preparations («Zolota zvezda®», «Zvezdochka» in the form of balm and liquid balm, «Irikar») and 1 domestic preparation («Menovazan»).

**Conclusions.** According to results of the analysis established that imported antipruritic medicines constituted 81.8% (9 trade names) of the total number of medicines in this group in the Ukrainian market and presented by 7 producers from 5 countries (a share of domestic medicines – 18.2% respectively). The results of the analysis define low economic availability and demonstrate the dependence of the Ukrainian pharmaceutical market from imports.

# COMPARATIVE ANALYSIS OF CONTENTS DISCIPLINES OF SOCIAL CHARACTER IN THE PHARMACEUTICAL HIGHER EDUCATIONAL ESTABLISHMENTS ABROAD

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**Introduction.** In most countries the range of activity and knowledge of pharmacist increases every year. However, the growing need for basic and specialized training pharmaceutical specialists direction to meet the needs of pharmaceutical companies in specialists. Nowadays particular attention is paid of teaching social direction in view of the socialization of most countries of the world.

**Objective:** Comparative analysis of the content of the disciplines of social direction in pharmaceutical higher educational institutions of foreign countries and the National University of Pharmacy (NUPh).

**Materials and methods:** We have analyzed the international experience and scientific literature on teaching disciplines of social direction, specialty "Pharmacy" in 13 countries svitu.zokrema Bulgaria, Austria, Russia, Italy, Great Britain, of Denmark, Finland, Czech Republic, Spain, Australia, Poland, USA, Ireland. The results compared with the content of socio-economic disciplines studied pharmacy at 4-5 course of NUPh according to the curriculum of the specialty "Pharmacy" educational kvalifikatsiynoho of "specialist".

**The results:** The study, which is presented in Table 1 . The presence of a wide range of disciplines social direction in foreign practice in most institutions foreign countries during recent years studies supported teaching disciplines of socio-economic direction and, especially, in areas such as pharmaceutical law, professional ethics, organization of pharmaceutical assistance management and economic aspects of pharmacy.

**Conclusions:** The results defined that that in most countries in pharmaceutical universities, as in of NUPh, considerable attention is paid of teaching social direction, which testifies to their importance and practical significance in modern society and in education pharmaceutical specialist.

**Table 1**

Comparative analysis of the content of subjects of social character in pharmaceutical universities in foreign countries and NUPh

Academic discipline of NUPh	Countries of the world, which taught discipline social purpose	Alternate names disciplines	The question of discipline that studies in foreign practice
«Pharmaceutical Law»	United Kingdom, Bulgaria, Austria, Czech Republic, Italy, Spain, Poland, Russia, Australia, Ukraine	<ul style="list-style-type: none"> <li>• «Pharmaceutical Law and Ethics»;</li> <li>• «Pharmaceutical legislation and ethics in in health care.»</li> </ul>	The study of existing legal norms regulating pharmaceutical activities as well as the principles of ethical pharmaceuticals.
«Organization and economics of pharmacy»	Russia, Poland, Czech Republic, Bulgaria, Ukraine	<ul style="list-style-type: none"> <li>• «Pharmacoeconomics»;</li> <li>• «Economic pharmacy»;</li> <li>• «Management and economics of pharmacy.»</li> </ul>	Includes several sections, including the economics of pharmaceutical organizations, pharmaceutical care organization, accounting and reporting of pharmacy organizations.
«Management and Marketing in Pharmacy»	Spain, Italy, USA, Denmark, Portugal, Poland, Finland, Ireland, Ukraine	<ul style="list-style-type: none"> <li>• «Management and planning in pharmacy»;</li> <li>• «Technology Management»;</li> <li>• «Pharmaceutical Business»;</li> <li>• «Social Management»;</li> <li>• «Economy and marketing in pharmacy»;</li> <li>• «Pharmaceutical management and marketing.»</li> </ul>	Examines basic theoretical concepts of management and control features, business and communication activities, personnel management, domestic and foreign labor law, business entities in pharmacy.
«Social economy in pharmacy»	Austria, Ireland, the USA, Portugal, Bulgaria, Denmark, Finland, Ukraine	<ul style="list-style-type: none"> <li>• «Social pharmacy»;</li> <li>• «Social and professional aspects of pharmacy»;</li> <li>• «Sociology of health.»</li> </ul>	It combines the study of national policies in pharmacy and strategic management.



# RESEARCH OF SYSTEM OF SOCIAL MANAGEMENT OF PERFUM AND COSMETIC ENTERPRISE

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**Introduction.** Today, one of the priorities of modern perfume and cosmetics enterprises is targeting management system on social values. Important questions about the use of social features management domestic perfumery and cosmetic companies are so multifaceted, relevant and open, requiring further study and develop ways of its improvement in the conditions of socially oriented economy of Ukraine.

**Aim.** The aim of this work is to research the theoretical and practical aspects of the use of social management of modern perfumery and cosmetic companies.

**Materials and methods.** Used methods of scientific analysis, systematic approach and marketing analysis.

**Results and discussion.** The system of social management of enterprise perfume and cosmetics industry is individual and unique, to be reflected in the development of the mission, goals, business strategy, vision of business processes, key standards system and indicators.

The use of social management in practice perfume and cosmetic company requires a reorientation of the overall management system in compliance with human social values, namely in the environment - a focus on the social values of the consumer, in the mid - social values staff. Without studying social processes and relations in the relevant company, creating an adapted system of social management is not possible to meet the social needs of society and solving economic and social problems of the company.

We studied management system of perfume and cosmetic company LLC "BIOKON" and found that it has a social orientation. It includes: the presence of the social mission of the enterprise, social development strategy, the use of social partnership programs, the use of methods to solve social problems of staff and customers, achieving high indicators of social relations in society.

Today LLC "BIOKON" is one of the leading perfume and cosmetic enterprise in Ukraine. Company constantly develops and implements innovative marketing and promotional social-focused strategies that reinforce its positive image, which affects customer loyalty to the brand and increases brand perception.

LLC "BIOKON" as a socially responsible company for many years engaged in charity. From 2013 company realizes the program "BIOKON for women's health," which was designed for 3 years. As part of the charity project company assisted hospitals in all regions of Ukraine. Every month two antenatal clinics in two different

regions receive necessary equipment for the treatment and diagnosis. The community appreciates the value and importance of the project in terms of development of Ukrainian health system.

The main competitive advantages of the company are coordinated business behavior, rich network of business contacts and relationship management skills, adaptation to change the unfavorable external environment, strategic flexibility, the use of programs of social partnership, innovation activity in solving social problems.

Note that it is formed by the social partnership system allows the company to combine resources to create social programs that it cannot develop on their own. This opens up new strategic and innovative opportunities for him.

The system of social management LLC "BIOKON" provides a clear definition of tasks and can be used in any way to define business processes, setting goals for further work, evaluation and planning of actions necessary to improve the situation.

Human resources of cosmetic company is recruiting and retaining the necessary personnel corporation, his professional training and development, evaluation of each of the employees in terms of the implementation of the social objectives of the company, it gives the opportunity to adjust its behavior, and provides rewards for staff for his efforts.

The purposes of the company LLC "BIOKON" in the future - is the development and production of new social competitive products. In their laboratory, scientists are creating new recipes and improve existing ones.

Each year the company receives patents for ten or more cosmetic products, which are then used in production. The company has modern pharmaceutical equipment and cosmetic raw materials from leading manufacturers from France, Germany, Austria and other countries.

Thus, the social management of modern perfumery and cosmetic companies - a system of social control that ensures the efficiency of the production of social production by addressing social problems in society and can effectively influence social processes in the country.

**Conclusions.** We investigated the main aspects of the social management of modern enterprises perfume and cosmetic industry and found that the management model according to the system of social management provides a clear mission statement, goals and objectives for socially-directed enterprise perfumes and cosmetics, which affects the process of strategic planning, organization, motivation and evaluation practice. The system of social management on the example of LLC "BIOKON" and are the main areas of social work, which provide it a competitive advantage in the Ukrainian beauty market.

# THE STUDY OF THE MAJOR INTERNATIONAL RATING INDICATORS IN THE PHARMACEUTICAL INDUSTRY AND THE IDENTIFICATION OF LEADERS AMONG PHARMACEUTICAL COMPANIES

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**Introduction.** The pharmaceutical sector of health care isn't only one of the most significant, as it develops and manufactures medicines for maintenance and recovery of health, but also one of the most problem in economy, as it isn't able to ensure the availability of pharmaceutical care to all persons in need.

A degree of participation of pharmaceutical companies in the work on increase in the availability of medicines and medical support is reflected by the rating indicator «The Access to Medicine Index» (than the bigger efforts a company applies to increase the availability of drugs and medicines in 106 low- and middle-income countries, the rating is the higher).

A level of corporate social responsibility is reflected by a rating indicator «RepTrak® 100». It is the «gold standard» for measurement of reputation of the international companies, including pharmaceutical.

**Aim.** The study of the major international rating indicators in the pharmaceutical industry and the identification of leaders among the pharmaceutical companies

**Materials and methods.** During carrying out the research the data of Access to Medicine Index [<http://www.accesstomedicineindex.org/ranking>] was used and the data of Reputation Institute [<https://www.reputationinstitute.com/research/Global-RepTrak-100>] was used; content analysis, analytical and statistical methods were applied.

**Results and discussion.** The leaders of the rating indicator «The Access to Medicine Index» in results of the evaluation in 2014 became the following pharmaceutical companies: «GlaxoSmithKline», «Novo Nordisk», «Johnson & Johnson», «Novartis AG» и «Gilead Sciences Inc.» (Table 1).

The pharmaceutical branch in a rating «RepTrak® 100» in 2015 was presented by 10 international pharmaceutical companies, the leaders were «Johnson & Johnson», «Eli Lilly», «Abbott Laboratories», «Novo Nordisk», «Bayer», «Bristol-Myers Squibb», «Roche», «Sanofi», «Merck Sharp & Dohme» и «AstraZeneca» (Table 2). Unfortunately, the companies «GlaxoSmithKline» and «Pfizer» in 2015 were not included into the top 100 of world leaders in the corporate social responsibility.

**Table 1**

Rating of the pharmaceutical companies in accordance with the indicator  
«Access to Medicine Index»

Company	Rank 2014	Rank 2012	Company	Rank 2014	Rank 2012
GlaxoSmithKline	1	1	Eisai	11	15
Novo Nordisk	2	6	Hoffmann-La Roche	12	10
Johnson & Johnson	3	2	Bristol-Myers Squibb	13	12
Novartis	4	7	Boehringer Ingelheim	14	17
Gilead Sciences	5	5	AstraZeneca	15	16
Merck KGaA	6	8	Pfizer	16	11
Merck & Co.	7	4	Eli Lilly and Company	17	14
Sanofi	8	3	Astellas Pharma	18	20
AbbVie	9	-	Daiichi Sankyo	19	19
Bayer	10	9	Takeda Pharm. Company	20	18

**Table 2**

Rating of corporate social responsibility of the companies RepTrak® 100

Company	Company	Rank 2015	Rank 2013
Johnson & Johnson	United States of America	12	15
Eli Lilly	United States of America	67	39
Abbott Laboratories	United States of America	71	48
Novo Nordisk	Danmark	73	-
Bayer	Germany	77	60
Bristol-Myers Squibb	United States of America	81	70
Roche	Switzerland	92	62
Sanofi	France	93	
GlaxoSmithKline	the United Kingdom	-	85
Pfizer	United States of America	-	94
MSD (Merck Sharp & Dohme)	United States of America	98	-
AstraZeneca	the United Kingdom	99	-

**Conclusions.** The leaders among the international pharmaceutical companies were identified by the results of the main international rating indicators «Access to Medicine Index» and «RepTrak® 100» analysis, among them «GlaxoSmithKline», «Novo Nordisk», «Johnson & Johnson», «MSD (Merck Sharp & Dohme)», «Sanofi», «Bayer», «Roche», «AstraZeneca», «Pfizer», «Eli Lilly», which took an active part in increasing the availability of medicines and medical care for the population around the world.

# IMPACT OF DEREGULATION ON ACCESS TO COMMUNITY PHARMACIES. EVIDENCE FROM SLOVAK REPUBLIC

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**Introduction.** Deregulation constantly brings changes with direct or potential impact on community pharmacies. For their understanding and positive use in provision an affordable and good quality pharmaceutical care, it is important to continuously monitor and analyse their development, particularly in relation to demographic and geographic characteristics.

**Aim.** The number of community pharmacies, population to pharmacy ratio and area to pharmacy ratio are important parameters that are sensitive to changes with strong regulatory potential.

**Materials and methods.** Data on the number of public pharmacies, population, land area during the years 1998-2014, were drawn from a database of the Statistical Office of the Slovak Republic. The collected data were entered and edited in Microsoft Excel. Mann-Kendall test, Fisher test and Pettitt tests were carried out under the R statistical software.

**Results and discussion.** In 1998 Slovakia had 952 community pharmacies, 5552 residents and 52.5 square kilometres per community pharmacy. Gradually, increased the number of community pharmacies, concurrently the number of residents and the surface area per community pharmacy statistically significant decreased in all regions of Slovakia ( $p < 0.05$ ). The most significant change in the trend occurred in 2005 ( $p < 0.05$ ). The number of public pharmacies peaked in 2012 (1612; 3352 residents and 30.5 square kilometres of the territory per community pharmacy). In 2014, Slovakia had 1,598 community pharmacies, 3394 residents and 30.8 square kilometres of the territory per community pharmacy.

**Conclusions.** Deregulation increased the number of community pharmacies and enhanced access to community pharmacies. Despite the fact, the public pharmacies were mostly established in major cities, we have recorded improvement of accessibility also in rural areas.

## PHARMACOECONOMIC FEATURES OF THE ANALYSIS OF DRUGS USED TO TREAT PSORIASIS

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**Introduction:** Feature pharmacological treatment of psoriasis is that it is a chronic systemic disease with genetic predisposition, provoked near endo and exogenous factors, characterized by hyper proliferation and impaired differentiation of epidermal cells. It is therefore very important to correctly and promptly appoint a treatment every needy patient. The clinical protocol of diagnosis and treatment of psoriasis have more than 60 names of drugs.

**Study Objectives:** To conduct a comparative analysis of the use of medicines in the diagnosis and treatment of psoriasis in a hospital.

**Materials and Methods:** The statistical, comparative, social analysis methods.

**Results:** The clinical protocol of diagnosis and treatment of psoriasis approved minutes of the meeting of the Expert Commission for the Development of Health number 18 by the Ministry of Health and Social Development of the Republic of Kazakhstan from September 19, 2013. This document specifies the treatment of two types of drugs for the treatment of psoriasis, the first - essential medicines (compulsory, 100% probability), the second is additional drugs (probability less than 100%). In the list of essential medicines, there are two pharmacological groups of drugs. There are immunosuppressive agents, including anti-cytokine agents (these include methotrexate, cyclosporine, infliximab, ustekinumab) and preparations for the topical treatment (derivatives of vitamin D3, glucocorticosteroid ointments). A total of 16 kinds of medicines, including form-solid 18.75%, liquid form- 12.5% and soft - 68.75%. And more than 10 pharmacological groups such as antihistamines, sedatives, sorbents, vitamins, immunomodulators, desensitizing drugs, steroids, drugs improving peripheral circulation in the supplementary list of protocol treatment of psoriasis. In general name of 46 drugs, among them 22 solid formulation, the liquid 21, 3 soft form.

**Conclusions:** We have reviewed the use of medicines in the treatment of psoriasis in a hospital for the clinical protocols of diagnosis and treatment of this disease.

## RESEARCH GUIDELINES IMPLEMENTING PHARMACEUTICAL PRACTICES IN THE WORLD AND IN UKRAINE

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**Introduction.** Good Distribution Practice is a quality assurance system standards, guarantees the quality of medicines, supported at all stages of the supply chain from the enterprise of the manufacturer to the pharmacy.

**Aim.** The purpose of work is to study the wholesale and distribution managers in the EU and compared its practices with Ukraine.

**Materials and methods.** To implement this goal were defined tasks:

- an analysis of the literature data and legal documents on the general concept of wholesale distribution executives.
- specify the general regulations that govern the relationship between the firm-supplier and the state, the general practice.
- to analyze the strengths and weaknesses of wholesale distribution executives.

**Results and discussion.** Analysis of the literature and regulatory documents showed that the structure of the new leadership of the Good Distribution Practice consists of 10 main points: quality control; personnel; facilities and equipment; documentation; operations; claims, refunds, suspected of drug counterfeiting, and their reviews; outsourcing; transport; self-inspection; special provisions for intermediaries.

In our further research, we will use most of them during questioning Ukrainian distributors. In the first phase of our research we analyze patterns of species distribution of the Software was held in the world. It happens:

- Standard - The manufacturer-distributor of Pharmacy-Patient;
- Directly to the pharmacy;
- Custom distribution;
- Hospital.

In the next stage of our research we analyzed the patterns of interaction of the manufacturer and the buyer. The analysis showed that there are two basic supply chain: Producer-distributor of Pharmacy and Pharmacy Manufacturer. In our view, part of the patient, more promising since the second a continuous information flow and cash flow. What ultimately reduce the cost of medicines to consumers, and therefore - the availability and improve the information to pharmacies and patients about the drugs.

We also conducted an analysis of published data on the wholesale market of Ukraine and the EU. The analysis showed that 36% of the countries the number is

less than 100 distributors, 24% from 500 to 1000. Ukraine has 440 pharmaceutical wholesale company. And for the same company for 47 pharmacies.

Analysis of the dynamics of indicators of distribution of the Software showed that in Ukraine since 1999. The number has decreased by 3 times. It was 1400 in 2014. already 440.

In order to improve the work of Ukrainian distributors, we conducted a survey of 50 employees of large Ukrainian wholesale companies. Analysis of the information on the expert who participated in the survey on the distribution showed that 82% were pharmacists. Experience from 70% up to 3 years. In the questionnaire of 10 key questions were asked.

Analysis of the questionnaires showed that 100% response options were supported as "Compliance with the conditions of the contract" and "there are a few companies distributors in Ukraine, who have enough experience to open new markets." The question is - what is the deciding factor when working with the manufacturer? 80% of respondents - Prestige manufacturer. The question is - what is the deciding factor when working with pharmacies? 70% of respondents - the market share occupied by the pharmacy.

**Conclusions** were drawn from the research:

1. Analysis of the literature and the results of our study showed that in Ukraine for the transition of pharmacy in a highly costly category, and to overcome the existing negative trends, must be the introduction of effective strategies, development of the industry at the present stage. The development of market relations requires the organization of the pharmaceutical sector on a fundamentally new basis.

2. Studies have shown that Ukraine should pay attention to and consider the introduction of models of delivery of drugs that exist in the EU that will allow pharmaceutical companies producing enforce appropriate standards of storage, delivery, drug release, as well as the export of pharmaceutical products, and to develop other services for patients in collaboration with pharmaceutical pharmacist.

3. The statistical analysis showed that the dynamics of the development of distribution of the Software, the number of wholesalers decreased every year since 1999. There were in 1400, and in 2014 already - 440. In the United States over the past 30 years, the reduction from 150 to 50.

4. The statistical analysis showed that a key indicator: the average number of pharmacies per distributor warehouse in EU countries - 390-450 pharmacies and 45 drugstores in Ukraine.



# THE MONITORING CONDITION OF MARKET PARAPHARMACEUTICAL BY MEANS OF A QUESTIONNAIRE SURVEY

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**Introduction.** Currently continues active development and formation of parapharmaceutical market in Ukraine. There is an ongoing active development in Ukraine and formation of parapharmaceutical market. Pharmacies parapharmaceutics (PF) share reaches 25% of total sales. In the near future the ratio of drug to pharmacies and PF range can reach 60% and 40%, respectively.

**Aim.** The aim of the study is to monitor the state of the market PF by questioning consumers, allowing improving the development of scientific and methodological approaches to the regulation of their circulation in Ukraine.

**Matiriais and methods.** To conduct the study, we used a logical, documentary, functional and questionnaire analysis methods. Materials: results of a questionnaire survey among consumers in pharmacies PF c. Kharkiv.

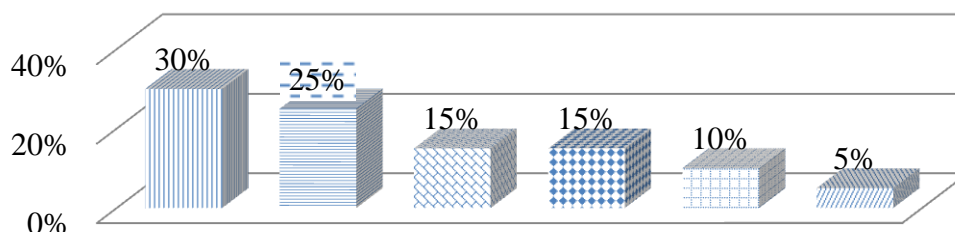
It was found that the category "Therapeutic shampoos and hair products" constantly increases due to the receipt of new products – shampoos «Vitoral» (LLS «Aromat», Ukraine), «Kenazol» («Pharma Interneshnl», Jordan), «Ebersept» («Bros Ltd», Greece) on pharmaceutical market.

The results of the survey of consumers indicate that the main consumers of the PF for hair care women aged from 21 to 45 years, with higher education, living in the city, social status – employees with monetary income for one member of the family from 700 to 1000 hryvnia. They often buy PF products in pharmacies, where are able to get professional advice. This indicates the growing role of pharmaceutical institutions in the realization of the analyzed goods. It was found that the main factors of choice of PS customers are the safety, efficiency, affordability. The lack of complete and reliable information in 55% of the respondents influences the formation of the stereotype on its medicinal properties.

Only 45% of consumers are familiar with the fact that the PF shall apply only as preventive means. It was found that 58% of consumers prefer goods of local producers, and imported goods – 42%. This is the result of the dynamic development of the national parapharmaceutical market, whose main objective is the provision of accessible and effective PF goods.

According to the data questionnaire respondents were established the main factors that influence the choice in buying between PF and medicines that have a similar effect. The main factor is the absence in the composition of many products parapharmaceutical preservative, colors and flavors. That is, they are safe and do not

cause irritation of the skin – mentioned 30% of consumers; presence in these products of natural ingredients (extracts of herbs) – 25% of respondents denoted; price parapharmaceutical products is available indicated 15% of respondents; allergic reactions on the part of the body when using medicines said 15% of consumers; preventive direction on the impact advertising on the PF indicated 10% of consumers; the negative attitude towards medicines indicated 5% of the respondents (figure).



- || Parapharmaceuticals is more safe and do not cause irritation of the skin
- Presence in parapharmaceutical goods natural ingredients's (extracts of medicinal plants's)
- ^ Price parapharmaceutical products is available
- ⌘ In some cases, the manifestation of allergic reactions on the part of the body, when applying medications
- ⋯ Successful advertising parapharmaceutics to prevent diseases
- ⋈ The negative attitude towards medicines

**Figure.** Factors influencing the choice between purchasing parapharmaceuticals and medicines of similar

On the question posed to consumers by trade names ant seborrheic shampoo with ketoconazole, which they often buy in pharmacies, it was found that the respondents prefer a more «promoted brands» (shampoo «Nizoral» («Janssen Pharmaceutical NV», Belgium) – 50%; shampoo «Dermazol» («Kusum Hlephther», India) – 20%, instead of the little-known brand (shampoo «Vitoral» (LLS «Aromat», Ukraine) – 10%, shampoo «Ebersept» («Bros Ltd», Greece) – 10%, shampoo «Kenazol» («Pharma Interneshnl») – 10%).

This indicates that the level of consumer demand of consumers depends not only on the advice of pharmacists, pharmacists and doctor's appointments of certain shampoos, as well as on the level of advertising support goods.

**Conclusion.** During the monitoring process market condition PF based on consumer profiles it has been found that consumers prefer domestic goods manufacturer. Key factors of choice of PF goods: safety, efficiency, affordability.

## ANALYSIS OF MARKET OF PARAPHARMACEUTICALS ANTI-SEBORRHEIC ACTION

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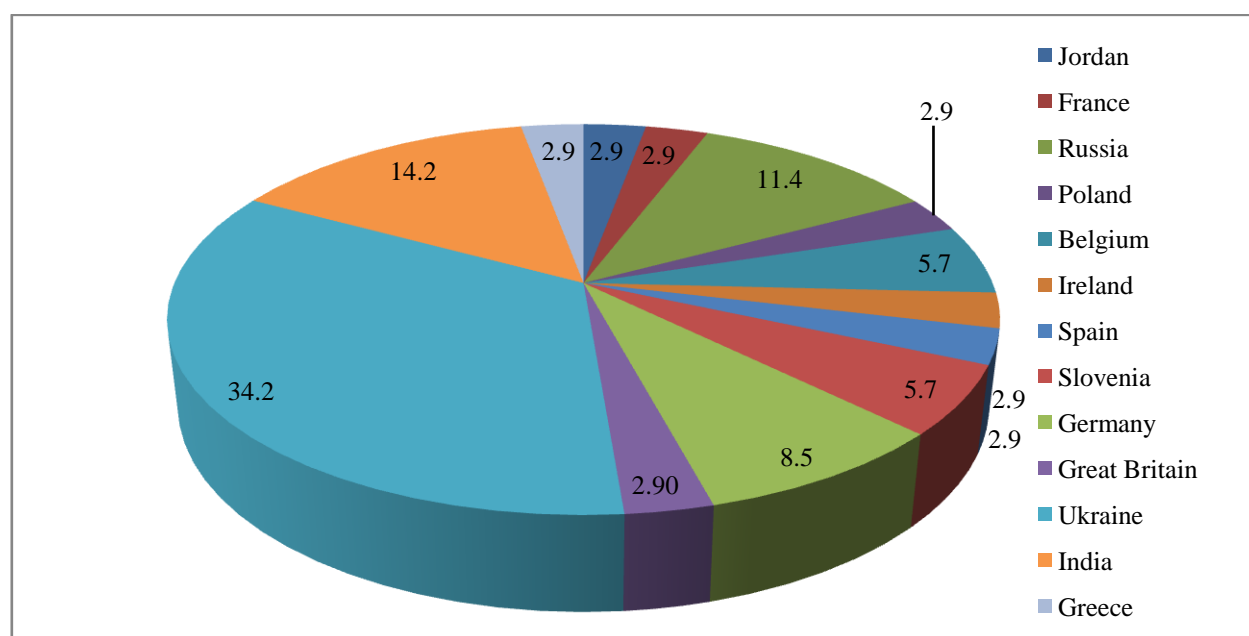
**Introduction.** Seborrhea is a widespread chronic disease, affecting head skin. The urgency research lies in the fact that the disease is prevalent in 15% of the population, of which 5% are seborrhea in the acute form.

**Aim.** The aim of our study is to analyze the main trends of development of market parapharmaceutical goods as an example shampoos anti-seborrhoeic action, which are using to prevent disease.

**Matiriais and methods.** In the research, we used content analysis, logical and comparison method. A method is statistical data on the structure of the market on seborrheic shampoos in c. Kharkiv.

**Result.** The parapharmaceutical market research established that, in December 2015, c. Kharkov pharmacies were present 35 brands of shampoos for the prevention and treatment of seborrhea.

Part of anti-seborrheic shampoos Ukrainian producers is 34,2%, indicating a significant dominance of imports in the test segment of goods (figure).



*Figure. Share distribution on seborrheic shampoos by manufacturers countries*

The Ukrainian producers are presented by 7 company's producers. SPA «Elfa» makes the greatest number of shampoos – 5 trademarks: «Ketoconazole shampoo with anti-dandruff» 100 ml; «Shampoo a neutral «Ketoconazole + Zinc»» 150 ml;

«Home Doctor dandruff Tar and Tea Tree» 300 ml; «Tar Shampoo, Tea Tree Anti-Dandruff» 300 ml; «Shampoo Dr. Sante Aloe Vera Anti-dandruff» 300 ml.

It was found that in the study group of goods there is a significant predominance of imports. Among shampoos for the treatment and prevention of seborrhea share anti-seborrhoeic shampoos foreign producers is 65.8% (23 goods). Leading position among them is India Company «Kusum Healthcare» – 14.2%. Greatest value have such companies as LLC «Pharmaceutical Technology» (Russia), NPK «AS-COM» (Russia), Natura Siberika LLC (Russia) – 11.4% and «Schering-Plough» (Germany) – 8.5% (at the expense of line of anti-seborrhoeic shampoos («Friderm»).

Middle position is occupied by such companies as: «KRKA» (Slovenia) – at the expense of the line anti-seborrhoeic shampoos «Fitoval» and «Janssen Pharmaceutical NV» (Belgium) – at the expense of long time presence on the Ukrainian pharmaceutical market a single brand «Nizoral» with ongoing advertising support.

The share of foreign companies such as: «Bros Ltd» (Greece); «Pharma International Jordan, Ducret» (France); «Stefel L.T.D. Laboratories» (Ireland); «Heminovo International SA, Macarena» (Spain), «P & G & SHOULDERS» (United Kingdom) among the total number of companies producing anti-seborrhoeic shampoos, almost the same for all and is 2.9%. In these companies usually there are single branded shampoos with a good advertising support.

In ours research was found that the proportion of manufacturers's antiseborrheic shampoos in soshetkah is only 9%: Vitoral sachets of 10 ml №10 LLC «Aromat», Ukraine; Dermazol 2%, 8 ml sachet №20 «Kusum Hlephther» Indiya;

«Sebozol», 5ml sachets №5 of «Farmatsevtichni tehnologii» OOO Russian Federation.

**Conclusion.** Thus the analysis of basic tendencies of of development of parapharmaceutical goods on the example of anti-seborrhoeic shampoos action found that the share of Ukrainian producers in December 2015 y. in Kharkov is not great and is only 34.2%. This represents a significant predominance of imports parapharmaceutical goodss anti-seborrhoeic action, which are used to prevent diseases. Ukrainian producers are represented 7 companies. The leading position is occupied the «SPA «Elfa»» on the production of brands among them. The share of the foreign producer's seborrheic shampoo is 65.8%. Indian company «Kusum Hlephther» Glenmark Pharmaceuticals Ltd. holds a leading position – 14.2%.

# THE COMPONENTS' ANALYSIS OF THE PROVISION OF PHARMACEUTICAL CARE FOR POPULATION

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**Introduction.** Timeliness, usefulness and efficiency of pharmacotherapy is an important issue in a changing modern system of pharmaceutical and health care system. According to the World Health Organization indicators, which allow to assess the state of health of the population and the health system at the national level, are divided into economic, clinical and humanistic results.

**Aim.** The aim of our study is conducting analysis of the socio-economic components of pharmaceutical care to the population in the different countries.

**Materials and methods.** Methods of content analysis, comparative analysis of scientific literature and periodicals, statistics Ministries of Health and the World Health Organization are used during the study.

**Results and discussion.** According to the analysis of economic indicators it was revealed that health expenditure in the world differ greatly. For example, in the US Health expenditure, total (% of GDP) amounted to 20.7% in 2014, and that in Iraq amounted to only 5.2% (with an average value in the period 2002-2014 – 3.96%). The analysis of expenditure per capita (current US\$) shows a high level of support in countries such as the US (9145 ), Canada (5718 ), Japan (5965 ). It should be noted that in Iraq, the figure in 2014 was 305 US\$ with an average annual growth rate of 37%.

It was determined that during the last years rate of population growth in Iraq had increased by 0.3 and amounted to 3.01, while the death rate (per 1000 people) of the decreases in average by 1.8% annually. Population growth in the US amounted to 0.75 at the significance of the mortality rate 8.2.

We defined the physical accessibility of pharmaceutical care to the population out of the analysis of the number of pharmacies in countries. By the number of residents having access to a pharmacy the most favorable situations are in China (1657 residents) and Lebanon (1486 residents), the least secured by pharmacies residents of Tanzania. In the United States 5143 residents and in Iraq 5441 residents are at the average number of pharmacies per 100 thousand of population 19 and 18, respectively.

**Conclusions.** The results of the analysis testify to that fact that there are the influence factors of a modern system formation of medical and pharmaceutical care. In order to elicit the problematic aspects and to develop a state program for improving the quality life of population, it is necessary to implement the systematic auditing of indicators that define the scope, accessibility, completeness and quality of pharmaceutical care to the population.

# MONITORING SIDE EFFECTS OF DRUGS PERMITTED IN KAZAKHSTAN

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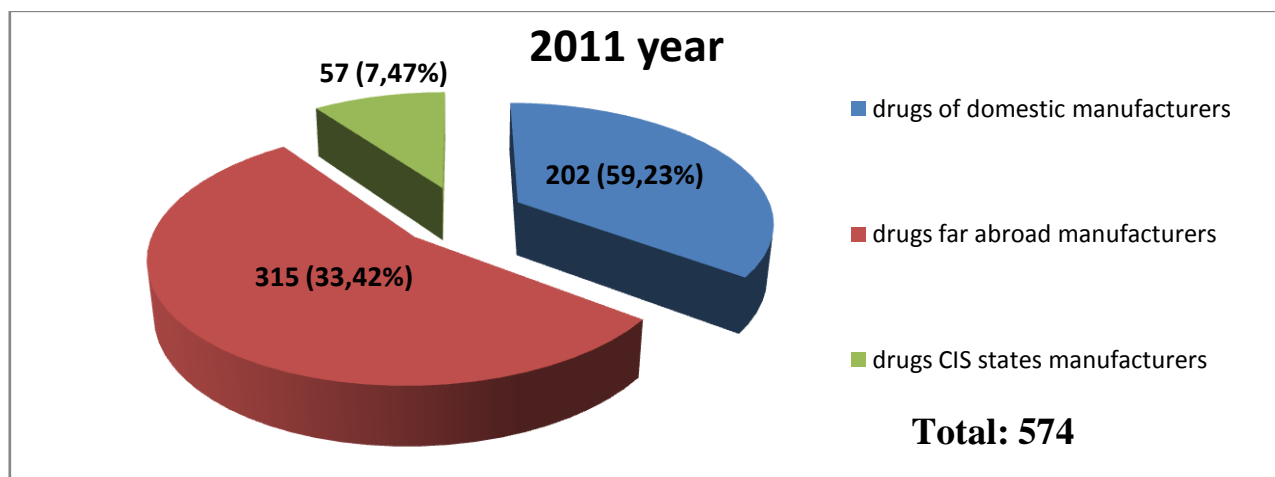
**Introduction.** Problems in the application of different pharmacological drugs and pathogenetic mechanisms of development.

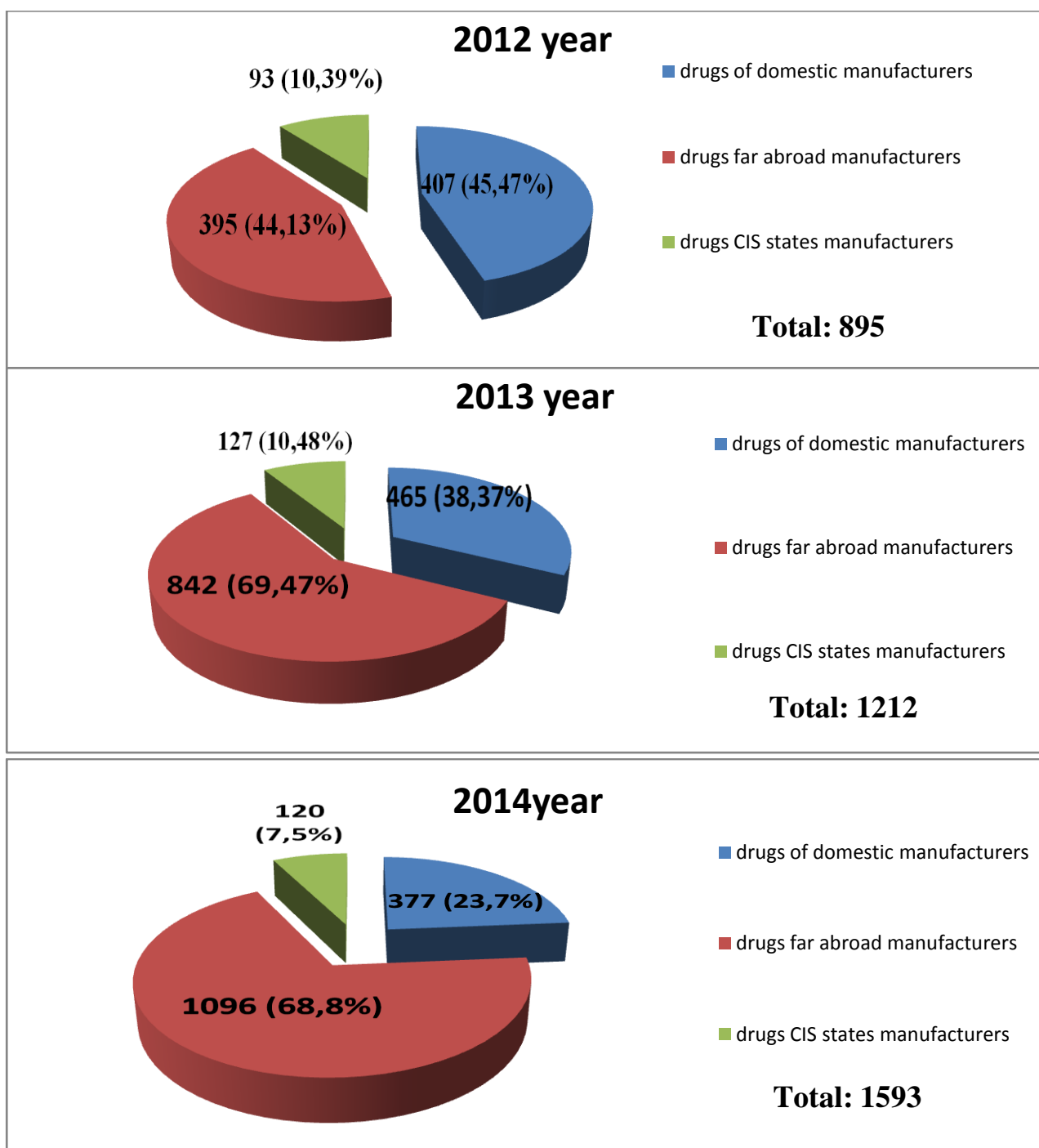
Assessment of drug safety is an extremely important issue for modern medicine. The timely detection of adverse drugs reactions and conduct appropriate activities aimed at their prevention will improve the quality of the treatment.

**Purpose of the study.** To conduct a comparative analysis on the monitoring side effects of medicines authorized in the Republic of Kazakhstan for 2011-2014.

**Materials and methods.** "Post Card" side effects of drugs, Good pharmacological practice (GVP), comparative analysis.

**Results.** Comparative Analysis on monitoring of side effects of drugs for 2011-2014 years (numerical and percentages).





**Conclusions.** As the analysis messages cards showed adverse reactions more than 96.81% of registered among drug manufacturers and the Republic of Kazakhstan abroad. From 2648 card messages identified for drugs-CIS countries in 1623 (69.57%) are related to drug manufacturers in India. 114 communications card of adverse reactions identified in the drugs received from the Global Fund of WHO, which are not registered in the territory of the Republic of Kazakhstan.

It should be noted that the indicators of the side effects of drugs are increasing every year. One solution to this problem is to improve the quality of domestic drugs, improving pharmacovigilance Republic of Kazakhstan.

## **A LOGISTICS APPROACH TO INVENTORY MANAGEMENT OF MEDICINES OF THE REPUBLIC OF KAZAKHSTAN**

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**Introduction:** Pharmaceutical market has dramatically increased the interaction between wholesale and retail level in modern conditions of Kazakhstan. There is a clear tendency of actively influence to the retail link in the behaviour of distributors. Current relationship of 1(one) wholesale and retail level of drug supply of Kazakhstan is characterized by the constant search for new forms of interaction and collaboration. Moreover, this is quite natural, since the interaction should be highly efficient, i.e. to make a profit.**Objective:** To review the logistics systems pharmaceutical market for the promotion of domestic product of the Republic of Kazakhstan. **Materials and Methods:** The statistical comparative analysis methods. **The results:** The main problem is distribution of the duration of passage of goods through the channels of supply, and 80-90% of total time is spent on storage. The experience of other countries shows that reducing the time of movement of goods from production to the final consumer, as well as minimizing warehousing, handling, transport costs, possible with usage of logistic approach. The application of methods of logistics, according to domestic and foreign scientists, allows reducing inventory levels by 30-50% and reducing the movement of goods by 25-45%. Relevant importance is given to different regional conditions in the analysis of the situation of choice of supplier, the transition from simple criteria orders "cheaper", to the formation of more complex, integral criterion taking into account specifically established. The study and theoretical generalization of domestic and foreign literature on inventory management shows that the most promising direction in this field is the use of methods and techniques of logistics. It has been established that the activities of the distribution sector is characterized by greater concentration of companies active in establishing their own pharmacy chains, increasing the share of domestic drugs in the range of medicines, revitalization of the work of creating images for businesses and brands. **Conclusions:** Covering all of the streaming processes in the sphere of circulation of medicines, pharmaceutical logistics apply to procurement of medicines and their distribution through the pairing of the sellers ' interests - subjects of sentences, on the one hand, and customers - the final consumers - the subjects of demand, on the other. Currently in logistics research and development uses two basic directions in inventory management. One of them is associated with a functional approach to merchandising, i.e. the management of all physical operations that must be performed upon delivery of the goods from the supplier to the consumer.



**REVIEW OF PHARMACEUTICAL MARKET  
FOR ADVANCEMENT OF PHARMACEUTICAL PRODUCTS  
OF PRODUCERS IN KAZAKHSTAN**

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**Introduction.** The pharmaceutical market of Kazakhstan is the largest and most structured in the Central Asian region, despite the strong growth dynamics, it is based on a relatively low base. Strong economic growth in the country in recent years, caused by the rapid development of oil and gas and mining industries, provided a significant impetus to the growth of sales of pharmaceutical and health care costs. Foreign producers were able to establish a dominant position in competition with local producers, which are limited by relatively low technology and production capacity.

**Objective.** To review the pharmaceutical market for the promotion of domestic product of the Republic of Kazakhstan.

**Materials and Methods.** The statistical comparative analysis methods.

**The results.** At the beginning of 2016 in Kazakhstan registered 78 pharmaceutical manufacturers, of which 20-25 of them are active. However, only three companies produce the majority (70%-75%) production: Chimpharm (acquired by the group in Polpharma 2011), Globalpharm, Nobel. Among other pharmaceutical manufacturers republic: a manufacturer of plant-based Phytochemistry, start Karaganda Pharmaceutical Factory; Pharmaceutical company Romat - Pavlodar manufacturer, Kyzylmay and Dosfarm (manufacturers of Over-the-Counter products) and small producers generic products - Lekos and Elias.

On June 1, 2015, according to official data of the Registry "national center of examination of medicines, products of medical purpose and medical equipment" the Ministry of health and social development of the Republic of Kazakhstan registered in the territory 7315 drugs represented 67 countries.

Nearly half of all the registered medicines occupy solid drugs fractions with 41% (different types of tablets, capsules, granules). The second place is occupied by the liquid dosage forms with a share of 23%, which includes tinctures, syrups, alcoholic solutions for outdoor use, etc. Injection solutions in vials and infusions occupy the third position with a share of 15%. Among other products of domestic manufacturers are registered such dosage forms like sprays, ointments, gels, lotions,

suppositories, powder medicines, powders and lyophilizates for the preparation of solutions for injection. Injection solutions in vials and infusions occupy the third position with a share of 15%. Among other products of domestic manufacturers are registered such dosage forms like sprays, ointments, gels, lotions, suppositories, powder medicines, powders and lyophilizates for the preparation of solutions for injection.

**Conclusions.** Domestic pharmaceutical production is based on relatively simple mechanisms of production and its growth is driven mainly by imports of technological and innovative products. Local production is mainly concentrated in the South of Kazakhstan, in Shymkent and Almaty, along with other significant facilities in Pavlodar and Karaganda.

Overall, domestic production covers about 10% of domestic demand in value terms and 25-30% in real terms, whereas in the public procurement sector share is 15% and 50%, respectively.

The top ten domestic manufacturers by the presence of registration certificates is as follows: in first place is the company JSC "Chimpharm", who has registered at 204 pharmaceuticals.

The main dosage forms manufactured by the manufacturer, are tablets and capsules, injections, powders for injection and liquid dosage forms in the form of syrups, tinctures and solutions for internal use.

Second place goes to Nobel, who has registered 111 the drug. Basically it is a hard drug, a small number of registered syrups and soft medicinal forms. And closes the three leaders of the company Abdi Ibrahim global Pharm with 66 positions in the state register. Registering with a given producer is present only to tablets and capsules.

# ANALYSIS OF CLINICAL EFFECTIVENESS OF THERAPY FOR PATIENTS PNEUMONIA

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**Introduction.** Community-acquired pneumonia today remains an important medical and social problem. This is due, primarily, its high prevalence, relatively high rates of morbidity and mortality and significant economic losses due to this disease. In Ukraine in 2015, according to official statistics, the incidence of pneumonia was 519.7 per 100 thousand population, and mortality - 10.3 per 100 thousand population, that is, died almost 2% of those who contracted pneumonia. However, these figures do not fully correspond to the actual level of morbidity and mortality.

**Aim.** To analyze the clinical effectiveness of drugs used in the treatment of community-acquired pneumonia. **Materials and methods.** An analysis of the literature, were also used logical, analytical and systemic research methods

**Results.** According to the study, published in the «JAMA» journal, treatment of pneumonia in elderly patients using azithromycin was associated with a reduced risk of deaths, but along with it a small risk of myocardial infarction. Clinical practice guidelines recommend that combination therapy with macrolides, including azithromycin, as a first-line therapy in patients hospitalized with pneumonia, but recent studies have shown that azithromycin therapy may be associated with an increased risk of cardiovascular disease in these patients. In the new study, scientists from the University of Texas, USA, was attended by about 65 thousand. Patients with pneumonia elderly (65 and older). During the 90 days of hospitalization of patients, scientists assessed the relationship between azithromycin therapy, the risk of cardiovascular disease (heart failure, myocardial infarction, heart rhythm disturbances) and poor outcomes in these patients. The final analysis included about 32 thousand. Patients with pneumonia who received azithromycin and about 32 thousand. Patients with pneumonia who received other recommended therapies. It was found that within 90 days the number of deaths among patients taking azithromycin, was lower than in those who received other recommended therapy, - 17.4 and 22.3%, respectively. However, azithromycin therapy is associated with a higher risk of myocardial infarction (5.1%) compared with the other recommended therapy of the disease (4.4%). It should be noted that this communication is not dealt with in the general occurrence of various cardiovascular events, the risk of which is for the patients who took azithromycin, 43%, and for patients treated with other recommended therapy - 42.7%, the risk of cardiac arrhythmias 25.8 and 26% respectively, and heart failure - 26.3 and 26.2%.

**Conclusions.** Thus, the researchers found that patients receiving azithromycin pneumonia significantly reduces the risk of death among these patients, which is more important than the slightly increased risk of myocardial infarction. Thus, according to the results of studies of azithromycin therapy can prevent 7 deaths per 1 induced nonfatal myocardial infarction.

# INVESTIGATION OF THE PECULIARITIES OF PREPARATION OF PHARMACIES WORK IN EMERGENCY SITUATIONS

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**Introduction.** Modern development of global society involves rapid growth in the number of anthropogenic accidents, catastrophes, natural disasters, frequent cases of terrorist acts, which leads to a high risk of emergency of natural, technological and social and political backgrounds.

The subject is topical due to the fact that among a set of measures aimed at reducing and eliminating the consequences of emergencies, not only medical care is foreground, but also organization of pharmaceutical full and timely supply of victims and people in general.

**The aim of the study** is to highlight the theoretical aspects, and analysis of the peculiarities of preparation of pharmacies work in emergency situations, as well as determining opportunities for solving the problems identified.

**Materials and methods.** An extensive information database was used in the study. The former included materials of the current legislation and scientific publications by I. V. Oliynyk, P. V. Oliynyk, V. V. Trohimchuk, T. G. Kalynyuk, A. A. Kotvitskaya and E. E. Evstratev. Methods of scientific generalization were used to process the information.

**The results.** The analysis of publications shows that during elimination of a disaster, the following factors effect the functioning of pharmacies: the number of people affected; epidemiological, chemical, radiation situation in the emergency area; the location of the pharmacies in the region, the availability of means of communication and transport, work of the electricity network, water supply; resistance of pharmacies' buildings to disaster factors.

In the process of the study, it was found that in emergency situations all the activities of pharmaceutical institutions of various forms of ownership should be subordinated by the organs of centralized control of pharmaceutical supply of the region and aimed at the full and uninterrupted pharmaceutical care.

It is proved that the preparation of pharmaceutical institutions to work in emergencies provides beforehand production of medical equipment reserves in the pharmacy network and search for additional sources of replenishment of its

resources, and providing its efficient use; development of measures to ensure supplies of medical equipment to health care institutions timely; the development and implementation of measures to improve the sustainability of pharmaceutical institutions in emergency situations, including the protection of their staff and medical equipment stocks from the effects of damaging factors of emergencies; ensuring the rational use of pharmaceutical staff, including maneuvering of them in order to achieve maximum efficiency when operating in emergency situations.

In the event of a large-scale disaster, the supply of medicines to hospitals is performed not only by industrial companies, but also hospital and inter-hospital pharmacies, as well as pharmacies, which are eligible for the extemporaneous preparation of medicines.

For the purpose of effective pharmaceutical care of the affected population, pharmacies need to be prepared for the production of a large number and a large assortment of extemporaneous preparations in pharmacies, deployed in adapted premises in the emergency area.

In this regard, there is a need to bring a pharmacy in accordance with modern requirements for aseptic units and other production facilities; acquire modern technological equipment for pharmaceutical manufacture of medicaments; establish autonomous sources of heat, water and power supply; prepare the pharmacy to be expanded in the adapted premises of suburban areas in a disaster elimination; to prepare pharmaceutical personnel to perform their duties in emergency situations.

**Conclusion.** On the basis of the study it can be concluded that specific methodological approaches need to be developed, as well as normative legal acts to improve the sustainability of pharmacy institutions in emergency situations with the subsequent practical use of pharmacy institutions in emergency situations in peacetime and wartime.

# RESEARCH PRICE CHARACTERISTICS OF VACCINES AGAINST INFLUENZA VIRUS

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**Introduction.** Each year, with the approach of a flu epidemic is increasing relevance of mass vaccination, especially of people of working age. Mass vaccination appears as one of the most effective means to combat the flu. This economic importance due to vaccination shall budgetary savings by reducing complications from influenza.

Thus the financial crisis and reduce the solvency of the population becomes particularly relevant study price characteristics vaccines. The analysis indicators index price growth for the vaccine can be used in the planning of the need for vaccination in preparation for epidemics of influenza.

**Aim.** Research of pricing characteristics of influenza virus vaccines

**Materials and methods.** Statistical comparative systematic and analytical methods and techniques of price analysis.

**Results.** The analysis of data of state registration of the SE "State Expert Center MoH Ukraine" was established that in 2016 registered 13 influenza virus vaccines (including release forms), production of European pharmaceutical companies, the price of which essentially depends on the exchange rate. Compared with 2007 the number of vaccines increased by 43.75%.

Registered in the pharmaceutical market of the vaccine presented in two forms release a fixed needle syringes with 84.6% and 15.4% of bottles and in four doses, vaccine dosed in disposable syringes with fixed needle 0.5 ml – 68.75% 0.1 ml – 6.25%; 0.25 ml – 12.5%, vials of 5 ml – 12.5%.

It should also be noted that domestic production of the vaccine are only 28.6% of the total, and vaccines imported - 71.4%.

Investigate to price characteristics of influenza virus vaccines we have selected vaccines recommended by the Ministry of Health of Ukraine for vaccination in epidsezoni 2015-2016 biennium. Vaksigryp suspension for injection in 0.5 ml №1 (SanofiPasteur S. A., France); Fluarix & trade suspension for injection in 0.5 ml №1 (GlaxoSmithKlineBiologicals, Germany); Influvac suspension for injection in 0.5 ml № 1 (AbbottBiologicals BV, The Netherlands).

Calculate the index price growth we have selected wholesale prices for vaccines against influenza viruses that were purchased for the budget years of 2007 - 2013. And presented on the site "online pharmacy" and "Marion".

In the absence of tenders in 2016 we were selected price-list distributors, operating in the domestic pharmaceutical market vaccines against influenza viruses.

Calculate price indices (lg) were carried out monitoring studies of average wholesale prices for vaccines against influenza viruses that were present in the domestic pharmaceutical market in the period 2007-2016. Thus, the value lg Vaksigryp the drug suspension for injection 0.5 ml №1 (SanofiPasteur S. A., France) in 2007 was 1.04 and in 2016 – 2.15. That is, the average price over the past year increased by 48.37%. The value of lg Influvac the vaccine suspension for injection in 0.5 ml № 1 (AbbottBiologicals BV, Netherlands) in 2007 amounted to 0.97, and in 2015 of 2.33, the price of the drug has increased by about 58.37%. Indicators lg the vaccine Fluarix & trade suspension for injection in 0.5 ml №1 (GlaxoSmithKlineBiologicals, Germany) were important in 2007 – 0.70, and in 2016 – 2.56, the price of study drug increased about 72.65%.

**Conclusion.** Given the fact that the domestic pharmaceutical market the vaccine recommended for vaccination only foreign, now becomes an important social and economic importance of the implementation of program activities of import substitution.

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Thus, the results of our research of price characteristics vaccines have proved that today a priority national health care system and pharmacy in addressing the issue of mass vaccination against the influenza virus is to encourage domestic manufacturers to produce vaccines and the development of state programs of pharmaceutical software vaccines.

# THE RESEARCH OF CLASSIFICATION OF MEDICATION ERRORS AN INTERNATIONALLY ESTABLISHED PRACTICE AND UKRAINE

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**Introduction.** A medication error is "any preventable event that may cause or lead to inappropriate medication use or patient harm while the medication is in the control of the health care professional, patient, or consumer. Such events may be related to professional practice, health care products, procedures, and systems, including prescribing; order communication; product labeling, packaging, and nomenclature; compounding; dispensing; distribution; administration; education; monitoring; and use." In order to determine the causes of and effective preventing medications errors, it is important to study their classification.

**Aim.** Considering the above objective of the research is the study approaches to classification of medications errors an international established practice and Ukraine.

**Materials and methods.** In the study, we analyzed scientific articles and guidelines of international organizations on issues definitions and classifications of medication errors.

**Results and discussion.** As a result of studying the international experience found that today there is no single classification system. One of the main criteria and approach to the systematization of medications errors is the ways in which errors occur. However, according to this criterion also cannot give a single classification. We were allocated following medication errors according to various scientific sources (Table 1).

**Table 1**

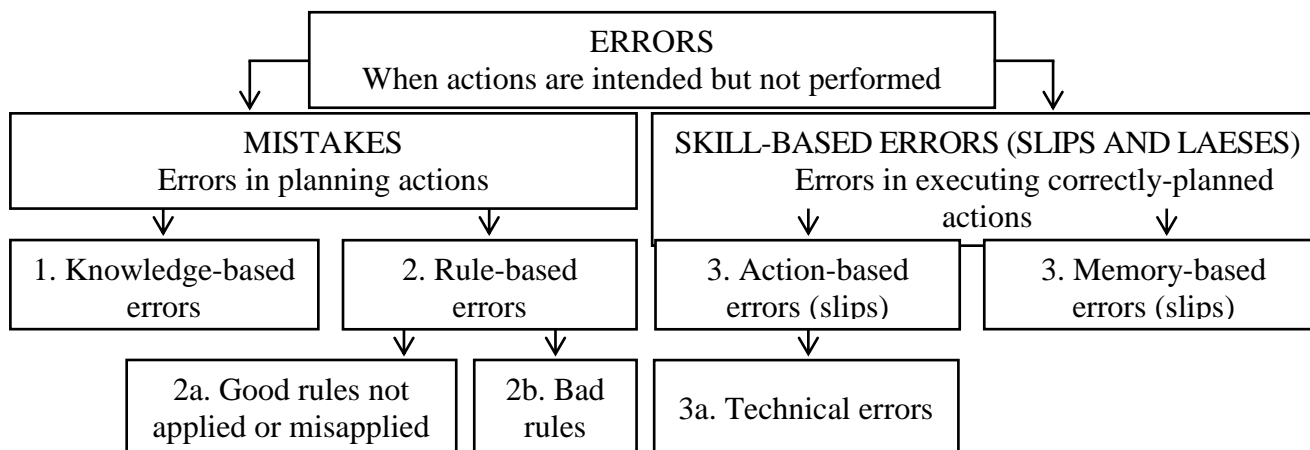
The main types of medication errors according to ways in which errors occur

Types of errors	Definition
Dosage errors	Medication administered in doses greater or smaller that what had been prescribed
Time errors	Medication administered to patient in an time different from that which had been prescribed or predetermined
Unauthorized	Administering medication that has not been prescribed be the physician
Technique errors	Medication incorrectly formulated or manipulated before administering or using inappropriate procedures or techniques to administer of medication
Administration route errors	Administering medications using a route different from what had been prescribed
Extra doses	Administering and extra dose to what had been prescribed or a medication that had been suspended
Prescription errors	Incorrect selection of the medication, dosage, presentation, administration route, infusion speed, inadequate use instructions by physician and not registering a verbal prescription
Omissions	Professional's mistake to not administer the medication to the patient



Wrong patient	Administering the medication to the wrong patient
Presentation errors	Administering medication in a way different from what had been prescribed

At the same in the opinion of Professor Jeffrey K. Aronson, there is another approach to classification based on a psychological theory, that, from his point view, is to be preferred, as it explains events rather than merely describing them. Its disadvantage is that it concentrates on human rather than systems sources of errors. The classification of medication errors based on a psychological approach is presented on Fig. 1.



**Fig. 1.** The classification based of medication errors based on a psychological approach

It should be noted that, the pharmacovigilance system used other classifications of medications errors and their combinations for research, collection of statistics

Unfortunately, in Ukraine, it is impossible to conduct a classification of medication errors, as there is no relevant definition and national pharmacovigilance system only includes data on adverse drugs reaction. However, international experience shows differentiation concepts “medications errors” and “adverse drug reaction” that is included in their pharmacovigilance system. Issues of relationship between medication errors and adverse drug events are the subject of study of American and European scientists. In our opinion, this subject is topical for Ukraine, given the Eurointegration processes and the reform of the domestic health care system.

**Conclusions.** According to the study definition of medication error and the main approaches to the classification established that today the term is not used in Ukraine. Most often of the National pharmacovigilance system applies the term "adverse drug reaction". Regarding the classification of medications errors, can be argued that today based on the study of international experience, there are several approaches to the classification of medications errors, the most common of them is the classification according to methods ways in which errors occur and psychological approach, proposed by Professor Jeffrey K. Aronson. Term “medication error” is not used in the Ukrainian health care system and pharmacovigilance that is not in accordance with global trends.

# RESEARCH AND FUNCTIONS OF MAJOR TASKS HOMEOPATHIC PHARMACIES

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**Introduction.** Homeopathic treatment exists more than 200 years and continues to grow. This method has a number of benefits and is based on the basic principles of the homeopathy as a scientific therapeutic system: the law of similarity as the only law of selection of homeopathic medicines; use of small doses of medicinal substances; applying the potentiation (dynamization) while producing the homeopathic medicines (HM) to enhance the therapeutic effects, which help to adapt to the impact of external factors.

The homeopathic treatment has attracted the attention of scientists and practical experts of medicine and pharmacy since Ukraine became independent. Thus, in 2001, current State Pharmacopoeia of Ukraine was introduced; it includes sections devoted to homeopathic medicines. The definition of homeopathy, its basic preparations, types of raw materials, general requirements to them and to the method of potentiation and certain types of quality control are provided in the “Homeopathic Medicines” section and its sub-clauses.

Nowadays, modern homeopathic pharmacy (departments) that performs functions of selling HM, providing the consumers with qualified information about HM, constant collaboration with homeopaths and manufacturing function for extemporal production of HM. According to the current law, homeopathic pharmacies (departments) activities are regulated by the Order No.165 of the Ministry of Health of USSR of 03 August 1989, which contains Provisions concerning HM and nomenclature of HM that is allowed for manufacturing by pharmaceutical factories and for turnover in pharmacies. The Order is valid for more than 20 years, and current conditions of the pharmaceutical industry are different, so the provisions of the Order are not relevant now, and they need to be revised and improved in the current situation. This has outlined the purpose of our research.

**Aim.** The aim of our research is to analyze the main tasks and functions homeopathic pharmacies.

**Materials and methods.** Research has been carried out with the use of information materials, including pharmacopoeias, data from literature sources and materials of own research, using conventional empirical methods. For achieving this purpose and developing the homeopathic treatment and homeopathic pharmacy, organising high-quality and timely provision of the population with HM, we have analysed the main functions and tasks of specialized homeopathic pharmacy and

homeopathic pharmacy department, taking into account the specific character of production of HM within the modern conditions.

**Results and discussion.** It has been established that the main task of homeopathic pharmacy (department) is:

- to provide the population with HM of extemporal production by the prescriptions of homeopaths;
- to organize and conduct informative work among physicians of medical institutions, consumers, pharmacy professionals.

Homeopathic pharmacy (department) conducts the following functions:

- logistic support of HM turnover;
- ensuring the proper storage of homeopathic materials, basic drugs, HM;
- extemporal production of HM by the prescriptions of homeopaths;
- selling prescription HM and OTC HM;
- the study and generalization of prescriptions coming from homeopaths;
- improving methods and forms of public service, introducing domestic and foreign work experience based on modern achievements of pharmaceutical and medical sciences;
- provision the population and health professionals with relevant information on homeopathic pharmacy;
- ensuring sanitary conditions for the staff and the production process.

All the above-mentioned tasks and functions of homeopathic pharmacies are taken as a basis of modern “Regulations on Specialized Homeopathic Pharmacy” and “Regulations on homeopathic Pharmacy Department”. These Regulations define the main principles and activity areas of such pharmacies, their internal structure, tasks, functions, responsibilities, rights and relationships with other pharmacy departments.

Scientific achievements have been tested and approved by the “Pharmacy” Problem Committee of the Ministry of Health and National Academy of Medical Sciences of Ukraine and agreed with Medicines and Healthcare Products Regulatory Agency of Ukraine. Practical application has been found in homeopathic pharmacies (departments) of five regions of Ukraine.

**Conclusions.** We have analyzed and summarized the objectives and functions of homeopathic pharmacies for the first time during last years. Taking into account them, the Regulations about homeopathic pharmacy and department, which reflect the specifics of the work of such pharmacies (departments), were developed and proposed.

# THE RESEARCH OF EFFICIENCY OF BUSINESS PROCESSES OF PHARMACEUTICAL COMPANY

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**Introduction.** Market pharmaceutical industry takes a special place in the social sector of the economy of each country. The activities of the pharmaceutical market takes place in the form of private enterprise, so all the processes of reorganization and restructuring of the pharmaceutical companies have the same final goal – improving business effectiveness. However, the specificity of the pharmaceutical business, its enormous social responsibilities imposes special requirements to the quality of its operations. In this context, pharmaceutical companies should be considered as special business system. The activities of the modern pharmaceutical enterprise is a series of business processes, representing a sequence of actions and decisions aimed at achievement of a certain goal, therefore as a whole the effectiveness of the company is conditioned by efficiency of their business processes.

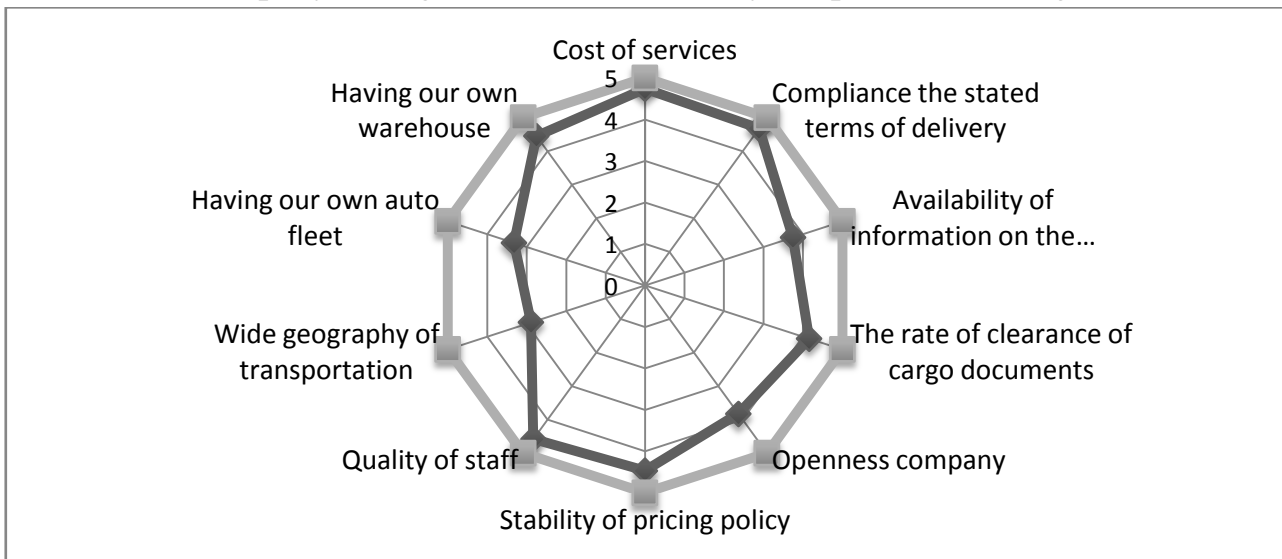
**Aim.** The aim is research of effectiveness of business processes at the manufacturing pharmaceutical company. To realize the certain goal it was necessary to solve the following problem: to examine the theoretical basis and methodology of business processes; identify and summarize the criteria for assessing the effectiveness of business processes

**Materials and methods.** In the study we used the methods of systematic, comparative, retrospective analysis and methods of sociological research. Statistical, economic and other information is processed and analyzed with the help of modern computer technology.

**Results and discussion.** The Business-process of the pharmaceutical market is a series of interrelated functions and tasks aimed at making profit and representation of pharmaceutical services from creation to realization of pharmaceutical products. The main operational business processes of the pharmaceutical market include supply, production, marketing and sales. With that, a significant proportion of profits during formation of pharmaceutical services presentation, production and sale of pharmaceutical products are formed in the implementation of business processes of marketing and sales. They form a group of business process of marketing-oriented management of pharmaceutical market.

In order to optimize business-processes expedient implement a method that involves the stability of business projects as producer relationships with customers, suppliers and intermediaries. To realize the this thesis we propose implementation units integrated program Customer Satisfaction in individual business, which allows

increasing efficiency of key business processes. Measurement Customer Satisfaction – an usual practice for European companies. Customer Satisfaction Index is included a recommended performance indicators according IMA (Institute of Management Accountants). Ultimate program aims is increase customer satisfaction from the cooperation with enterprises. The program allows to assess all aspects of its business processes directly or indirectly and to make management decisions aimed at improving the efficiency of both individual business processes, and business in general. As the representative model of pharmaceutical companies was elected leader of the pharmaceutical market – JSC "Farmak". The main indicators of business process "producer – client" is: availability of own stock, deadlines delivery of goods, information accessibility, cost of services, the term of registration of cargo documents, openness, price policy, quality of work of personnel, availability of own fleet and the company's image. Results of the study are presented in Figure 1.



*Fig. 1. Results of evaluation of certain business-processes at pharmaceutical company*

**Conclusions.** Been determined that the in a market economy dynamic market environment presents the new requirements of the enterprise. The current market situation is such that most companies become aware necessity of activation of individual business processes as part of market sustainability of the whole enterprise. In order to increase competitive edges of enterprise offered to implement a comprehensive program of Customer Satisfaction, whose ultimate goal is to increase customer satisfaction from the cooperation with company. The obtained results indicate that 40% of business - processes, namely compliance with the terms delivery of goods, cost of services, pricing and quality of staff sufficiently effective and correspond to the maximum value chart, 30% of business processes, which are mainly the availability of information , terms of clearance of documents and openness company are close to their effective implementation, these as business processes as availability of own auto fleet and transportation geography latitude require improvement.

# REVIEW OF PROFESSIONAL EDUCATION INTERCOMPANY PHARMACEUTICAL STAFF IN OTHER DEVELOPED COUNTRIES

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**Introduction.** In-house training is one element of an integrated system of continuous postgraduate professional education. It helps an organization to more effectively meet the challenges of the modern world, to changes in the economy and society. Create in-house training and development system is one of the effective measures to ensure that in a market economy the constant growth of labor productivity and professionalism, and compensates for the shortcomings of traditional forms of learning and support the proper level of competence of workers to help in-house training program. Professional training in the educational units of the organization it considers as part of vocational training, which is intended to achieve and maintain this level of qualification, which would provide an efficient, reliable and secure operation of the enterprise.

In countries around the world are searching for improvement of the systems in-house training, the most appropriate for a given country, based on its history and culture, the state of socio-economic development. Let us analyze in-house training systems on the example of countries such as Japan, Germany, USA, Korea, France.

**Aim.** The aim of our research is to analyze problems in-house training of staff in other developed countries.

**Materials and methods.** The methodological basis of the study is a comprehensive approach to the development of training system of the pharmaceutical companies. In the study used statistical, computational and analytical, comparative, systemic, and other analysis techniques. Informational materials used in the study is the data published in the press, as well as materials specialized periodicals.

**Results and discussion.** In the Japanese system, training of pharmaceutical company occupies a central place in-house training. Professional training state and municipal authorities played only a supporting role in the whole training system.

In another economically developed country - Germany - also dominates the action in-house labor market. He is met by well-organized system of professional development of existing staff.

USA widespread theory of «human capital». The idea is that investment in education and at the societal level and on a personal level is the most advantageous placement of capital. Pay off long-term costs and high dividends, and there is a direct correlation: the cost - the level of education – income.

The Korean pharmaceutical company occupies an important place internal training related to in-house training of employees and reflects the distribution policy of the organization.

We reviewed the particular in-house training of staff on the example of the five developed countries. Such systems exist in various versions in many foreign countries. In-house training is defined in these countries as one of the leading trends in the youth and adult population, helping people to successfully solve the social problem of employment.

The study of the theory and practice of professional functioning of foreign public education system in-house allows us to conclude that this system is usually an integral part of the internal labor market (hidden labor market within the enterprise). In-house training serves as a mechanism for employers of these countries to extinguish the social contradictions within the company, that is, try to do without the mass release of staff to the external labor market through retraining, permutation (rotation), training of existing staff, the introduction of advanced, cutting-edge technologies.

Concluding the brief analysis of international experience in-house training of staff in the context of the various aspects, we emphasize that many of the positive aspects (as well as domestic experience) has been successfully implemented in modern major pharmaceutical companies, firms, enterprises.

**Conclusions.** The study of the theory and practice of vocational training of the population considered foreign operation intra-system leads to the conclusion that this system is usually an integral part of the internal labor market (hidden labor market within the enterprise). In-house training population serves as a mechanism for employers of these countries to extinguish the social contradictions within the enterprise, that is, try to do without the mass release of staff to the external labor market through retraining, permutation (rotation), training of existing staff, the introduction of advanced, cutting-edge technologies. In the CIS countries also have a situation whereby more active while operating the external labor market and less active - the labor market within the company.

In all the countries, it has been widely developed remote training. On the one hand, distance learning in this context - is training of employees in the workplace, ie, in the firm, and on the other - it is learning by using Internet technology, and teachers, by tutors are experts who are well beyond the scope of this company, city, region. At the same time, we can talk about the intranet space. Distance learning is an educational technology is a combination of in-house and external training, members of the corporate training structure, which is realized at the expense of companies, firms, corporations, companies, etc.

**SECTION № 17**

**QUALITY MANAGEMENT IN THE PHARMACEUTICAL SECTOR  
OF HEALTHCARE**



# REGULATIONS PROCEDURE OF THE INTERACTION WITH CONSUMERS DURING THE FORMATIVE QUALITY MANAGEMENT SYSTEM

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**Introduction.** One of the key principles of modern Quality management is a focus on customers. From the standpoint of principle, which is also implemented with the requirements of ISO 9001:2015, top management of the organization should demonstrate leadership and commitment on targeting consumers by ensuring that:

- a) the requirements of customers and applicable statutory and regulatory legal requirements identified, understood and consistently met;
- b) risks and opportunities that may affect the conformity of products (goods and services) the requirements, as well as the ability to increase customer satisfaction, identified and addressed;
- c) the focus is improving customer satisfaction.

Today almost every profitable company that wants to compete and grow their business critical condition for achieving sustainable success is adherence to this principle.

**Aim.** The aim of our study was to investigate the scientific literature, the requirements of ISO 9000 and excellence for production companies in the world applied recommendations concerning the regulation of interaction with customers as part of the Quality Management System (QMS) that can be applied to domestic pharmaceutical companies.

**Materials and methods.** In the course of our work examined different approaches to establishing a system of feedback and increase customer loyalty in enterprises of various fields and traced change the standards for quality management system and analyzes the typical violations of the requirements observed in the domestic pharmaceutical enterprises.

**Results and discussion.** We offered must regulate activities related to the interaction with consumers of feedback. If such a process is identified as one of the processes of the QMS, it is advisable to describe his performance in the documented procedures (DP) for PDCA Cycle ("Plan-Do-Check-Act"), which makes it possible to order the planning of such a process, the terms of its performance indicators, criteria and means of checking the effectiveness and directions and measures for continuous improvement of this activity.

In practice, these actions are not often described in the documents of the reasons why the procedure contains important elements and cannot regulate and perform activities that could significantly affect the outcome of the process. For example, the lack

of description of the performance evaluation process of interaction with consumers (and any other process) makes it impossible to accumulate measurable results of assessments and track them over time, analyzing trends and patterns. In addition, the lack of data makes factual basis for the development of corrective and preventive actions needed for continuous improvement process.

The same can be said about the importance of regulated planning phase of the process, because proper planning any activity largely determine sits out come.

Information communication with customers, described documented procedure should include:

- a) provide information about products/services;
- b) processing requests, contracts or orders, including their changes;
- c) provide feedback on products and services from consumers, especially for claims, complaints or claims of consumers;
- d) handling or property management customers;
- e) establish special requirements for actions taken in unforeseen circumstances.

The organization has always define the requirements established customer, including requirements related to delivery and subsequent maintenance, if applicable to the products. In addition, should also be determined by the requirements not stated by the customer but necessary for specified or intended use, where such knowledge.

**Conclusion.** We believe that organizations often make the mistake of only limited documentation of direct regulatory or customer requirements, without describing those that are not obvious. Description action claims and complaints - one of the key elements DP QMS regarding interaction with customers. This element should include ways and means of receipt of such information, as well as enough detailed sequence of actions in such situations - from receipt, registration and consideration of complaints, to develop appropriate solutions and actions to eliminate the causes of complaints and minimize the negative consequences for the customer and its information. These actions may be summarized in a separate document, such as standard operating procedures, SOP).

Documented procedures also describe the monitoring data relating to customer perception of the degree of their needs and expectations. It is necessary to determine the methods for monitoring and analyzing this information. For example, this may include consumer surveys, reviews of products delivered / services rendered, meetings with customers, market share analysis, and thanks for warranty claims and dealer reports. Also organization shall meet requirements for post-delivery activities associated with the products and services. In determining the extent of post-delivery activities that are required, the organization shall consider statutory and regulatory requirements; the potential undesired consequences associated with its products and services; the nature, use and intended lifetime of its products and services; customer requirements; customer feedback. Post-delivery activities can include actions under warranty provisions, contractual obligations such as maintenance services, and supplementary services such as recycling or final disposal.

# INTRODOCTION QUALITY MANAGEMENT SYSTEM IN ACTIVITY OF PHARMACIES AND PHARMACEUTICAL ORGANIZATIONS

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**Introduction.** The feature of modern pharmaceutical market is the constant growth of competition, incessant rise in prices for pharmaceutical products from suppliers and yet consumers do desire to keep prices at a reasonable level. In order to fulfill the social mission of pharmacy, and commercial gain, pharmacies are searching for ways to increase competition and optimization work. Quality Management Systems (QMS) is currently closely associated with the term "certificate ISO». ISO standards governing requirements, determine the basic provisions concerning the operation of the QMS. Many pharmacies established work according to the standards ISO, so implementing a quality management system will enable to organize business processes and ensure that they are provided with adequate resources and documents.

**Aim.** Our research has focused on the issue of introduction of Quality Management Systems in the work of pharmacies and pharmaceutical companies.

**Materials and methods.** We used empirical methods: observation and comparison; and methods of experimental and theoretical: logical analysis, the hypothetical synthesis of theoretical generalizations.

**Results and discussion.** Providing quality pharmaceutical care in sufficient quantity and adequate quality, according to the expectations of the consumer (by pharmacies, patient or doctor) requires solving complex strategic problems of quality control of pharmaceutical care. The activities of the pharmaceutical providing of population conducted in the following areas:

- improve the system of quality assurance of pharmaceutical care management solutions optimal balance between social and economic performance of pharmacy;
- improve the quality of pharmaceutical care by analyzing the shortcomings of consultation with experts;
- optimization of partnership with consumers of pharmaceutical services: surveys, analysis of feedback and requests, analyzing complaints and applications customers, the organization benefits for some sectors of the population and hotline for consumers;
- corporate approach to improving cost-effectiveness of pharmaceutical care.

The quality of pharmaceutical care is ensured through systematic approach and objective assessment of each element that make up the system: quality policy, the

responsibility of the head, staff and authorized persons of quality control of drugs, experience of employees and the company as a whole, the level of economic development, document processes and document management, management information quality; skills development, internal audits and others. Quality Management System to enable domestic companies entering foreign pharmaceutical market, attracting foreign investors, joint projects with foreign firms and prestige in the domestic and international level.

After the entry into force of the «Law on technical regulation» in drugstores were possibilities of voluntary standardization activities for compliance with ISO 9001 and to meet the requirements of «National standards of good pharmacy practice». The basis of «National standards of good pharmacy practice» responsible process approach of ISO 9001, using the experience of international pharmaceutical companies. Quality management – quite expensive process involving qualified personnel, quality infrastructure and working environment, good governance, the right business processes, and thus higher customer satisfaction, and as a result of good financial results. The introduction of quality management in pharmaceutical organizations require commitment, labor costs, economic costs psychophysical costs and awareness goals of quality management development of which requires a certain sequence and phasing (according to the Deming cycle). In pharmacy organizations should be formed quality control system. You must define business processes in the company. Process approach – it is the basis of standard ISO. Note that ISO does not demand unconditional adherence to its tenets. Many of the standard allows free interpretation. For example, it can decide which of the six methods to choose: document management, management reporting, internal audit, management inadequate reporting, corrective action and preventive measures. Certificate ISO assumes that the document management and management reporting can be done in one document. Also, activities of quality pharmacy service or the authorized person of quality is the implementation of national goals and objectives for the protection of public health, standards of medical and pharmaceutical activity; development of organizational strategic goals, evaluation of pharmaceutical services.

**Conclusions.** In our opinion that pharmaceutical organizations to develop and implement a quality management system must: an analysis of the existing quality control of pharmaceutical products and services; conduct a situational analysis and diagnosis of problems of quality management; objectives and responsibilities; determine resource capabilities and resource requirements; motivate employees of the organization; develop a program introduction and implementation of quality management system; build a system of training for the intended principle. Having decided to introduce a quality management system (QMS), Pharmaceutical organization must be ready for what belongs to continually improve their operations.

# ACTUAL RESEARCHES OF ORGANIZATION OF INTERNAL AUDITS OF PHARMACEUTICAL QUALITY SYSTEMS

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**Introduction.** For today organization certification in accordance with the requirements of standard ISO 9001 is one of effective events for the increase of competitiveness. For domestic Pharmaceutical Manufacturers such a step makes it possible to consolidate its position not only in domestic but also in foreign markets. Thus the branch requirements of GMP in relation to the pharmaceutical quality system (PQS) do not eliminate application of model of quality management system (QMS), which described in the standards series of ISO 9000.

One of the required elements of QMS is the system of internal diagnostics of company, known as internal audits (IA). At the same time, domestic companies often performed audit formally, mostly just to meet the requirements of supervisory authorities. However, properly organized auditing company management can provide important information about the functioning of the QMS, which can be used for taking corrective and preventive actions in order to improve.

**Aim.** Our goal at the current stage of researches on organization of audits on pharmaceutical companies (PC) becomes planning assessment of IA at the leading PC by using a sociological survey.

**Materials and methods.** As information database of research were used laws of Ukraine, which are published in the official sources, and also the resources of Internet network and materials published in scientific and professional literature.

**Results and discussion.** Since 2011 Ukraine has "Licensing terms for the business of drug manufacturing, wholesale and retail sale of medicines" compliance with this on the base of the pharmaceutical market verifies by the State Administration of Ukraine on Medical Products (SAUMP). Licensing is based on the Law of Ukraine "On Medicines", which provides a PQS at companies that produce a medications. License terms require efficient the PQS, but they do not contain a detailed description of the structure and mechanisms of the PQS. More detailed recommendations on this issue contains at the guidance ICH Q10, which has become a supplement to national guidelines of GMP, however, and this guidance provides only a general description of the PQS and briefly defines place and role of IA.

IA in PC are intended for systematic, independent and documented process of conformity assessment of the PQS as specified internal and external requirements. IA should be directed at identifying of "weak points" (types of activity, where a risk for quality of products and health of patients is unacceptable high), and also on being of

potential of further development of the PQS. Successful IA may contribute to a significant improvement of the PQS, reducing the risks to the quality, increase the productivity of production processes and reduce unproductive expenditures.

The audit of the PQS relating to the types of audits which is not regulated by a state legislation. Accordingly, there are not mandatory legal regulations to determine the order and rules of audit of quality systems, determination of requirements to auditors and the required reporting. Accordingly, there are no mandatory legal regulations to determine the order and rules of the PQS audit, no requirements for auditors, documentary support and more. However, QMS certification for compliance with ISO 9001, it is appropriate to carry out domestic enterprises have to follow all the requirements of the relevant sections of ISO 9001. Methodological assistance to implement these requirements provides standard ISO 19011 "Guidelines for auditing management systems."

In our opinion, the combined compliance guidelines ICH Q10, guidelines on GMP and ISO 9001 and 19011 is a rational approach to effective audit of the company.

We plan to conduct studies to comparative analysis of mentioned standards requirements, and determine the status of audits on domestic enterprises of different ownership, product range, magnitude and complexity of the of production processes. The objects of study in the first phase will serve companies that are certified in accordance with ISO 9001.

For our study, we chose the most acceptable variant to obtain information - a sociological survey to the representatives of company. The respondents, that the heads of quality control department will come forward, will be offered to fill an application form, that will contain questions about the form of audits, the number of involved auditors and their qualifications, frequency of audits, audit complex of documents, applicable auditing methods and so on.

The sociological survey is planned to conduct by using of software products like Google of Form and Survio.

**Conclusions.** The analysis of existing legal and regulatory requirements to the system found that the regulation of the formation of such systems and their individual processes, in particular - internal audits provided only by general provisions. Is also marked that the certain shortage of methodical literature and scientific publications on these questions. Accordingly, our research aimed at determining the best approaches to the organization of effective audits, as well as the assessment of internal audits proceedings in domestic companies. The results of such analysis will give an opportunity to offer the optimal model of IA organization in accordance with modern requirements and specific of the domestic companies from the production of medical products.

## **REGULATION PHARMACEUTICAL INDUSTRY IN JORDAN**

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**Introduction.** Jordan is considered a pioneer in the Arab world from the perspective of the pharmaceutical industry, since the first pharmaceutical factory was founded in Jordan in 1962. Since then, the volume of the pharmaceutical industry in Jordan has increased significantly: as of January 2016 are 17 pharmaceutical companies, pharmaceutical manufacturers. In Jordan, the dynamically developing production of pharmaceutical and cosmetic products, 70% of which are exported to other countries. Cosmetic products based on Dead Sea salts and dirt are exported to many European countries. In Jordan, there is no local manufacturing capacity for certain therapeutic groups of drugs – such as cancer drugs, vaccines.

**Aim.** Our research has focused on the issue of theoretical analysis of pharmaceutical industry in Jordan.

**Materials and methods.** We used empirical methods: observation and comparison; and methods of experimental and theoretical: logical analysis, the hypothetical synthesis of theoretical generalizations.

**Results and discussion.** Local pharmaceutical manufacturers carry out contract manufacturing for major international pharmaceutical companies, but now it is less than 5% of the revenue of the pharmaceutical sector as a whole.

All 17 of the Jordanian pharmaceutical companies have been certified in accordance with GMP standards of the WHO. Two of pharmaceutical companies have FDA certified, and 7 – EMEA certified. Despite the high level of the local manufacturing sector, pharmaceutical production goes to foreign markets at a lower level in the overall scheme of the world's supply. Major pharmaceutical companies, which owns a number of factories producing medicines in Jordan:

- The Arab Pharm. Mfg. Co. Ltd
- Dar Al Dawa Development & Invst. Co
- Hikma Pharmaceuticals
- The Jordanian Pharm Mfg. Co.
- Arab Center for Pharm. & Chem.
- Hayat Pharm. Ind. Co. Ltd
- Middle East Pharmaceutical and Chemical Industries Company

Organization of Jordan Food and Drug Administration (FDA) is responsible for the registration of pharmaceutical products, including those for the quality assessment of clinical trials, bioequivalence studies for pricing, organization of accreditation of pharmaceutical manufacturers to promote rational use of medicines and pharmacovigilance and post-marketing monitoring.

JFDA put forward stringent requirements for the registration of new drugs and usually attracts for a decision on the registration status of the recognized world authorities such as the U.S. Food and Drug Administration US (FDA) and European Medicines Agency (EMA). Registration of any drug requires the drug sold by at least 1 year in the country of origin, or any system JFDA country. According to the bylaws JFDA, registration of a new drug should be completed in less than 180 working days. The average registration time is about 90 days. The price for registration of drug registration is 1500 JD (about US \$ 2,000) for new chemical substances and 400 JD (about US \$ 550) for the generic drug. JFDA has a modern well-equipped laboratory for quality control of drugs and substances, which has 56 staff employees.

Pharmaceutical company provides detailed information on the drug, which comprises the chemical structure, pharmacological and chemical properties, classification according to the Anatomical Therapeutic Chemical Classification regarding the therapeutic activity of the drug and its active ingredients on the organs or organ systems, to which they affect

**Conclusions.** JFDA bylaws regulate the drug, which stayed in the pharmaceutical market for more than two years and the number of issued more than seven consecutive batches of appropriate quality, should not necessarily be subjected to quality control for each party, and shall be subject only to the selective quality control. However, for medicines purchased by public sector institutions, JPD requires quality control of each series. Process pricing controlled JFDA, based on the external reference prices taking into account the price of the drug in the country of origin and in 16 countries studied (particularly in the UK and France), in Saudi Arabia. Therefore, this process can lead to the prices on the products will be higher on average than in some neighboring countries (such as in Egypt). To register a new drug it is analyzed in the laboratory to control the quality of JFDA. After confirmation of the quality of medicines and laboratory tests of collecting complete dossiers, files are transferred in JFDA technical committee to study, review and approval. The approval process for new products takes about 12 months.

Accelerated registration procedure may be requested for essential drugs. In these cases, the approval process can take as little as 6 months. In order to pass the accelerated registration procedure, the drug should be included in Rational Drug List Jordan. If the drug is approved for Rational Drug List, public hospitals can send their requests to the Department of Procurement Jordan. JFDA may issue a special permit for the import of medicines which are not registered in Jordan, but have already been registered by the US FDA or the EMA, if proved urgent need on the basis of a full dossier of the case, including recipes from the specialized doctor. Patients in this case pay the international price of the drug, which is fixed by a pharmaceutical company in the country of origin.



# DEVELOPMENT OF REKOMMENDATIONS ON OPTIMIZATION OF INTERNAL AUDIT ON CHEMICAL PHARMACEUTICAL FACTORY «ЧЕРВОНА ЗІРКА»

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**Introduction.** Currently, in Ukrainian pharmaceutical business facilities insufficient attention paid to audit quality, which conducted by the organization itself. However, it is internal audits first of all make it possible to determine as required and accepted at the discretion of the procedure and planned activities properly composed, performed and to prevent adverse effects. Internal Audit is the highest form of management control quality management system of Pharmacy company. Internal audit is an important management function, which covers accounting, financial analysis and monitoring, evaluation and comparison actual results achieved with the goal and objectives of pharmaceutical companies.

**Aim.** The research of our thesis focused on the analysis of the audit of the pharmaceutical company, drafting the audit plan for example Chemical-Pharmaceutical Factory «Червона Зірка».

**Materials and methods:** the theoretical analysis of scientific literature, periodic publications, experimental and theoretical methods: logical analysis, the hypothetical synthesis of theoretical generalizations.

**Results and discussion.** Audit regularly monitors the activities of all facilities management, identifies the causes of deviations from the standards deviations from the objectives set for the specific object, promotes efficient elimination of the violations. Built-in mechanisms for continuous optimization of processes within the Quality Management System can not only continually reduce risks to product quality and increase the level of satisfaction of requirements but also to reduce unproductive costs, positive impact on costs. Thus, the introduction of the Quality Management System is a rational step towards the strengthening of the market position and further business expansion. Company audit as a function of business management – a strict regulation of activity, the definition of duties and responsibilities of specialists, qualification requirements, relationships between departments and personnel.

**Conclusions.** We plan to develop recommendations to improve the audit process to minimize errors, analyze and identify inconsistencies, recommendations to eliminate inconsistencies as long as they did not affect the quality of products, and therefore also the reputation of the company. Research of this issue provides a material optimization of audits and use this information in the future not only for troubleshooting, but also to be able to predict and prevent.

# ANALYSIS OF INFLUENCE PERSONAL QUALITIES OF AUDITORS FOR EXAMPLE AUDITS ON CHEMICAL PHARMACEUTICAL FACTORY «ЧЕРБОГА ЗІРКА»

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**Introduction.** The implementation of quality management systems (QMS) according to the requirements of ISO 9001, becomes the last decade significant spread almost in all industries and services. This fact is due to the competitive advantages that may be due to implementation of the QMS. Such systems involve significant changes approaches to management of the organization, focusing all kinds of internal activities (business processes) to enhance guarantees of regulations and requirements and expectations regarding products and services.

**Aim.** Our research has focused on the issue of implementation of internal audit, as a requirement of ISO 9001, as well as good practice in pharmacy. Internal audit management provide timely and objective information on the implementation of QMS processes and the conformity of their results with the established requirements and opportunities for improvement. In fact, internal audit mechanism is internal "review" QMS audit but not for the purpose of a finding those responsible and punish them, and monitoring to identify "weaknesses" (substantial risks or potential problems) and existing inconsistencies, to initiate corrective action.

**Materials and methods.** We used empirical methods and theoretical methods: logical analysis, the hypothetical synthesis of theoretical generalizations.

**Results and discussion.** The objective of internal audit can be done only with the full set of documents regulating the processes of QMS, as verified whether the specific requirements established instead of processes at the discretion of the auditor. Internal audit should become a permanent process of supplying information for the management of the organization, so you need to attract appropriately trained auditors.

In developed company important issue is the creation of a separate group of competent auditors perform audit work professionally involved in education issues internal quality management in the project implementation QMS is one of the essential factors. Significant personal role as auditors and experts in quality, since they affect the methods and techniques of auditing and performance.

Auditors should ensure trust and ease in communication and show understanding explanations given on the facts discovered during the audit.

**Conclusions.** In our thesis work is planned to analyze the impact of personal qualities of the auditor on the principles, methods and ways of auditing, to make the expanded criteria for personality traits to be met by the auditor and propose a method of checking compliance with those criteria.

## TRAINING AND COMPETENCE ASSESSMENT OF INTERNAL AUDITORS

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**Introduction.** The success and competitiveness depend on competent management decisions and the level of competence of the personnel that directly affects the quality of the end product of each company. High requirements are put forward for the competence of personnel who are engaged in various kinds of control.

The international standard ISO 19011:2011 "Guidelines for management systems auditing" says that the trust and the confidence in the audit process depend on the competence of those who carry out the audit.

The auditors should pass appropriate training, traineeship and certification, maintain and improve their competence in this field of activity.

The **aim** of our research was the development of the internal auditors training program and evaluation of their competence.

**Materials and methods.** To conduct this work, we have used the ISO 19011:2011 standard requirements and methods of personnel certification at the enterprise.

**Results and discussion.** As a result of conducted research a program for internal auditors training and assessing their practical work at the pharmaceutical company has been developed, which includes:

- selection plan (determination of the necessary professional skills and knowledge of potential auditors);
- criteria for evaluation and ranking of candidates (assessment of professional knowledge of candidates for auditors and their expertise rating on a 5-point scale);
- training program for internal auditors (list of lectures and practical exercises followed by evaluation of acquired knowledge);
- program to improve knowledge and skills (development plan);
- quality control program of internal auditors work after conducting audits at the enterprise (used the method of units workers questioning where the internal audit carried out).

**Conclusions.** The program developed can be used in the preparation of internal auditors in the pharmaceutical enterprises. It allows assessing the skills and knowledge of potential auditors and train them to use the knowledge gained in practice. The program is aimed not only at the recruitment and training of auditors, but also to ensure the monitoring of their professional development.

## **REGULATION OF PROCESS «CONTROL OF MONITORING AND MEASURING DEVICES»**

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**Introduction.** Today improve the competitiveness of domestic production enterprises is an urgent matter of national importance, because the economy is closely linked to increased requirements for product quality as one of the main factors ensuring the competitiveness of products and services in the developed world.

To successfully run a business, you need to work on the rules of the world market not only in terms of production technology, but also in the management of the enterprise.

**Aim.** Our research has focused on the issue of regulation of process «Control of monitoring and measuring devices». Since Ukraine joined the World Trade Organization, certificates of compliance with ISO gaining relevance. Solving problems of quality control should be provided quality management system in accordance with the requirements of ISO 9001: 2015 (ISO 9001: 2015).

Development, implementation and certification of quality management system the company is not only demanding clients but also becomes a tool for optimizing internal processes, which in turn leads to higher product quality, reduce costs and increase in profits.

**Materials and methods:** experimental and theoretical methods: logical analysis, the hypothetical synthesis of theoretical generalizations; empirical methods (observation, comparison).

**Results and discussion.** Internal results received by the organization from implementing a quality management system directly depend on the efforts it is making to improve its activity.

External benefits the organization receives when certifies its quality management system by an independent competent authority for certification.

Important elements of quality assurance is the production processes at the plant, each of which is characterized by a number of parameters which often involved measuring equipment.

These settings should be changed only set limits to support the process in specified operating conditions and to provide relevant product characteristics.

Parameters process, semi-finished and finished products should be measured. Measuring in production intended for information on the status of the process.

Metrological support system must solving measuring tasks, provide reliable information about production values processes.

As a result, industrial production and its metrological support having significant flow measurement, background information about the quality of the final product. Obviously, the production efficiency and product quality level is largely determined by how efficiently the company uses information on the production process.

**Conclusions.** A quality assurance and metrological support of production are interrelated and determine the required accuracy of all the properties and conditions at each stage of the production process. Metrological provision of production covers all stages of the product life cycle, from the stage of research and experimental development activities, including:

- analysis of measurements;
- establishing a rational range of measured values and the use of measuring instruments (working and reference) due accuracy;
- providing verification and calibration of measuring instruments (W);
- Development of methods of measurement for the standards of accuracy;
- metrological examination of design and technological documentation;
- implementation of necessary regulations (national, sectoral and enterprise standards);
- accreditation for technical competence of staff;
- metrological supervision.

Current legislation in the field of metrology quality assurance requires all companies to control product quality during production, commodity, planning, and ensure efficient use of measuring instruments that are used.

In addition, the law established the responsibility of heads of enterprises for the selection of the right measurement technology and for its timely verified.

Metrological support system must solving measuring tasks, provide reliable information about production values processes.

Most of the enterprises undertaken to organize and improve metrological support of production can be divided into two groups:

- Measures cover organizational issues related to the organization of work on performance measurement, creation of documentation for processing and use of the information received, ensuring the training of qualified personnel in the field of measurement and further improve their skills.
- Measures relating to the logistics supply sides consider necessary BT, to ensure their proper operation, repair and calibration VT.

In view of the above, in the course of our research thesis project we plan to develop SOPs for the management of measuring equipment, analysis and systematization of possible errors during the process and develop proposals to minimize the risks of the process.

# THE USE OF FMEA- ANALYSIS TO ASSESS THE RISKS AT CREATING NEW DRUGS

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**Introduction.**In Ukraine diabetes occupies the third place on prevalence after cardiovascular and oncologic diseases. For the last ten years prevalence of diabetes mellitus(DM) in Ukraine increased in one and a half times, and on the state on January, 1, 2015 in a country 1 198 047 is registered patients, that makes about 2,9% from all population.

At the domestic pharmaceutical market the wide assortment of preparations which are used for treatment of DM of 2th type.

**Aim.**Creation of the combined antidiabetic drugs with the use of the known pharmaceutical ingredients, the mechanism of pharmacological action an action is directed straight on nosotropic links of DM. The purpose of work was creation self of the combined drugs, with diminished probability of origin of side effects.

**Materials and methods.**For the decision of the put task it was collected and analysed ActivePharmaceuticalIngredients (API), that used for treatment of disease on DM of 2th type. Composition for medication, that it was created in the process of previous researches it was subject to the expert estimation, in relation to side effects.

Project drug was considered from five components. Formed table of FMEA of -analysing. A table contains data in relation to each of components and them side effects. These methods allowed us to educe most critical components in the process for create of drug.

**Results and discussion.**Analysing these tables of FMEA-analysis, the most reliable disparities are distinguished, them possible reasons and consequences. Conducting calculations, it was to the receipt of riskspriority number (RPN), at what PNRs for each the accounts were settled a component, as AV arithmetic RPN of side effects. By the method of expert evaluation it was chosen those the values of which were evened, whether were more than 100. The chosen disparities were assorted in order of increase. Dyspepsia disorders had most disparity, namely, nausea, loss of appetite, pain in epigastrium and metallic taste in an oral cavity. All are higher transferred side effects were reason of reception of metformine. So as combination was examined from five API, and metphormin and akarboza had maximal disparity, then set that on the second place the side effects of akarboza - abdominal pains, nausea, diarrhea stood by value of RPN.

**Conclusions.**From the data do is concluded that the combination of these APIs will be HEPA -ethnic , as both ingredients negatively affect thefunctioning of the digestive tract.

Further research will be directed at eliminating disparities.

# THE PROCESS OF REGULATION INTERNAL AUDIT QUALITY MANAGEMENT SYSTEM

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**Introduction.** Internal Audit (IA) is an integral part of the quality management system (QMS), it allows you to objectively evaluate the operation of the QMS by power, checking the effectiveness of its processes and determines the potential to improve and enhance organizational performance.

Every modern company, including pharmacy companies, which seek to enhance its competitiveness through implementation QMS must adhere to the principles of objective, documented and professional audits, set out in ISO 19011.

**Aim.** The aim of our research was to study the provisions of ISO 19011: 2011, including: principles of VA approaches to management programed IA of IA methods, and assessment of competence of persons involved in the audit process. The study of these provisions would-standard helped us in developing proposals for regulation applied to the IA - on a typical pharmaceutical distributive company.

**Materials and methods.** Typically, domestic enterprises rarely describe the whole process IA in documentary form, leading to numerous violations in the conclusion-no audit, and as a result - to obtain false or incomplete information and incorrect understanding of the continuous improvement process in QMS.

We believe that all activities related to IA necessarily non-necessary to regulate the procedure documented in the cycle PDCA («plan-do-check-act»): This will enable sufficient detail algorithm process - from setting goals and formation program audit steps for its implementation, monitoring, critical analysis ways to continually improve process IA.

**Results and discussion.** We have formed recommendations on program development IA defined process steps, outlined the role of each in achieving the objectives of the audit proposed content documented procedure that includes a description of the following stages: initiation of the audit; IA formation program; of planned audits; preparing reports on IA; assessment of process- IA; taking action to improve the process of IA.

**Conclusions.** We believe that detailed regulation process IA setting clear goals and objectives for internal auditors, which reduces the risk of inconsistencies, but also can be used for training persons involved.

**SECTION № 18**

**INFORMATION TECHNOLOGY IN PHARMACY AND MEDICINE**



## THE MECHANISMS OF BACTERIAL ADHESION

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**Introduction:** The phenomenon of bacterial adhesion is an important phenomenon for those working within the pharmaceutical and healthcare sectors to consider. The way in which bacterial cells adhere to surfaces, or within communities, is of great importance to pharmaceutical microbiologists.

**General mechanisms of adhesion:** According Benjamin E. Russ, adhesion is the binding force between two different materials, whereas cohesion is the binding force between two similar materials. When two materials are brought into contact with each other, the surface molecules interact, giving rise to attractive forces that may be physical and chemical (e.g. adsorption, covalent bonding or van der Waals forces).

**Physical bonding:** Physical bond consist four types of theory: mechanical interlocking, diffusion theory, adsorption and electrostatic. Adsorption theory is a form of adhesive bonding involving the attraction between the molecules of an adhesive and a surface material. The bonding of an adhesive to an object or a surface is the sum of a number of mechanical, physical, and chemical forces that overlap and influence one another. As it is not possible to separate these forces from one another, we distinguish between mechanical interlocking, caused by the mechanical anchoring of the adhesive in the pores and the uneven parts of the surface, electrostatic forces, as regard to the difference in electro negativities of adhering materials, and the other adhesion mechanisms dealing with intermolecular and chemical bonding forces that occur at the interfaces of heterogeneous systems.

**Chemical bonding:** is a form of adhesive bonding involving a reaction that results in covalent bonds between the molecules of the adhesive and the surface material. The chemical bonding mechanism suggests that primary chemical bonds may form across the interface. In chemical bond consist two category of bond which is primary and secondary bond. Chemical bonds are strong and make a significant contribution to the intrinsic adhesion in some cases.

**Conclusions:** The study of mechanisms of bacterial adhesion is very important for pharmacy, its help the pharmacist to know the principles reactions with the bacteria. The surface binding is concern for cleaning and disinfection, the way in which bacteria may form a biofilm community within the pipework of a water system, or in relation to binding to a product formulation. Outside of the pharmaceutical environment, the binding of microbial cells to human host cells is important to areas including dentistry and medical implants, grafts, intravenous lines, drains, stents, and catheters.

# RESONANT METHOD FOR MEASUREMENT OF COMPLEX PERMITTIVITY OF BIOLOGICAL OBJECTS ON MICROWAVES

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**Introduction.** The majority of substances existing in the nature are heterogeneous, i.e. consisting of several components which are divided by distinctly expressed limit of the section. When smashing one of phases and her uniform distribution in other phase disperse heterogeneous system is formed. Examples of such systems are powdery medicines, porous bodies, emulsions, suspensions, composite materials, and also almost all substances of a biological origin: blood and cellular suspensions, muscular and bone tissues, etc.

**Aim.** The aim of investigation is the measurement of a complex permittivity of biological objects on microwaves.

**Materials and methods.** One of research methods of heterogeneous disperse systems is the resonant method for measurement of complex permittivity that has been developed. It is based on consideration of the proceeding processes in substance under the influence of electric field in connection with structure and a structure of substance. The questions that studied by such method closely adjoin to molecular physics in general and are connected with physical chemistry, physics of polymers, etc. Resonant method for measurement of complex permittivity allows obtaining very valuable information about features of a structure of substances of a biological origin, about the nature of intermolecular and intramolecular forces, about the structural violations and changes caused by various factors, etc. Objects of molecular biophysics, such as blood, serums, extracts, macromolecular and cellular suspensions, etc. represent liquid disperse systems with big dielectric losses.

**Results and discussion.** The way of calculation of permittivity of heterogeneous dispersive systems is the following. Some volume  $V$  is entered into consideration, which sizes are small in comparison with the sizes of all system, but are great in comparison with the local heterogeneities. Making averaging of electric field on the chosen volume  $\vec{E}$  and electric induction  $\vec{D}$  we will receive effective values,  $\vec{E}$  and  $\vec{D}$ , in relation to which the considered heterogeneous environment is uniform and isotropic and as that, it can be characterized by a certain effective value of permittivity  $\epsilon_{\text{eff}}$ .

For effective entered thus  $\vec{E}$ ,  $\vec{D}$  and  $\epsilon_{\text{mix}}$  ( $\epsilon_{\text{eff}}$ ) ratios take place:

$$\vec{D} = \epsilon^{cm} \vec{E}, \quad (1)$$

$$\vec{E} = \delta_1 \vec{E}_1 + \delta_2 \vec{E}_2, \quad (2)$$

$$\bar{D} = \delta_1 \bar{D}_1 + \delta_2 \bar{D}_2, \quad (3)$$

where  $\delta_i$ - a volume fraction for  $i$  components. From the equations (2), (3) follows

$$\varepsilon_{mix} = \varepsilon_2 + (\varepsilon_1 - \varepsilon_2) \delta_2 f_2, \quad (4)$$

$$\text{or } (\varepsilon_{mix} - \varepsilon_1) \delta_1 f_1 + (\varepsilon_{mix} - \varepsilon_2) \delta_2 f_2, \quad (5)$$

where  $f_i = \bar{E}_i / \bar{E}$ .

For example, for particles of the spherical form:

$$f_i = \frac{1}{3} \left( 2 + \frac{\varepsilon_{mix}}{\varepsilon_1} \right). \quad (6)$$

Ratios (4), (5) are the basis majority of the methods for calculation of permittivity of two-component heterogeneous disperse systems that have been described in literature. Various options of formulas correspond to various ways for calculation of coefficients  $f_1$  and  $f_2$ , the particles considering a form, their orientation, interaction, etc. It is easy to see also, that ratios (4), (5) are easily generalized on a case of any number component. Knowing values  $\delta_i$ , find permittivity for mix component may be to find. For this purpose it is necessary to measure resonant frequencies of electromagnetic oscillations in the resonator for two close volumes of mix (to minimize dispersion of permittivity for disperse environments). And then to solve system of the equations are made for equation (4) or (5). It is also possible to solve the return problem: on known to permittivity mix component to find volume concentration the substances mix.

**Conclusions.** In work the resonant method for measurement is offered complex permittivity double objects about microwaves. The offered method for measurement is less expensive, than the spectral methods of the analysis of heterogeneous systems existing now. ) and it's easily generalized on a case of any number components in mix.

## MODELING AND RESOLUTION OF CONFLICT SITUATION

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**Introduction.** At the moment, our market economy characterized by phenomena such as the decline of industry, economic crisis, lack of investment, that leads to bankruptcy of economic subjects.

**The relevance and practical importance.** Reallocation of funds received after the bankruptcy, crisis prevention.

**Aim.** Search asset allocation methods at bankruptcy. The research of distribution of property in bankruptcy, the inheritance section.

**Materials and methods.** Game theory is, perhaps, the most effective tool that can help find the best ways to cooperate in resolving conflicts arising in the levels - family, business, public relations.

### **The rule of the Talmud.**

Depending on the amount of the stated requirements in relation to the distributed amount of money used one or another rule.

If the sum is equal to half the sum of the stated requirements, each receives  $\frac{1}{2}$  of its application.

If the sum is less than  $\frac{1}{2}$  the amount of the stated requirements, then we use formula of the rules of equal payments restrictions.

If the amount is more  $\frac{1}{2}$  the amount of the stated requirements, then we use the formula of equal rules limited damages.

This rule can be determined by the following algorithm:

Divide equally among all agents until each non get an amount equal to half the minimum application.

After this agent fraction with the lowest requirement for some time stops.

The main part of shared equally among the remaining, yet each of them will not get the amount equal to  $\frac{1}{2}$  for the next minimal application.

Results and discussion. After a thorough analysis of the algorithm of the Talmud bankruptcy problems have made the distribution of property calculation between the five entities of the company, every person pretends to following amounts, respectively 100, 300, 400, 200, 500. The remaining capital is 1000.

	1	2	3	4	5	Sum
	100	300	400	200	500	1500
<i>The amount of residual capital = 1000 (more than ½ of the claimed amount), therefore use a limiting rule equal losses</i>						
Divide equally	100	300	400	200	500	
Share	50	150	200	100	250	Sum =750
<i>Residue 1000-750 = 250 division with minimal requirements stop.</i>						
Divide	-	150	200	-	250	
The main part of shared equally among the remaining, yet each of them will not get the amount equal to ½ for the next minimal application. Priority maximum application						
Share	-	25	100	-	125	Sum =250
Share	50 (50+0)	175 (150+25)	300 (200+100)	100 (100+0)	375 (250+125)	1000

**Conclusions.** Equitable distribution of entity with more demanding than the other, does not receive a smaller proportion and is not smaller losses. In the subsequent model analysis can be improved by introducing the other elements of consideration.

# CASE-ORIENTED INFORMATION TECHNOLOGY FOR QUALITY AND SAFETY ASSESMENT SOFTWARE FOR TECHNOLOGICAL PROSESS OF DRUGS PRODUCTION IN THE PHARMASEUTICAL ENTERPRISE

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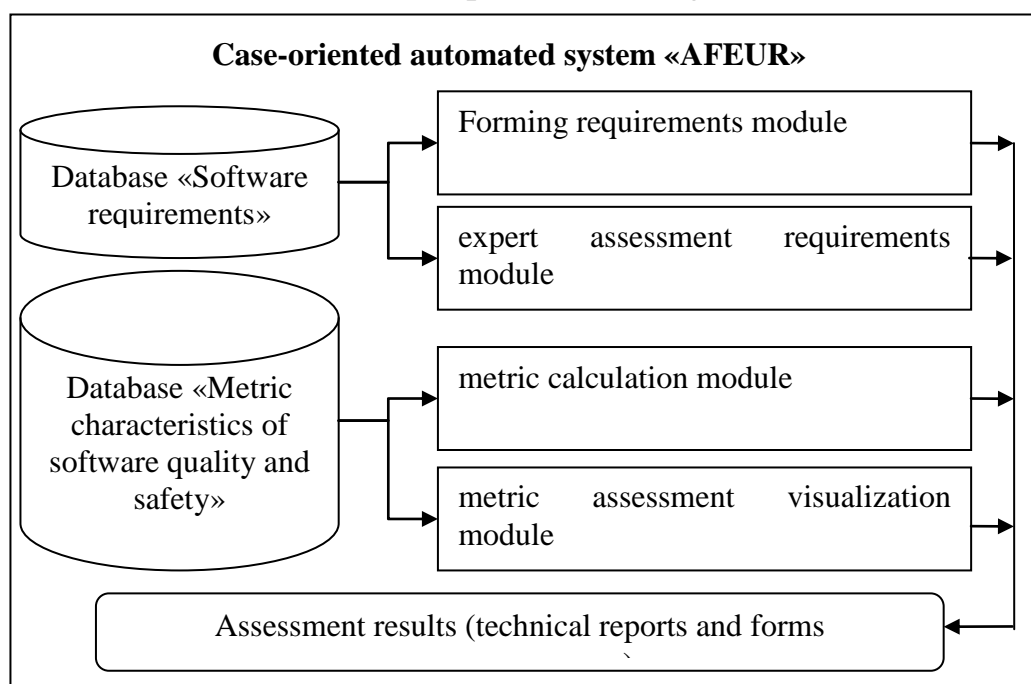
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**Introduction.** Using the automated equipment in the pharmaceutical enterprises are connect with quality and safety tasks. This choice of such equipment determines the quality of drugs, as each process step and stage of production takes place under the control of the equipment and, consequently, included in his software. Necessary to say, the software quality and safety requirements are important part of the critical information system such as pharmaceutical brunch.

**Results and discussion.** There are different approaches to the quality and safety assessment of the finished software, however, none of them takes into account the characteristics of pharmaceutical manufacture. In this article we proposed an automated system of quality and safety software assessment, based on the Case-methodology and the author's method, which call «AFEUR».

«AFEUR» architecture represented at Fig. 1.



**Fig. 1.** «AFEUR» architecture

This system includes:

- Web-oriented interface with two languages;
- the software requirements database;
- hierarchical model of software requirement and it visual representation;
- integral for

- requirements assessment based on expert-lists;
- integral index and average gravimetric factors calculation;
- radial-metric diagram for visual representation of searching results;
- technical reports of software assessment results, recommendations for use.

Fig. 2 represented software requirements tree structure.

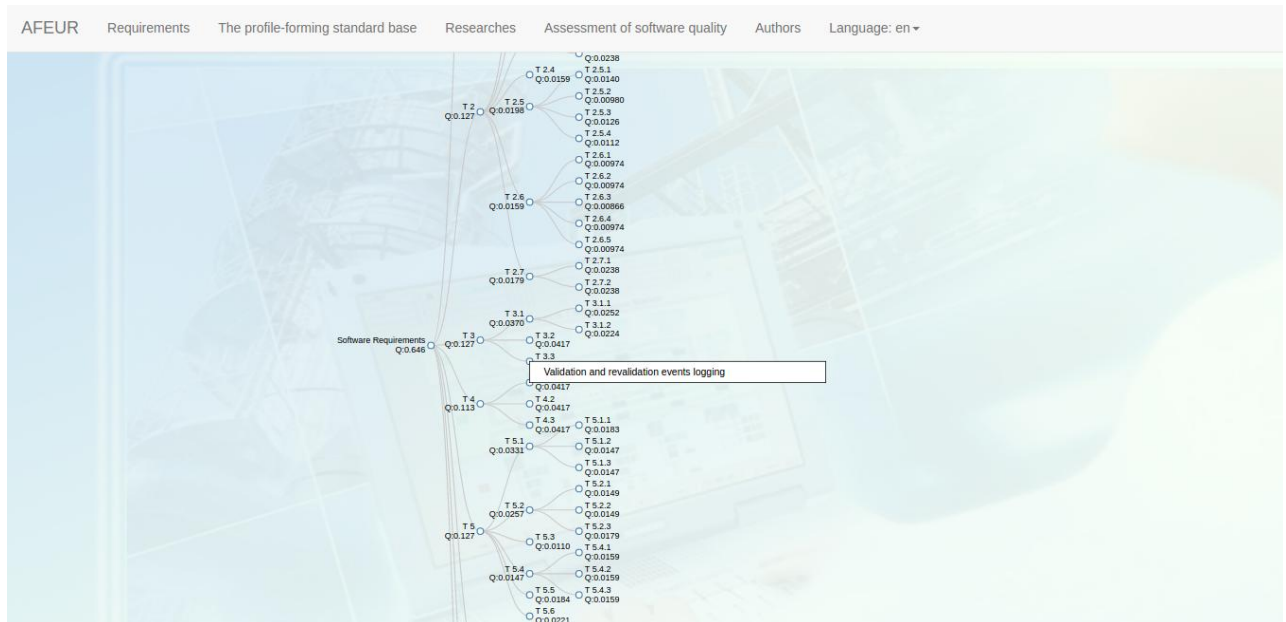


Fig. 2. Case-oriented automated system «AFEUR», software requirements tree structure

Fig. 3 represented how we can introduce the assessment results in visual form.

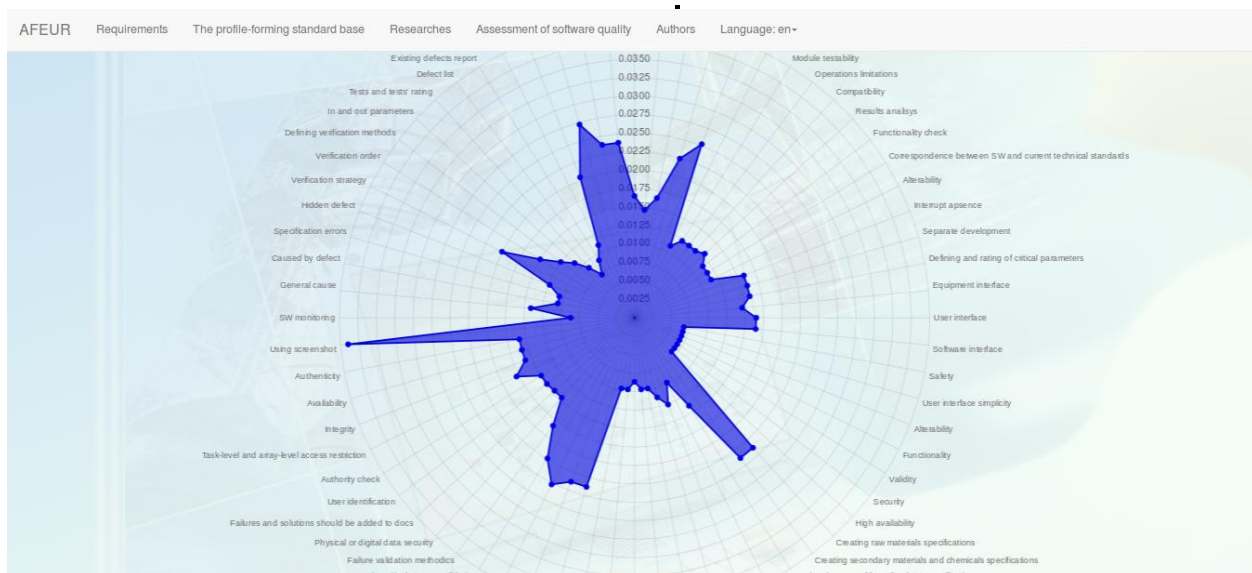


Fig. 3. «AFEUR», radial-metric diagram

**Conclusions.** The Case-oriented information technology for quality and safety software assessment was developed. Based on this IT developed Web-interface tool «AFEUR» for automated quantitative safety and quality software assessment in the pharmaceutical enterprise. Further researches can be directed modification and perfection of developed system.

## **INFLUENCE OF BINAURAL RHYTHMS ON THE PSYCHO-EMOTIONAL STATE OF A HUMAN BEING**

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**Introduction.** Binaural effect of acoustic waves is known for a long time. This effect occurs when the superposition of two acoustic waves with similar frequencies. The amplitude of such a wave varies with time periodically. This effect was called the binaural effect or the binaural rhythms. When a person with the usage of headphones listens to the two different pure-tone sine waves, both with frequencies lower than 1500 Hz, with less than a 40 Hz difference between them, his brain produces an auditory illusion. This illusion appears because of the fusion of these two waves. But these waves are electromagnetic waves. Robert Monroe, an American researcher, began to study binaural rhythms in the middle of the 20<sup>th</sup> century. Since then appeared the whole industry which persuades people that music with binaural rhythms has a positive influence on the mental health. The official label which uses the music with binaural rhythms is called **Hemi-Sync (hemispheric synchronization)**. There is a hypothesis that acoustic binaural beats lead to synchronization of the brain hemispheres. The beat frequency can determine the basic biorhythms brain frequency. However, there is no certain scientific evidence on the effect of the Hemi-Sync technology.

**Aim.** To study the influence of binaural rhythms on the psycho-emotional state of people.

**Research Method.** 18 volunteers between the ages of 16 to 60 took part in the experiment. They didn't have any mental disorders or physiological illnesses. They were asked to answer the questions before and after listening to the same piece of music with and without Hemi-Sync during the certain period of time (from 10 to 20 minutes). There were 8 questions in the questionnaire. To answer these questions volunteers had to rate their psychological state by the scale between -5 to +5. The results were analyzed by the Wilcoxon test. Wilcoxon test is a non-parametric statistical test used to compare two paired samples at the level of a quantitative trait measured in a continuous or ordinal scale. Processing of survey results conducted with a significance level of less than 0.05

**Results and discussion.** The research showed that music with Hemi-Sync has an influence on the psycho-emotional state of people. The influence was less in the control group where volunteers were asked to listen to the same piece of music



without Hemi-Sync. It can be seen by the average results in the groups. The differences between the states of volunteers before and after listening to music are much more visible in the experimental group. The psycho-emotional state has changed significantly in the control group on 4 criteria. And the psycho-emotional state has changed significantly in the experimental group on 7 criteria.

The differences were the highest in the answers to the questions number 3, 4 and 7. All changes were positive.

In the 3<sup>rd</sup> question volunteers were asked to say if they felt themselves more self-confident after listening to music. In the experimental group, their results increased by 1.72 points in average while in the control group it was just 0.83 points what less than the statistical error. In the 4<sup>th</sup> question volunteers were asked to note their change of mood. The average result in the experimental group was incredible 2.29 points while in the control group it was 0.94 points, which is close to the statistical error, too. In the 7<sup>th</sup> question volunteers were asked to rate their overall psychological state. 1.89 points was an average result in the experimental group and 1.44 points was an average result in the control group.

These results show that binaural rhythms in this piece music have a positive influence on emotional and psychological states of people.

**Conclusions.** Music with Hemi-Sync has a definite positive influence on the psycho-emotional state of people. This effect has to be studied more. It can be used as a method of the light mental impact.

# USING MATHEMATICAL METHODS PLANNING FOR SELECTION OPTIMAL COMPOSITIONS POLYMER SHELL TABLETS

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**Introduction.** The perspective directions of the domestic national Pharmaceutical industry is the development and implementation of new industrial production dosage forms, which will be added to the range of domestically produced remedies, for its efficiency and quality not inferior foreign analogues.

At the present stage of pharmaceutical industry development is the best level of pharmaceutical workers for using the informational technology ensures the implementation of mathematical planning experiment in scientific research. Because of intensification research, the success of research and experimental work in pharmacy is based on the use age of mathematical planning scientific research in the field of new pharmacologically active substances synthesis as well as the development of optimal composition, technology dosage forms optimize quality control, conducting biopharmaceutical research.

**Aim.** Explore the use of mathematical methods planning for selection optimal compositions polymer shell tablets.

**Materials and methods.** The scientists-pharmacists use method of mathematical planning multifactor experiment for solving the optimization problem structure dyes and pigments in the dragee shell of tablets. This technique experimental design is the best method of solving the problem optimization shell color with a minimum number of experiments.

Creating a new drug or new dosage form is a complex multistage process in experimental studies that may include long stage requires the use of mathematical method planning. Thus, for the development and implementation of new solid dosage forms in industrial environments using different group subsidiary substances for shell tablets: film forming agents, pigments, dyes, plasticizers, stabilizers, etc. In this studies the impact of many qualitative factors on the structure and properties of the polymer film plans using analysis of variance.

**Results and discussion.** Using this method, we can divide the total sum of observations squares on components that get due to the influence of various factors and their interaction. Since the tablet-core having a hydrophobic surface and photosensitive properties to the selection film forming agents be aware that the film has high adhesion to the surface and core tablets were protected from light. Therefore, in film forming agents qualities necessary to use different polymers: hypromellose, methylcellulose and polyvinyl alcohol. In addition, improving light protective properties of the film also introduced shell white substrate based polymer similar to that using a color coating. The scientists studied the amount coating on the tablet surface, as well as value white substrate and colored coating for optimal selection of the best value part to mask the surface of the tablet-core of UV exposure radiation.

**Conclusion.** Thus, the creation of a medicinal product is complex multi-stage process of experimental research. To optimize the development of composition and technology of drugs in laboratory conditions industrial pharmacy it is necessary to use the most effective methods of math's planning experiment. In particular, for the purpose of rational composition coating excipients tablet cores selection it is used the method of math's planning experiment – three-factor analysis of variance on the Latin square basis.

# MONTE-CARLO METHOD IN PHYSICS, MATHEMATICS, BIOLOGY

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**Introduction.** Monte Carlo method is used at research of many processes in physics, chemistry, biology. This method is basing on the use of random numbers. Nuclear reactors settle accounts by this method, it is widely used in geophysics, economy, biology, ecology - for the solving of those tasks, wherever the analytical or numeral methods are not work from the high degree of complication.

There are random numbers generators in the mathematical programs of MATHCAD, MAPLE, MATLAB, STATISTICS and other. It is possible to get the arrays of random numbers with the different laws of distributing - even, normal, exponential and other with their help

**Aim.** Different tasks for the decision of which the method of Monte Carlo is used are considered in our researches.

**Materials and methods.** The program MATHCAD is using for demonstration of solving of different tasks by using of Monte-Carlo method.

1. Generation of random numbers. The different variants of the programs realizing this process are considered.
2. Demonstration of one-dimension moving of particle.
3. Two-dimension Brownian motion of particle. The numeral experiment is made on verification of Einshtein-Smolukhovsky equation for diffusive processes.
4. Calculation of mathematical constants. This is calculating of  $\pi$  and error of result is estimated.
5. Calculation of integrals.

**Results and discussion.** The numeral experiments are look the possibilities of Monte-Carlo method for modelling of different processes in physics, mathematics, biology.

**Conclusion.** Monte-Carlo method can be using for solving of many tasks, which not possible to solve by traditional methods.

# SAMPLE SIZE CALCULATION PROCEDURE FOR PLANNED STUDIES AND ITS PROGRAM IMPLEMENTATION

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**Introduction.** Sample size determination is an important part of research planning in studies aimed at testing and confirmation of formal hypotheses. This task is particularly relevant for cost-effectiveness substantiation of the research and for its financial planning, that are integral parts of market researches, clinical trials, state public researches or studies, which are carried out under grants. The major part of methodical and teaching materials, instructions, and procedures proposed in the literature, as well as the methods implemented in specialized computer programs, focuses on planning methods of sample size evaluation for tasks of two-groups comparisons by some variable of interest, which is generally numeric. At the same time the problems of frequency assessment for qualitative feature in a single sample are insufficiently considered in the literature and implemented in specialized software.

**The aim** of the work is to give a survey of methods for sample size determination in a case of a dichotomous feature occurrence frequency assessment, and to introduce the software tool, developed by authors, which allows executing appropriate calculations.

**Materials and methods.** The computer program is written using Python 3.4.4 Integrated Development Environment (IDLE).

**Results and discussion.** Basic input parameters in the tasks under consideration are: confidence probability level, guess value of the expected frequency, and necessary precision of its estimate (width of confidence interval). At first the program gives user the possibility to choose one of confidence probability levels, which are most commonly used in practical researches (95%, 99% or 90).

To calculate the sample size, which is ample for expected frequency assessment, accurate within given threshold, we use formula:

$$n = \left[ Z_{\alpha/2}^2 \cdot \frac{p \cdot (1-p)}{I^2} \right],$$

where  $n$  – required volume of sample;  $p$  – expected frequency of feature occurrence in the population;  $I$  – a half of confidence interval width (precision of frequency estimation);  $Z_{\alpha/2}$  – standard Gaussian distribution quantile of  $\alpha/2$  order, where  $\alpha$  – type I error level (determined as 1 minus confidence probability);  $[\dots]$  – operation of rounding to the nearest greater whole number. In cases, when researcher

has no assumptions about specific value of the frequency expected, we use formula given above with  $p = 0.5$ . The current formula is most often cited in accessible literature sources as a single alternative to evaluate the necessary sample size for dichotomous variable expected frequency assessment in one sample. The formula is valid when the total size of the population is unknown or immense. On the other hand, in situations when we know the total size of the population, the required number of observations may be considerably less, if it is calculated by formula:

$$n = \left[ \left( \frac{1}{N} + \frac{4 \cdot I^2}{Z_{\alpha/2}^2 \cdot p \cdot (1-p)} \right)^{-1} \right],$$

where  $N$  stands for total population size.

If the researcher's task is not in obtaining the confidence interval for the frequency, but in confirmation of the hypothesis that the incidence of a feature of interest in population is not greater than some expected value, then in cases when total size of population is unknown or vast the following formula should be used to calculate the smallest necessary sample size:

$$n = \left[ \frac{\ln \alpha}{\ln(1-p)} \right].$$

For the same purpose another formula should be used if the total population size is known:

$$n = \left[ \left( 1 - \sqrt[N]{\alpha} \right) \cdot \left\{ \frac{1 + N \cdot (1-p)}{2} \right\} \right],$$

where  $\{\dots\}$  means integer part of a number. Moreover, the last two formulae are preferable in cases when the expected frequency is close to 0 or to 1 (100%).

In the proposed software tool the particular method of sample size calculation is selected proceeding from dialogue with the user, who specifies the goals and objectives of his experiment, and inputs certain parameters he wants to assess.

**Conclusions.** The proposed software for sample size determination in various alternative experiments, relating to assessment of a feature incidence in the population, is supposed to be useful for clinical researchers, market research analysts, research engineers, quality control specialists and many others in their professional activity. One of prospective and challenging directions of our investigations is the software enhancement to other tasks of sampling studies planning (central tendency and variation estimation for numeric variables, among-groups comparisons of quantitative and qualitative variables, correlation power assessment, etc.). Another prospective development direction is to upgrade present software tool user interface thought the instrumentality of object-oriented programming.

**THE NATIONAL CENTER FOR BIOTECHNOLOGY  
INFORMATION AS AN INFORMATIVE RESOURCE  
OF EVIDENCE-BASED MEDICINE**

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**Introduction.** A lot of researchers and young scientists in Ukraine are lacking the informative resources when they are performing their diploma or PhD projects.

**Aim.** The aim of our paper is to introduce The National Center for Biotechnology Information (NCBI) as informative resource for young scientists who are doing their projects in the area of evidence-based medicine and are keen to find some date to prove or disapprove the facts they has discovered.

**Materials and methods.** Data mining on the web.

**Results and discussion.** NCBI contains world's largest repository of medical and scientific abstracts, full-text articles, books and reports, as well as supporting resources for cataloging and indexing the materials on such medical topics as health, genomes, genes, proteins and chemicals.

The resources of NCBI include databases for use in clinical practice and medical research that contain information about human disease and pathology, including diagnostics and treatments. Any researcher can find genes associated with a condition, find variations with a clinical assertion for a condition, view genotype frequency for a gene or condition; catalogs and tools for bioactivity screening studies and a repository of chemical information, as well as a database of molecular pathways that provides links to relevant records in companion databases for participating compounds, proteins and genes.

To retrieve an article is very easy to do. The researcher should click on the desired record to display the abstract view. The researcher also can examine links to related articles, including reviews.

**Conclusions.** The National Center for Biotechnology Information is very powerful, advanced resource which provides access to biomedical and genomic information with very friendly and easy to use interface.

# FUZZY LOGIC OPERATIONS IN THE ENVIRONMENT OF OPEN OFFICE.org CALC

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**Introduction.** Fuzzy logic arose up, as the third wave of the intellectual programming, in connection with the necessity of creation of expert systems, able to work in the conditions of vagueness and fuzzy of initial information. Such the tasks arise up in medicine, biology, economy and other areas of scitech, where basic data are poorly mathematically described or unreliable. Bases of simulation of human intellectual activity were found at the sixty years of the last century by the American scientist L.Zade. According to principle of incompatibility, formulated L. Zade, for the systems complication of which is excelled by some threshold level, exactness and practical sense become almost eliminating each other descriptions. Fuzzy logic describes character of human thought and chain of his reasoning more naturally, what traditional formal-logic systems. In a general view fuzzy logic operates linguistic variables by rules, clear a man and near on a structure to the ordinary natural language. Basic advantages of this approach are a comfort of presentation of information and universality. According to Fuzzy Approximation Theorem, formulated B. Kosko, any mathematical model can be approximated the system, built on fuzzy logic. Presently fuzzy logic found practical application in the different spheres of scitech: in defensive applications, at the design of economical, political, exchange and extra-ordinary situations. On the basis of fuzzy neuron networks the systems of support of passing of decision are developed. This is expert systems with a minimum of preliminary analytical work of man-expert. For the decision of fuzzy logic tasks the special programs are created. The license software (Fuzzy Logic Toolbox, Fuzzy TECH, CubiCalc) are requiring the special preparation of user. The software package FuziCalc, uniting the mathematical apparatus of fuzzy logic with spreadsheets, is presented particular interest. FuziCalc has a friendly interface, analogical an interface of Excel, acquaintance to the users. Its feature is possibility of description of fuzzy object in a cell, noting the object as «fuzzy» and building function of object distribution in the special window. In connection with inaccessibility of this commercial package in educational process are presented actually analysis the possibility of work with fuzzy data in freeware spreadsheet.

**The goal** of work is researching the methods of solving of fuzzy logic tasks in the environment OpenOffice.org Calc.

**Operations with fuzzy information.** Let fuzzy logic variables of  $A$  and  $B$  with the functions of belonging  $\mu_A$  and  $\mu_B$  on the interval of  $u \in [0,1]$  set as discrete



fuzzy sets with pointing of degrees belonging of separate values, then basic actions with them are determined the operations of fuzzy conjunction ( $AND - \cap$ ), disjunction ( $OR - \cup$ ), negation ( $NOT - \bar{A}$ ) and implication ( $\Rightarrow$ ):

$$\mu_{A \cap B}(u) = \min(\mu_A(u), \mu_B(u))$$

$$\mu_{A \cup B}(u) = \max(\mu_A(u), \mu_B(u))$$

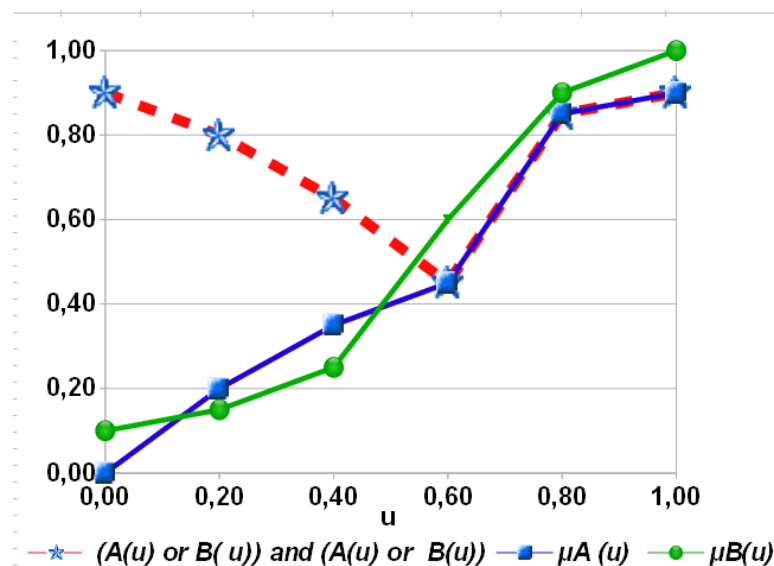
$$\mu_{\bar{A}}(u) = 1 - \mu_A(u)$$

$$\mu_{A \Rightarrow B} = \max(1 - \mu_A(u), \mu_B(u))$$

In a table resulted: interval of determination  $u$ , functions of belonging  $\mu_A$  and  $\mu_B$  of fuzzy logic variables  $A$  and  $B$ , and also sequence and results of calculation of expression  $(A(u) \cup \bar{B}(u)) \cap (\bar{A}(u) \cup B(u))$

	C	D	E	F	G	H	I	J
<b>u</b>	<b><math>\mu_A(u)</math></b>	<b><math>\mu_B(u)</math></b>	<b><math>\bar{\mu}_B(u)</math></b>	<b><math>\mu_{\bar{A}u}</math></b>	<b><math>\bar{B}(u)</math> or A</b>	<b><math>\bar{A}(u)</math> or B</b>	<b><math>(A(u) \cup \bar{B}(u))</math> and <math>(\bar{A}(u) \cup B(u))</math></b>	
0,00	0,00	0,10	0,90	1,00	0,90	1,00	0,90	
0,20	0,20	0,15	0,85	0,80	0,85	0,80	0,80	
0,40	0,35	0,25	0,75	0,65	0,75	0,65	0,65	
0,60	0,45	0,60	0,40	0,55	0,45	0,60	0,45	
0,80	0,85	0,90	0,10	0,15	0,85	0,90	0,85	
1,00	0,90	1,00	0,00	0,10	0,90	1,00	0,90	

On this drawing the initial data -  $\mu_A, \mu_B$  and the end-point of calculations are shown.



**Conclusions.** The described method allows successful solving educational fuzzy logic tasks in the environment spreadsheets of free software OpenOfficeorg.Calc.

# THE ROLE OF MATHEMATICAL CALCULATIONS IN ASSESSING THE EXERCISE IMPACT ON SCHOOL-AGE CHILDREN'S ORGANISM

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**Introduction.** Mathematics is an extremely powerful and flexible tool in the study of the world around us. It is the queen of sciences, since its application can be found in every sphere of human activity. In particular, a set of numbers is constantly applied in the daily life of each person. Therefore, on today's a day the issue of the day is role of mathematical count at the estimation of influence of the physical loading on the organism of children of school age.

**Aim.** Mathematically to estimate influence of the physical loadings on work of heart of man, and also to pay regard to method of Rufe, determining level of the physical loading for a man without a risk for his health.

**Materials and methods.** Experiments conducted among 1000 students of school age during engaged in a physical culture. Research was conducted with the observance of ethnic norms and rules of conduct with teenagers.

**Results and discussion.** Studies have shown that the quantitative ratio of cardiovascular (CV) diseases rank first among all adolescent ailments and make up 35.9%. It should be added that 83 - 85% of teens have a poor performance in the functional tests. The main diseases of the cardiovascular system are mitral valve prolapse (MVP) constituting 47.1%, in second place - cardio psychoneurosis (CPN) - 26.8%, and the third - vascular dystonia (VD) - 17.9%.

In most cases after the detection of a secondary schoolchild or teenager's high blood pressure (HBP) or hypertension (HT), drug treatment is not applied, though non-pharmacological treatment and observation are recommended. However, in cases where non-pharmacological therapy is ineffective, medication and non-drug therapy are administered simultaneously.

It should be noted that the pharmaceutical industry is the most important link in the treatment of adolescents, as it is extremely difficult to cope with any disease without the help of drugs. The choice of drugs in adolescence and young age should also take into account the peculiarities of hypertension pathophysiology, the presence of risk factors for cardiovascular diseases, the presence of comorbid conditions

(obesity, diabetes, disorders of the autonomic nervous regulation, renal functioning, and others).

In addition, the criteria for drugs selection include: drug efficacy, side effects, cardio protective effect of the drug, the number of doses per day, the cost of the drug. Concerned parents may also begin to self-medicate, which can cause further problems, as they should start with the lowest dose of the drug to reduce the adverse side effects. Increase of the dosage is also possible. Subsequently, a decision on replacement of a drug or a combination of therapies is made, depending on drug tolerability and its antihypertensive effect.

It is necessary to mention that 7 major classes of antihypertensive drugs are used in the current long-term treatment of hypertension in different age groups: diuretics, b-blockers, calcium channel blockers, angiotensin converting enzyme inhibitors, angiotensin receptor antagonists II, a-blockers, and centrally acting agents. Diuretics occupy the honorable first place among these agents, which in principle do not differ in anti-hypertensive action. Moreover, judging from the degree of influence on the endpoints of hypertension in young patients, risk factor was more significant than the increase in general cholesterol level. This study marked the beginning of new goals in the prevention of CVD since adolescence. It became obvious that hypertension in adolescents should be cured as soon as possible – not only for improvement of the quality of patients' life, reduction of blood pressure and existing symptoms, but also for long-term prevention of cardiovascular diseases.

**Conclusions.** It can be concluded that a number of studies make us look at the problem in a new way and to draw attention to the need for the diagnosis of hypertension in adolescents, taking into account the risk factors that will help to determine the prognosis and tactics. Therefore, such examination by skilled workers and the choice of drugs on the advice of the pharmacist will lead to the best results.

# MULTIELEMENT LIGHT SOURCES FOR ATOMIC ABSORPTION ANALYSIS

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**Introduction:** Optimization of design parameters of spectral light sources allows to extend the use of the spectral analysis, and in particular in the multi-channel devices atomic absorption analysis.

**Objective:** The actual problem of atomic absorption analysis in medicine and pharmacy is the creation of multi-spectral light sources. The use of multi-element lamps eliminate the need for a change of light sources in the restructuring of the analyzer on the various elements thereby reducing the analysis time.

**Materials and Methods:** Use as a spectral light sources, hollow cathode lamps due to the advantages of this form of discharge as the almost complete absence of the field and the low temperature of the gas in the negative glow.

The discharge of the hollow cathode allows to initiate intensive and at the same time sufficiently complete spectra of neutral atoms and ions with narrow lines is almost completely free of the broadening due to the Stark and Doppler effects. Due to the peculiarities of the discharge mechanism of the hollow cathode discharge are present in the spectrum of the arc and spark lines as the main gas and cathode material.

**Results and discussion:** Usually atomic absorption spectrometer contains multiple light sources, selectable using a stepper motor. This causes an additional error source when changing. There are multi-element design of lamps with multiple cathodes within one tube. The disadvantage of such structures is a significant increase in lamp size and partial diaframirovannie emission cathodes distant.

Additionally, you must rebuild the optical system control device for the removal of various cathodes. It is proposed to use a coaxial cylindrical hollow cathode instead of the cathode for the creation of a multi-element light source for spectral analysis. Along the axis of the cathode cavity accommodate 5-6 bars of equal length cathodes made of different materials. The diameter of the rods must be minimal, but to a certain size so that it does not lead to the heating

and deformation of the rods. The radius of the circle on which the rods must be located advisable to take equal to half the radius of the cathode polosti. Eto due to the fact that the bars do not extend beyond the region of negative glow that can reduce the radiation intensity. Accommodation close to the axis of the rods leads to mutual screening rods from the ions coming from the negative glow, which can also reduce the intensity of the radiation.

The current density of the rod of the cylinder can exceed the current density of the order. Therefore rod sprayed more intensively than the cylinder, hence at small discharge currents will occur in the spectrum lines of the material web and the cylinder are fixed line material.

Thus, a compound of one of the cylinder rods to the cathode leads to a source line in the spectrum of radiation material rod. To change the form of the spectrum is only necessary to connect to the cathode corresponding rod

**Conclusions:** The proposed design of the light source it is possible to control the intensity of the emission spectra of different elements at a constant discharge current by applying the rod of a building. The proposed multi-element light source can be used in devices for multi-atomic absorption analysis.

# TESTING OF THE SPECIFICATION OF ECONOMETRIC MODEL

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**Introduction.** Economic theory, the provisions of which are used in the selection of regressors, is not perfect. So often in the econometric model includes factors that should not be there, and do not turn on the factors that must be present there.

Proper specification of the econometric model indicates that

- choose the right function for the relationship between the independent and dependent variables;

- excluded from the model covariates insignificant and unimportant;

- the model includes all relevant and significant covariates.

Violation of the last of these conditions leads to very unpleasant consequences:

- estimation of the regression parameters are biased and unfounded;

- checking the quality of the model hypotheses and the construct confidence intervals for the parameter estimates are incorrect.

**Aim.** We will consider the Ramsey test (RESET test), one of the few ways of testing specified violations specification model and its implementation in a software environment R.

**Materials and methods.** The test is based on the auxiliary regression of the dependent variable on factors  $x_1$ ,  $x_2$  of the original model and power functions of the estimated values variable  $\hat{y}$ :

$$y = b_0 + b_1x_1 + b_2x_2 + a_1\hat{y}^2 + a_2\hat{y}^3 + \dots + a_m\hat{y}^m + e$$

Further, it is necessary to check a hypothesis by the corresponding F-test:

$$H_0: a_1 = a_2 = \dots = a_m = 0$$

If value of statistics is more critical, then the zero hypothesis is rejected, and the specification of model is recognized incorrect. Otherwise, the initial set of factors is considered accepted.

**Results and discussion.** The considered scheme of testing of the specification of econometric model is realized in many software products, in particular in the program environment R.

R is a programming language and software environment that is used to perform statistical calculations and construction of graphical objects. R is open source software that is freely distributed under GNU license. GNU license agreement gives you a right to make a free copy, modify, and distribute the code. The main ideas of R CRAN (Comprehensive R Archive Network, <http://cran.r-project.org>) system are constant expansion, collective testing and prompt distribution of applied data processing tools. R is distributed free of charge, and now it is the de facto standard for statistical computing.

Ramsey's test is realized in a package `lmtest` (Testing Linear Regression Models).

Usage:

```
resettest(formula, power = 2:3, type = c("fitted", "regressor", "princomp"), data = list())
```

Arguments:

<i>formula</i>	A symbolic description for the model to be tested (or a fitted "lm" object).
<i>power</i>	Integers. A vector of positive integers indicating the powers of the variables that should be included. By default, the test is for quadratic or cubic influence of the fitted response.
<i>type</i>	A string indicating whether powers of the fitted response, the regressor variables (factors are left out), or the first principal component of the regressor matrix should be included in the extended model.
<i>data</i>	An optional data frame containing the variables in the model. By default the variables are taken from the environment which <code>resettest</code> is called from.

**Conclusions.** In the present message Ramsey's test and his realization in the program environment R is considered.

# MATHEMATICAL MODELING OF IMMUNE RESPONSE IN INFECTIOUS DISEASE (SUBCLINICAL FORM)

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**Introduction.** The studies in theoretical immunology on the basis of mathematical models are considered nowadays as a priority direction in the investigations of complex systems in biological sciences which is supported by the European Science Foundation and the European Society of Mathematical and Theoretical Biology. Aspects of an organism's defense against viral and bacterial infections and the reaction of immune system to infection are the main problems in practical immunology. Understanding of regularities in immune response provides the researchers and clinicians new powerful tools for the stimulation of the immune system and for increasing its efficiency in the struggle against antigen invasion. In this connection the construction of mathematical models of immune response to an antigen irritant is considered as the only right tactics in the cognition of the above regularities.

The **aim** of the work is to develop the simple mathematical model of subclinical form of infectious disease on the basis of an equilibrium relation for each component that participates in an immune response (antigen, antibody, plasma cell, and degree of damage of an organ subjected to antigen attack).

**Materials and methods.** The mathematical model must adequate represent the immunological models based on theoretical and experimental conceptions on the defense system of organism. Indeed, in designing the simplest model of immune defense we have used the main conception of immunology: an antibody binds an antigen and forms antibody-antigen complexes. In proportion to the quantity of these complexes, plasma cells are formed in an organism in a time  $t$  which carry out the mass production of antibodies. The quantity of plasma cells forming in response to antigenic stimulation depends on the viability of the affected organ: the more severe is the damage to this organ the less is the quantity of plasma cells because of the deficiency arising that affects the immune defense activity. It is seen that many details are missing in this model; however, all the essential components of the immune defense mechanism are taken into account.

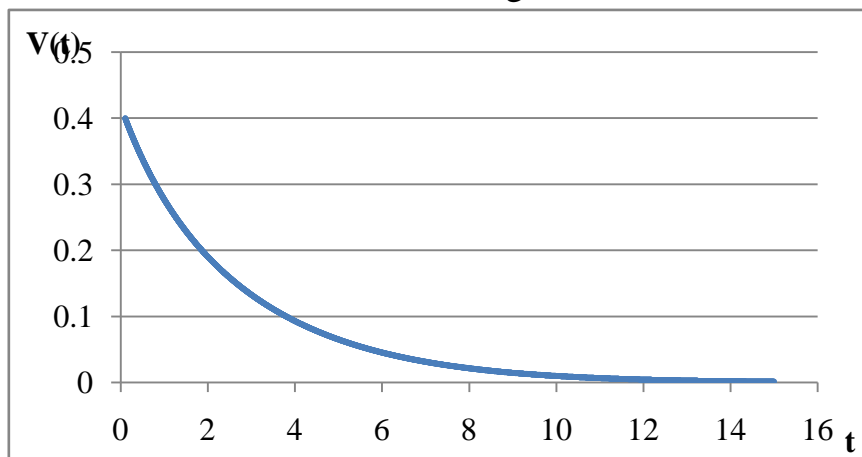
The basic acting factors of an infectious disease are: 1) concentration of pathogenic multiplying antigens,  $V(t)$ ; 2) concentration of antibodies,  $F(t)$ ; 3) concentration of plasma cells,  $C(t)$ ; 4) relative characteristic of affected organ,  $m(t)$ . So, the simple mathematical model of infectious disease is represented as the system of nonlinear differential equations:



$$\begin{cases} \frac{dV}{dt} = (\beta - \gamma F)V \\ \frac{dC}{dt} = \xi(m)\alpha V(t - \tau)F(t - \tau) - \mu_c(C - C^*) \\ \frac{dF}{dt} = \rho C - (\mu_f + \eta\gamma V)F \\ \frac{dm}{dt} = \sigma V - \mu_m m \end{cases}$$

This system of equations describes the dynamics of pathologic infection development during immune response.

**Results and discussion.** Subclinical form of infectious disease is usually latent and is not connected with physiological disorder of an organism. It is usual contact of an organism with a familiar antigen, and the organism has the resources sufficient to suppress the antigen: specific immunoglobulin, lymphocytes, interferon, macrophages, and other components of the immune system. In this case the proliferating population of viruses or bacteria is suppressed by available resources and the antigen is destroyed before it reaches the concentration level that provokes noticeable immune and physiological reactions of the organism. The pathogen population dynamics in this case is shown in Fig. 1.



*Fig. 1. Antigen concentration dynamics in case of subclinical form of disease*

The simple mathematical model of subclinical form of infectious disease, of course, is extremely approximate and requires further detailed elaboration. However, even in this form it allows one to include in the system various essential factors of infectious disease dynamics.

**Conclusions.** Realization of simple mathematical model of subclinical form of infectious disease with the help of spreadsheet LibreOffice Calc allows computing the main parameters of disease and representing them graphically. This model is useful for exploration of general picture of a disease course and for explanation of some results of observations. Some theoretical results may be used in searching for effective methods of treatment.

# EFFICIENCY OF PREPARATION "FLEBODIA" IN TREATING PATIENTS WITH CEREBRAL VENOUS DISORDERS OF VARYING ETIOLOGY

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**Introduction.** When violations of cerebral circulation the most important pathogenetic significance insufficient blood flow to the tissues of the brain in the pool stenotic or occluded artery and the failure or delay of venous outflow. Venous stasis in the brain is the most common form of venous disorders of cerebral circulation in a number of organic diseases of the brain. The high degree of dependence of vascular encephalopathy (DE) from venous congestion, which in these patients is total (by type of general phlebopathy) character. This raises the problem of fighting with venous stasis in patients with ED as a priority.

**Aim.** In this regard, we conducted a study whose purpose was to investigate the clinical efficacy and tolerability Phlebodia 600 mg, manufactured by "Innotech" France, in patients with cerebral venous disorders.

**Materials and methods.** We examined 30 patients with various diseases (essential hypotension, headache, effects neuroinfections, atherosclerosis), accompanied by cerebral venous disorders in age from 19 to 45 years (including 18 women and 12 men). Cerebral venous pathology is common in women by almost 2 times more often than men, and developed under the age of 40 years. In most patients, disease duration ranged from 1 year to 10 years (73%). Confirmed by venous dysfunction rheographic study, Doppler, registering spontaneous retinal vein pulsation dynamics.

**Results and discussion.** All patients were administered 600 mg Phlebodia 1 tablet per day, in the morning 30 minutes before breakfast for 30 days. Evaluation of clinical manifestations was performed using a questionnaire patients. Severity of symptoms on a 5-point scale: headache, ringing in the head, visual disturbances, morning facial swelling, puffiness under the eyes, skin cyanosis of the face sheets, memory loss, unsteadiness of attention, sleep disturbances. Take into account the dynamics of REG and TKD, spontaneous retinal vein pulsation.

**Conclusions.** Take this medicine most patients contributed to a decrease in headaches, dizziness, noise in my head, visual disturbances, improve memory, attention, sleep normalization formulas and neurological symptoms. There was a statistically significant dynamics of REG as improve blood supply in all vascular beds, enhance venous drainage, the reduction of elevated vascular tone and blood supply of asymmetry. Positive dynamics observed in the form of an increase in the LCS vessels carotid and vertebral arteries.

# COMPUTERS METHODS OF TREATMENT OF INFORMATION AT ANALYSIS OF ANNUAL RINGS OF TREE

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**Introduction.** Annual rings are the of growth woods, which are visible on the transverse sections of trunk, branches and roots of arboreal plants. The width of annual rings depends on the temperature of environment, amount of falling precipitations out, number of suns days and etc Age of plant influences on the thickness of rings. It is possible to define age of tree, and a climate and weather on the amount of annual rings and their width.

**Aim.** The ordinary methods of measuring of width of rings occupy heap of time. The computers methods of registration, measuring and analysis of rings are offered in our work.

**Materials and methods.** The following algorithm is offered:

1. A digital camera does the picture of cut of tree.
2. A two-dimension numerical matrix which describes the image turns out by the mathematical program.
3. A column or of matrix, which is describing the distributing of intensity along a diameter, is selected.
4. The co-ordinates of maximums (or minimums) of intensity, which is describing the annual rings, are determined.
5. The width of annual rings is calculated. The graph of dependence of width of rings on time is built.
6. The graphs of width of rings, temperature of environment, amount of precipitations are compared.
7. The climatic descriptions of the explored temporal interval are determined (changes of temperature, precipitations and etc) by mathematical models.
8. The prognosis of further changes of climate in the looked region after is done.

**Results and discussion.** Offered and tested computers methods of measuring of width of annual rings of tree and data processing.

**Conclusion.** The use of digital chamber and mathematical computer programs allows to improve the process of measuring of annual rings of tree and treatment of the results.

## SCILAB. CREATING GRAPHICAL APPLICATIONS

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**Introduction.** Scilab - a package of applied mathematical software provides an open environment for engineering and scientific calculations. It is the most complete publicly available free alternative to MATLAB and Mathcad. Scilab includes hundreds of mathematical functions, and also have the opportunity to add new, written in different languages (C +, C ++, Fortran, Turbo Pascal, Visual Basic). There are a variety of data structures, an interpreter and a high level language.

**Aim.** In this article, we consider using of Scilab for creating graphical window using the appropriate command-line, the main purpose of which is to call a function that responds to a mouse button.

**Materials and methods.** Personal computer and Scilab v.5.2.2 program.

**Results and discussion.** As an example, in this work were created programs that allow you to create windows with different buttons, when you click on that box to run the window with the schedule of function. All this is exemplified by features such as:  $y = \sin 2x$ ,  $y = \cos x / 3$ ,  $y = \arctg 3x$ .

Also in this program provides the creation of labels, tags and switching component, which are used for displaying character information, switching between states or turning off one of the properties. Example shows the use of switches on the program in which you can select the function by a switch, whose graph is reproduced in a separate graphic window, by clicking on created button.

**Conclusions.** As a result of work, some conclusions can be drawn. At first, the program is completely free. Next - it is compatible with different operating systems (such as Windows, Linux and Mac OS). The program has small size, depending on the version (from 20 to 117 MB). This program is very easy to use.

Input language of Scilab allows using not only the built-in commands, but also developing their own visual applications. Creating windows, buttons, checkboxes and labels facilitates solving mathematical and engineering equations of any complexity.

# MATHEMATICAL BASICS OF EVIDENCE-BASED MEDICINE

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**Introduction.** Medical researches spend all over the world. Some of them form the basis for new recommendations. But how effective and safe the new recommendations? This problem solves evidence-based medicine.

**Aim** of this article is a review of mathematical methods underlying evidence-based medicine.

**Results and discussion.** Evidence-based medicine eliminates the evaluation results of the studies of human bias. It is accomplished by transfer bias at random with subsequent mathematical processing. Modern design evidence-based medicine consists of the following principles.

1. The homogeneity of the groups is random selection and strict control criteria.
2. Triple control is, when the patient, physician and statistician do not know use of the drug or the method.
3. A sufficiently big size of the sample to achieve the required accuracy.
4. The direction of research is to prevent endpoints and improved quality of life.

Modern statistical treatment varied. They are used as parametric and non-parametric methods. For medical researches of properties, which abnormally distributed used nonparametric methods such as, for example, Mann–Whitney's U test, Kruskal-Wallis's test, McNemar's test, Friedman's test, Cochran's test and others.

For the interpretation of the results of research are widely used assessment of the relative risk (RR) and the odds ratio (OR). RR and OR are used to compare the probability of the outcome depending on the availability factor. At risk is the ratio of the studied, with particular feature  $D$ , a sample volume  $D + H$  and at odds is the ratio of the test with a sign  $D$ , to the number study that do not have this feature  $H$ .

Consequently, we have  $RR = \frac{D_e(D_c + H_c)}{D_c(D_e + H_e)}$  and  $OR = \frac{D_e H_c}{D_c H_e}$ , where index  $e$

corresponds to the experimental group and  $c$  to the control group.

The confidence interval of the natural logarithm of the RR and OR are

$$\ln(RR) \pm U_{1-\alpha/2} \sqrt{\frac{H_e}{D_e(D_e + H_e)} + \frac{H_c}{D_c(D_c + H_c)}} \quad \text{and}$$

$$\ln(OR) \pm U_{1-\alpha/2} \sqrt{\frac{1}{H_e} + \frac{1}{D_e} + \frac{1}{H_c} + \frac{1}{D_c}},$$

where  $U$  is quantile Gaussian distribution.

Confidence intervals RR(OR) and compliance with the design of medical research determine a rating system for evaluating clinical research into I, II, III, IV classes and A, B, C, D levels. The class indicates the degree of predominance of the usefulness of the risk, and the level of confidence result.

A special place in modern studies takes systematic reviews and meta-analysis. A systematic review is a special kind of scientific research, where the objects of study are the results of other studies. Meta-analysis is a method of secondary statistical processing of the results of different studies on the same problem. High-quality meta-analysis involves the study of all the studies dealing with the corresponding problem, assess heterogeneity and identifying information content of the main results of the sensitivity analysis by. Sensitivity analysis technique is to modify selected parameters within certain limits if the other parameters remain unchanged.

With the results of medical research can be found on the resource Pub Med of [ncbi.nlm.nih.gov](http://ncbi.nlm.nih.gov) or site [trialresultscenter.org](http://trialresultscenter.org).

**Conclusions.** Thus, the evidence-based medicine results overturn our understanding of existing methods and guidelines medicine. Therefore, evidence-based medicine concept, based on the achievements of mathematical statistics, demand for modern scientific world, pharmaceutical companies and public.

## **SOME OF ASPECTS OF APPLICATION OF DIFFERENTIAL OF EQUATION IN MEDICINE AND PHARMACY**

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**Introduction.** Theory of differential equations is one of the biggest topics of modern mathematics. It has many links with different Sciences, particularly in medicine and pharmacy that today is a very important issue.

Research objective – to conduct theoretical analysis of applications of differential equations in medical and pharmaceutical research.

**Materials and methods.** To solve this problem there were used theoretical methods of research (studying and analysis of scientific literature to determine the status of the development and theoretical rationale for the study). The theory of differential equations is one of the largest branches (sections) of modern mathematics. She has many ties with the different sciences, especially in medicine and pharmacy.

As it is known, in the performance of their professional duties medical workers and pharmacists often have to produce a different mathematical calculations. From the correctness of the calculations carried out depends on the health and occasionally the life of patients. Very often in the laboratory practice have to meet with cases of preparation of solutions with a certain mass fraction of solute, mixing the two solutions of different concentrations or by diluting the strong solution with water.

That differential equations were used to build the apparatus "artificial kidney", as the hemodialysis process (i.e. blood purification using an artificial kidney) is described by a system of differential equations. In addition, the differential equations are used in particular for determining blood flow velocity, the velocity of the heart walls and valves, determining the viscosity of blood and other hemodynamic parameters; for description of biomedical applications of ultrasound( ultrasound, ultrasonic physiotherapy, ultrasonic cardiography and location); for describing the processes of physiological acoustics, which studies the device and work of soundaccepted and soundproduced bodies of humans and animals; for determining function of changes in amount of microorganisms population depending on time.

**Conclusions.** Thus, referring to the famous Gauss, who said, "Mathematics is the Queen of Sciences" it can be elained that mathematics as a science has found its reflection in many areas of science, in particular medicine and pharmacy.

# THE DETERMINATION OF THE OPTIMAL STRUCTURE REGRESSION MODEL

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**Introduction.** It is known that the inclusion of an econometric model of additional factors (explanatory variables) always leads to an increasing the coefficient of determination  $R^2$  and to reducing the sum of squared residuals model  $RSS$ . Thus, it is an "improvement" of a model. However, the extra factors reduce the efficiency of the model parameter estimations, and lead to the expansion of the confidence intervals of these estimations.

**Aim.** The purpose of this paper is to analyze the ways to optimize the number of explanatory variables in the regression models.

**Materials and methods.** The advisability of adding of a new group of regressors is usually determined by one of embodiments of Wald's test. We compare long and short regression (long contains additional explanatory variables). There is a decrease of sum of squares of residues in the transition from short to long regression (from  $RSS_k$  to  $RSS_m$ ). It means regression becomes more accurate. The essential question is whether it compensates the decline? The null hypothesis assumes the simultaneous vanishing of the coefficients of these variables. The corresponding F-statistics is as follows:

$$F = \frac{(RSS_k - RSS_m)/(m - k)}{RSS_m/(n - m)}$$

where  $k$  - the number of regressors in the short (restricted) regression,  $m$  - quantity of regressors in a long (unrestricted) regression,  $n$  - number of observations.

If the calculated value of F-statistics is larger than  $F_{kp} = F_{1-\alpha}(m - k, n - m)$ , where  $\alpha$  - significance level, long regression is significantly better (null hypothesis is rejected).

The present approach is quite cumbersome in terms of its implementation. At the same time to solve the problem, you can use the so-called punitive criteria for determining the quality of the constructed regression models, which are easier to use. The most popular criteria are the Akaike information criterion AIC and Bayesian information criterion (Schwarz criterion) BIC.

For the linear, multiple regression model Akaike criterion value is calculated using the following formula:

$$AIC = n \ln(RSS/n) + 2p$$



where  $n$  - number of observations,  $p$  - the number of model parameters,  $RSS$  - the sum of squared residuals model obtained in the evaluation of the coefficients of the least squares' method.

Schwartz criterion is:

$$BIC = n \ln(RSS/n) + \ln(n) p$$

**Results and discussion.** By increasing the number of explanatory variables, the first term on the right side is reduced and the second is increased. Consequently, the criterion rewards approach for the quality of approximation and penalizes for excess of explanatory variables. Among several alternative models, one is preferred in which value of  $AIC$  and  $BIC$  are smaller.

The prediction model is the better, the lower the  $AIC$  and  $BIC$  are. Reduction of the residual dispersion positively influences on these criteria and the number of enabled parameters influences negatively. The main difference between them is the degree of stiffness, i.e. the value of the penalty for a large quantity of factors in the model.

$BIC$  is more stringent criterion. As we can see from the formula above, its stiffness increases with increasing of  $n$ . Thus  $AIC$  is more focused on the accuracy of the forecast, and  $BIC$  - to minimize the number of covariates.

The analyzed approaches about solving of problem of obtaining the optimal structure of the regression models have their drawbacks. As a part of the algorithm associated with the consideration of statistical hypotheses, it is possible only pairwise comparison of models with different numbers of factors. Thus, analysis of  $\sim m^2$  pairs of hypotheses is needed ( $m$  - the maximum quantity of factors). Approach, connected with using of punitive criteria, has no such a drawback. Each set of explanatory variables meets one criterion value. Therefore in the analysis we have to deal with a relatively small number ( $m$ ) of values of used criterion. At the same time this approach is too simplistic and not sufficiently well-grounded.

**Conclusions.** It is presented that the penal criteria can be used in the initial phase of construction of a regression model by the primary determination of its structure.

## THE STUDY OF "CHAOS GAME" MODEL

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**Introduction.** An example of a mathematical experiment invented by Barnsley and informally called the Chaos Game is examined. Playing board for the game is an equilateral triangle. The game is in placing points on the plane, starting from some arbitrary point. Every next point is plotted as a midpoint of a segment, which connects previous point with a random vertex of the triangle. No matter where initial point is, after some transient regime ( $\approx 50$  steps), the process draws a shape called the Sierpinski triangle, which is an infinite number of triangles inside the larger triangle. Increasing the resolution allows watching more smaller and tiny triangles. Thus, local randomness and global determinism create a stable self-similar structure, which is important feature of fractals.

Let us examine the algorithm in more detail. What is random, what is not? This algorithm operates with three nonrandom points (vertices of a triangle), and it is indicated that each next segment should be divided in two equal parts (not randomly). The randomness is in setting the initial point and in a choice of a vertex.

**Methods.** Computational investigation of more general model was performed in MathCAD. The choice of the software was caused by availability of appropriate and convenient functions for modeling. Thus, the functions ensemble  $\text{Ceil}(\text{runif}(n,0,M))$  finds a random array of vertices for a polygon with  $M$  vertices at short notice, and, we only should compute the coordinates of the midpoints of segments. This is the obvious generalization to the case of more than three vertices and division of segments into two unequal parts.

Calculations for generalized model of the Chaos Game were performed. 100,000 points were generated for each game, and it provides good image resolution. Models with different initial points and different number of nodes were investigated. The resulting figure does not depend on the initial point. Rotation of vertices by a certain angle about the axis perpendicular to the plane of the plot causes rotation of all the figures by the same angle. For polygons with 4, 5, 6 or more vertices self-similar fractal shapes appear when new points deviated from the midpoint.

**Conclusions.** The examined models are demonstrable examples of reciprocal action of local randomness and global determinism. Markets behavior is similar to the Chaos Game. Markets can be random locally, but they have a global statistical structure that is non-random.

## FINANCIAL STABILITY INDICATORS USE FOR STRATEGIC PLANNING

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**Introduction.** The major problem of firm operating is to ensure the further development. Strategic planning allows to consider all alternatives and choose the best one. Strategic plan should be based on reliable financial indicators.

**Aim.** The paper investigates financial stability indicators' influence on firm's development and strategic plan preparation.

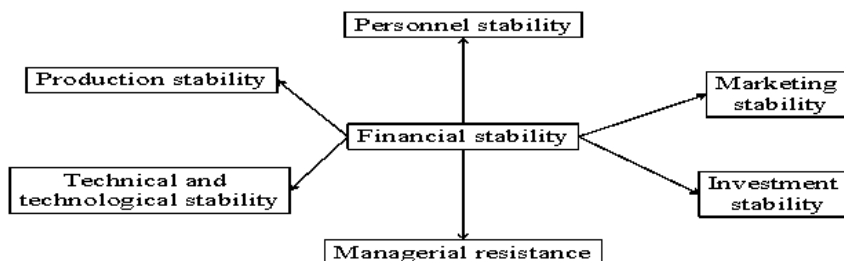
**Materials and methods.** Strategic management makes it possible rationally to use human potential, to take into account consumer demand, to provide flexible control and to achieve competitive advantage. The strategic management includes: analysis of conditions in which the firm operates; formation of goals; choice of optimal strategy; strategy implementation and assessment of results. Each firm should build its own development strategy. The main types of strategies are presented in Table 1.

**Table 1**

Strategies types	
Criteria depending on:	Strategies types
development scale	<ul style="list-style-type: none"> <li>✓ general strategy;</li> <li>✓ supporting strategies;</li> </ul>
activities	<ul style="list-style-type: none"> <li>✓ marketing;</li> <li>✓ operating;</li> <li>✓ financial;</li> <li>✓ investment;</li> <li>✓ strategy of other activities;</li> </ul>
resources' type	<ul style="list-style-type: none"> <li>✓ manpower use strategy;</li> <li>✓ core strategy and logistics;</li> <li>✓ strategy of equity capital;</li> <li>✓ strategies to attract debt capital;</li> </ul>
growth rates	<ul style="list-style-type: none"> <li>✓ accelerated growth strategy;</li> <li>✓ limited growth strategy;</li> <li>✓ strategy of status conservation;</li> <li>✓ reduction strategy.</li> </ul>
ways to ensure development	<ul style="list-style-type: none"> <li>✓ concentrated development strategy;</li> <li>✓ diversified development strategy;</li> <li>✓ integrated development strategy.</li> </ul>

**Results and discussions.** Financial stability is one of main characteristics of firm. It depends on operational results, firm's active and effective response to

changing internal and external factors. There are the following types of economic stability: internal, external, hereditary, general and financial. The main components of financial stability are presented bellow.



**Fig. 1.** Financial stability influence on firm’s economic viability

Analysis of financial stability is based on a combination of analytical methods and rules of business research. It helps to get the most complete assessment of financial stability and profitability. Financial stability analysis of the company's activities is implemented through the calculation and assessment of such factors: financial autonomy coefficient, financial dependence coefficient, financial risk coefficient, maneuverability equity ratio, factor structure covering long-term investments, long-term fundraising ratio, and financial independence capitalized sources coefficient. The company may have different financial stability, which is divided into four types (Table 2).

**Table 2**

Financial stability types

Financial stability type	Solvency
Absolute stability	High: the firm don’t lack loans
Normal stability	Normal: efficient use of borrowed funds
Unstable state	Violation: necessary to attract additional sources
Crisis	Insolvency – bankruptcy stage

Effective management strategies development is possible as a result external and internal environment analysis. Only factors management, that ensure the financial stability of the company, provide an opportunity to build a strategy aimed at sustainable development and reduces risks. If the company is financially stable, it has an advantage over other companies of the same profile and investments in obtaining loans, selecting suppliers and selection of qualified personnel. Stable financial position is the result of competent, skilled strategic management of business enterprises.

**Conclusions.** Using indicators of financial condition is crucial in assessing the internal environment, and the definition of enterprise financial stability directly affects the development of strategic management. Only management factors that ensure the financial stability of the company provide an opportunity to build a strategy aimed at sustainable development and reduces risk.

**SECTION № 19**

**COMMODITY RESEARCH**

## THE EFFECTIVENESS OF DENTAL FLOSS USE

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**Introduction.** Proper oral care is essential to maintain the health of teeth, oral hygiene and human health. In our time there is a lot of modern means appeared. One of them - is dental floss, as by means of a toothbrush and toothpaste, not all tooth surfaces can be cleaned efficiently and interdental spaces are often left neglected.

**Aim.** The purpose of this study is to evaluate the effectiveness of prophylactic action of dental floss to prevent caries and gingivitis, bleeding reduction and elimination of unpleasant odor from the mouth, as well as to explore the range of dental floss.

**Materials and methods.** The analysis of the pharmaceutical market of dental floss has been carried out and their prophylactic action effectiveness has been studied.

**Results and discussion.** Dental floss - is an additional tool of oral hygiene, which is used for cleaning the interdental spaces and provides prevention of caries and periodontal diseases occurrence.

There is currently a large number of dental floss, which are classified according to the following parameters: shape flat (for narrow gaps), round (used for wide gaps), belt (used for cleaning teeth with even larger gaps); surface treatment - waxed (wax impregnated), unwaxed (better cleaning), with a special Teflon coating; by the presence of impregnation - not impregnated impregnated (perform, except for the cleaning, treatment and preventive function, preventing dental caries); by purpose - for personal use, for research in conditions of a dental office; by thickness (the thickness of the thread used depends on its purpose and severity of the interdental spaces); by type of material - silk, synthetic fibers (cellulose acetate, nylon).

The issue of dental floss efficiency is currently very relevant. Because its use reduces the risk of caries and gum disease, preventing the accumulation of plaque, which is a sticky film of bacteria, fueled by carbohydrates, which uses in his diet every person. If you let the process take its course, the bacteria eventually begin to erode the tooth surface, that results in occurrence of painful cavities.

**Conclusions.** The use of dental floss - an important part of oral care in addition to the brush and paste. Proper use of floss helps get rid of bad smell from the mouth, the threat of caries and gum diseases.

# REQUIREMENTS TO COSMETIC PRODUCTS IN NIGERIA BY NAFDAC

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**Introduction.** Consumers of cosmetic and personal care products are protected by strong safety requirements laid down in cosmetics legislation. At the same time, manufacturers should use the best science and latest available research data to prove the safety of a cosmetic product before it is placed on the market. Some cosmetic products deserve special attention from regulators due to their scientific complexity or higher potential risk to consumer health.

The general requirements to cosmetic products in Nigeria is foreseen and ensured by the regulatory body known as National Agency For Food and Drug Administration and Control (NAFDAC). NAFDAC was established by Decree 15 of 1993 as amended by Decree 19 of 1999 and now the National Agency for Food and Drug Administration and Control Act Cap N1 Laws of the Federation of Nigeria, 2004.

Our **aim** was to study the necessary documentation for the implementation of cosmetic products in Nigeria.

**Materials and Methods.** This regulatory body (NAFDAC) uses the guidelines in accordance with provisions of ACTCAPF33LFN2004(formerly decree 19 of 1993) which emphasizes that no cosmetic product shall be manufactured, imported, exported and distributed in Nigeria unless it has been properly registered and inspected.

**Results and Discussion.** The process of documentation involves the manufacturer showing evidence of license to manufacture and that the sale of product does not constitute a contravention of the Laws of that country. Comprehensive certificate of analysis, Certificate of business incorporation with the corporate affairs commission in Nigeria .Certificate of registration of brand name with trademark registry. Labelling should be informative and accurate consisting of name of product, batch number, brand name, date of manufacture, location address of manufacturer, distributor, packer, importer, exporter, net content of essential ingredients in metric units which must be listed by their common names and must contain directions for safe use.

**Conclusion.** We can say that this regulatory body in Nigeria is very reliable efficient and carries out their duties effectively using the accurate guidelines in accordance with the ACTCAPF33LFN2004.

# MODERN APPROACHES TO GRAPHIC DESIGN OF DRUG PACKAGES

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**Introduction.** Graphic design of drug package, and first of all, its labelling strongly influences competitiveness of pharmaceutical enterprises and plays critical role in preventing medication errors what is much more important. The latter are attributed to confusing, complex and unwieldy information design on drug package. Now it's known that about 33% of medication errors in Great Britain and 25% in the USA occur due to improper labelling. Hence, improved design of a drug package can reduce this situation and also increase medication compliance, especially among older patients. Nowadays a lot of guidelines and standards are implemented to make package design, first of all, patient-centred. It means that design solutions acceptable for pharmacists to choose the correct pack from crowded shelves may not be so suitable for some categories of patients.

**Aim.** The objective of the present research is to study modern approaches and recommendations to graphic design of drug packages.

**Materials and methods.** Different information data including guidelines, standards, journal articles and Internet sources concerning principles of labelling on primary (mainly blisters) and secondary packages have been analyzed.

**Results and discussion.** When creating the design for pharmaceutical package, it is important to pay great attention on complex of labelling elements: colours, dimensions, allocation, typography, font formatting, trade names, identity of the manufacturer.

Colour is an important factor to make correct identification, classification and differentiation of medicines, but if improper it can cause many problems. Rendering the same colour design for a whole manufacturer's range of drugs can lead to confusing of different medicines resembling each other in their colours. This risk increases if drugs with similar names or with the same name but differ in dosage are stored close to each other in pharmacy, hospital or patient's home.

Proper colour differentiation facilitates distinguishing drugs within manufacturer's range, especially between different dosages of the same drug.

Text on every side of a secondary package should be oriented in the same direction. Recommended minimum font size is 12 point. The generic drug name should be at least 16 point in its size. Sentence case instead of capital case should be used at all times. The better typefaces are bold Sans Serif, Arial, Helvetica or Univers. Text should be aligned to the left margin.



The colour of type should strongly contrast with background colour.

Images and trademarks should be printed aside from the relevant text, because placing the latter around or over graphics reduces legibility of information.

The spacing between lines should provide clarity and ease of readability (e.g. 12 point text and 16 point spacing).

The most critical information (drug name, dosage, form, quantity of a drug) should appear in the same field of view on at least three non-opposing sides of a secondary package. Blank space can be used to great effect and to emphasize this critical information

Generic name of a drug should be preferably emphasized and presented consistently in large point size, at least 16 point or larger. Where patients have different brand names of the same drug, they may confuse its brand and generic names.

Many medication errors made by pharmacists, doctors and patients arise from look-alike and sound-alike drug labelling and names, also confusing or unclear information. They may also arise if a medical product is physically difficult to handle or use as intended for patients. To solve this problem it's recommended to use capital lettering emphasizing the difference between look-alike and sound-alike drug names (e.g. ChlorproMAZINE and ChlorproPAMIDE).

If a drug is produced in several dosages it's very important to provide differentiation between strengths of the same drug. This can be made clear through use of different typefaces, font colour and shape and especially background colour. Whole numbers (e.g. 1 mg instead of 1,0 mg) should be used. The use of decimal points should be avoided where possible.

There are also useful design recommendations for some primary packages – blisters, strips. To enhance readability and identification of a drug withdrawn from secondary package non-reflective, matt, printed and coloured foils should be used. Trade name and dosage of a drug should appear on each cell. The font colour should strongly contrast with background. It's especially important that bold type is used.

The primary and secondary packaging of a drug should have an identical (or linked) distinctive visual style (e.g. colour elements).

**Conclusion.** Proper design of package and labelling of drugs is one of the ways to eliminate most of the risks associated with medication errors occurring on all stages of drug turnover: in pharmacies, warehouses, hospitals, patient's home.

Most of the abovementioned recommendations are not mandatory yet, but in future they should be guidance for designers, manufacturers and authorized bodies to establish standardized rules to the package design that can strongly influence on the safe use of drugs.

# STUDY OF CONDITIONS FOR TRANSPORTATION OF VACCINES

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**Introduction.** Medicinal immunobiological preparations and, in particular, vaccines, serums, anatoxin, antigens, etc., should be transported under temperature from +2 to +8 °C. Great range of different equipment and system types has been developed for their transportation and storage. There are a lot of manuals and guidelines concerning their proper use, because it's very responsible process. Transporting, storage and handling errors can cost thousands of dollars in wasted vaccine and need for revaccination. Errors can also result in the loss of patient confidence when repeat doses are required

**Aim.** The objective of the present article is study of conditions for transportation of immunobiological preparations, in particular vaccines, in cold chain system.

**Materials and methods.** In the present study different information data sources including normative documentation concerning principles and methods of transportation of immunobiological preparations have been analyzed.

**Results and discussion.** To maintain appropriate storage and transportation conditions for vaccines from manufacturer to medical or pharmaceutical institutions there should be used cold chain system consisting of:

- personnel providing medical aid and refrigerating machinery services;
- procedures used to control distribution and use of vaccines;
- equipment itself which should conform the requirements for safe storage eliminating dependence on environment and various surrounding factors.

In every equipment for cold chain various refrigerants are used: recently – CFC-containing freons which unfortunately are harmful for environment, and now – HCFC, HFC - gases which are ecologically harmless.

To protect vaccines one should use thermocontainers and portable transferring bags where special cards-indicators & freeze indicators are placed into, providing necessary control over regimens of transportation.

Thermocontainers as well as transferring bags have a cover tightly closing them, and also they have heat-insulating properties, the difference is only in that transferring bag is much less in its sizes.

Charging of thermocontainers with preparations is carried out in fridge storage rooms (premises for vaccine storage) or under exceptional situations at ambient temperature if duration of charging does not exceed 10 minutes.

Thermocontainer is placed into cardboard box which prevents its damage. Onto

a box for vaccines, anatoxins, tubercular allergen which do not allow freezing a label with inscriptions “Vaccine! Urgent cargo”, “Do not freeze” is attached.

There are 4 levels of cold chain.

On the 1st and 2nd levels of transportation of immunobiological preparations from a manufacturer to a wholesale storage warehouse on large distances during 1–3 days it’s necessary to use refrigerator transport vehicles with temperature from +2 to +8°C.

On the 2nd level an authorized person should have coordinated supply schedule of immunobiological preparations to the 3rd level and should supervise their remaining shelf-life which should be not less than 1 month at the moment of shipment.

Transporting from the 3rd to the 4th level (to treatment-prophylactic establishments) is carried out in thermocontainers.

At obtaining of vaccines, anatoxins, tubercular allergen they should be immediately placed into refrigerating machinery and indications of control means should be checked.

Important parameter during transportation and storage of immunobiological preparations is duration of cold preservation inside equipment which is defined by time during which this equipment preserves temperature not above +10 °C.

There are some factors which this time depends on:

- type of a portable transferring bag, materials of which it is produced, thickness of its walls;
- temperature under which a cooling element has been placed into a container, and also weight of a vaccine;
- exposure time when a container was kept opened;
- environment, namely air temperature.

The complete set of the equipment for transportation of immunobiological preparations includes refrigerating elements (packets). They look as rectangular plastic containers filled with usual water.

The WHO recommends to use two types of cooling packets:

- 0.4 l (for portable transferring bags);
- 0.6 l (for thermocontainers).

For temperature maintenance within range from 0 to +8 °C also such frozen cooling packets are used.

During transportation in deep-freezer it’s necessary to keep the second complete set of refrigerating elements and while the first complete set is used, the second one should be kept in frozen state.

**Conclusion.** Vaccines must be transported and stored properly under cold chain from the time they are manufactured until they are administered.

## **STUDY OF CONSUMER PROPERTIES OF PEDIATRIC ORAL DRUGS**

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**Introduction.** Rapid development of pharmaceutical industry during recent years undoubtedly influenced package-producing industry. Today the latter is highly automated manufacturing of modern, attractively designed original packages. Development and introduction of new kinds of materials and technologies allow to implement advanced types of packages which design provides necessary consumer properties: to be convenient in transporting and use, to contain information about medical product, to have attractive appearance, etc.

**Aim.** The objective of the given paper is study of consumer properties of pediatric oral drugs.

**Materials and methods.** As materials of the research we use information taken from normative documents, scientific and educational literature, and also Internet sources.

**Results and discussion.** For packages of medical products applied in pediatrics there should be more strict requirements as well as for materials used in production of containers especially for primary packages and their design because children should get only the best. A child remained out of parents sight can reach a drug by himself and open it. Hence, to reduce danger of child self-poisoning there is a challenge for elaboration of such package types which would complicate availability of a drug to a child.

So, in number of European countries there are new requirements for packages of medical products according to which they should have protective devices preventing their opening by children. Review of patent materials shows that leading countries of the world pay great attention to this question: more than 37 % of overall quantity of patents directed to creation of new containers and packages which prevent their opening by children.

Child poisonings by overdosing of medical products after their administration at home when they are dispensed with tea or table spoon are observed. Thus a dose can exceed nominal one two and more times. Therefore creation of special portioning devices and their wide introduction in practice is an important task. So, auxiliary means (special measuring spoon, measuring reservoir, piston dispenser, etc.) should be structurally simple and accessible to washing, should withstand sterilization by boiling if needed.

Conveniently and simply is always important when it concerns administration

of a drug by a child. And it means that dosage form of a medical product should be adapted for children as much as possible.

Abovementioned requirements can be considered on an example of Nurofen drug for children which is very popular among parents. The drug quickly reduces fever, eliminates pains of various origin and simultaneously it is standard of simplicity in use. It's produced in form of syrup and this means that children can simply swallow it unlike tablets. And, of course, it's sweet and tasty ! Not a treatment but true delicacy as the syrup is manufactured with taste of orange and strawberry. One more advantage – convenient measuring syringe is attached to the package that allows to calculate necessary quantity of the drug precisely. With the help of a dispenser it's also convenient to give the medical product to an infant as any drop will not spill. As though it would be desirable, that all manufacturers of drugs for children in such manner will care of comfort for both child and adult.

Dosing devices should have attractive, not frightening appearance, and an instruction for application (leaflet) of a given medical product should contain all necessary information about calibration and usage of a dispenser that young patients will necessarily appreciate.

One of the most important requirements shown to closure means for pharmaceuticals of pediatric group is control of their dosing and protection against casual opening. Namely this should be a priority direction in development and creation of closure means and new kinds of packages.

It has been developed the device with passive resistance to flow of liquid pediatric dosage forms and also the package of such dosage forms containing single dose.

The Indian government is going to prohibit use of plastic, in particular, PET vials, bottles for packaging of such pediatric pharmaceuticals as syrups and other liquid dosage forms. Such a decision was accepted after introducing recommendations of advisory committee on medical products (DTAB). The authorities consider that plastic, in particular, PET containers used for packaging of pediatric medical products, and also preparations for aged people, women of reproductive age and pregnant ones can be harmful for health of patients.

**Conclusions.** Proceeding from the aforementioned, it is possible to make a conclusion that, speaking about new tendencies in development of package-producing industry, it is impossible to skip a problem of drugs applied in pediatrics. The given medical products require more serious and attentive approach for proper dispensing, high-quality package and rationally designed marking, because children are the most trustful but also the most exacting patients. Caring of children today we care of our future.

## LIP CARE PRODUCTS IN THE RANGE OF DRUG STORES

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**Introduction.** The structure the lip skin differs from the rest of the skin: due to the large amount of nerve endings they are more sensitive, lips have lack of oil glands and melanin and thin epidermis. That is why the lips are sensitive to external climatic factors (cold, dry air, wind, etc.) and any internal failures of the body (vitamin deficiencies, herpes in acute, systemic diseases), therefore require appropriate care with special health care facilities.

**The aim of the study** was to streamline the classification and study the pharmacy range of lip care products that are on the market of Ukraine.

**Materials and methods.** During our study analysis of the current literature concerning existing classification and characteristics of lip care products was conducted. Also, during the study methods of semantic analysis and hierarchical classification were used.

**The obtained results.** Today on the domestic market lip care products are widely represented. They mainly produced by manufacturers of Ukraine, Poland, Germany, less by Russia, France, Italy, Greece and the UK. The range of modern lip care products that are sold through drugstores are hygienic lipsticks, lip balms and creams. *Hygienic lipsticks* are presented by such trademarks «Зеленая аптека», «FJ», «Домашний доктор», «Альые паруса», «Senita» (Ukraine), «Фруктовый поцелуй», «Еко-ин косметик», «Eveline Cosmetics», «Coloris», «Спасатель» (Poland). *Lip balms* are presented by «Біокон», «Фармаком», «Красота и здоровье», «Ароматика» (Ukraine); «Сто рецептов красоты», «Фитокосметик» (RF), «Лип Айс» Ментолатум (UK), «Др. Тайсс Натурварен Гмбх» (Germany), «Nature House» (Italy), «Laino», «La Roche», «Vichy», «Uriage Bariederm», «Caudalie» (France), A pivita (Greece), etc. *Lip creams* are presented by «Caudalie», «Bioderma», «Vichy» (France), A pivita (Greece). Into a separate group can be identified *child lip care products* («Біокон», «Красота и здоровье», «Моя Прелесть» (Ukraine), A pivita (Greece)), and also *lip care for men* («Биокон», «Фармаком», «Красота и здоровье» (Ukraine)). Particularly noteworthy are preventative *lip care products against herpes* («Біокон», «Фармаком», «Красота и здоровье», «Червона зірка» (Ukraine), «Евалар» (RF), «Coloris», (Poland)), with antiviral and healing effect.

The main active ingredient in the composition of lipcare products are mineral and vegetable oils (castor, coconut, almond, sea buckthorn, avocado, jojoba, shea), natural and synthetic waxes. As the bioactive components added vitamins A, E, F and B group, that have regenerating effect, prevent cracking, inflammation. Various herbal extracts (chamomile, aloe, calendula, etc.) and essential oils promote healing wounds, provide anti-inflammatory, moisturizing effect.

**Conclusions.** Due to information above, we can conclude that Ukraine market has a wide range lipcare products of hygienic and preventive action.

## STUDY OF CONSUMER PROPERTIES OF KONJAC SPONGES

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**Introduction.** At present, the range of cosmetic products is actively expanding and adding new manufacturers and products. The trend in their production lies in predominant use of natural ingredients.

**Aim.** Studying of consumer properties of certain skincare products in the form of sponges from the Asian plant roots.

**Materials and methods.** The object of the study was konjac sponge for washing, made of the root of the Asian plant *Amorphophallus konjac*.

**Results and discussion.** *Amorphophallus konjac* is considered a dietary product and is a vegetarian substitute for gelatin, from it in Asia cook desserts and jellies. Konjac is 97% of water, filled with minerals, thus having an ideal environment pH, which has a positive effect on the skin. That is why in Japan, China and Korea for many years, it is used in the beauty industry and medicine.

In the analysis of the range it has been found that this type of sponges is available in different shapes and colors. The color depends on the sponge's components that manufacturers add to provide certain cosmetic effect. For example, green sponge contains an extract of aloe vera. This plant contains a lot of minerals, vitamins and amino acids, which have a positive effect on the condition of the skin, smoothing out its defects and nourishing with necessary substances. But the main advantage of this sponge is that it has healing and regenerative properties. Purple sponge with lavender oil soothes and moisturizes irritated skin, relieves fatigue. Red sponge with clay contains French red clay, thanks to the properties of which it further helps to even out skin tone, moisturize it and even prevent wrinkles due to soft massage action.

In dry form by its hardness the sponge resembles a piece of stone, but being wet, it becomes soft, jelly-like, and very pleasant to the touch. Unlike other sponges for the face, it is not just cleaning, but also has excellent exfoliating action, as well as helping to strengthen the properties of a cleaning agent and cleans the pores. Konjac sponge contributes to liquid penetration to the upper layers of the epidermis, thus moisturizing and making the skin more elastic.

**Conclusions.** Therefore, we can conclude that the konjac sponge due to its consumer properties, exhibits good effect and is suitable for various skin types, at its use there is also no need to the additional use of other cosmetic products.

# NOMENCLATURE AND CLASSIFICATION OF DRY MILK MIXES FOR BABY FOOD

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**Introduction.** No one denies about the benefits breast milk for feeding a small child, but and there are times when a baby at birth or later have to bring up with artificial milk mixes.

However, even the most advanced milk mixes cannot be compared with breast milk, which composition provides optimum flow for the individual child, not only nutritious, but also many other substances and cells: white blood cells, antibodies, enzymes, hormones, etc.

According to medical statistics, only 1-3% of women have serious health problems that make it impossible to breastfeeding, while 60% of children from birth to 2 months transferred to artificial feeding.

The reason for this is the failure or ignorance of basic rules of breastfeeding baby. To date, this type of baby food (infant mix) presented a wide range of assortment of products of different companies, types, storage, price ranges etc.

**Aim** of our research was to streamline the classification and study of the range of dry milk mixes that are present on the market of Ukraine.

**Materials and methods.** During our research were analyzed modern national and foreign literature on the existing of classification and characteristics of dry milk mixes for children. Also, there were used methods of semantic analysis and hierarchical classification.

**Results and discussion.** Today on the national market are represented dry milk mixes for children made by such manufacturers as America, France, Holland, Germany, England, Finland, Sweden, Austria, Japan, Israel, Yugoslavia, Switzerland, India and Ukraine. But unfortunately, that among all the product range of baby food Ukrainian milk mixes presented only a few names.

Today there is modern classification of dry milk mixes:

- **Highly adapted infant mixes.** The composition of such mixes are the following ingredients: whey, taurine, choline, lecithin, inositol. Such mixtures are applied to children with neonatal period (the mix for newborns and premature infants indicated by EDP or 0, and from birth to 6 months - figure 1). These compounds include: «Nutralon» »Nan», «Humala» and others.
- **Less adapted mix** (this group of compounds commonly numeral 2, suitable from 6 months). These mixes contain cow's milk proteins - casein «Similak», "Enfamil".



- **Partially adapted** mixes. In these mixes no bioactive supplements (taurine, choline, many fatty acids). Examples of such mixes, «Baby», «Malish», «Detolakt», «Agusha».
- **Blends therapeutic and hypo-allergenic**
  1. Lactose-free and low-lactose mixes for children with reduced activity of the enzyme lactase in the intestine, lactose intolerance («Nutralon low-lactose» «Similak-izomil»);
  2. adapted dairy-free mixes containing soy protein and are designed for children with intolerance to cow's milk protein, lactose, with galactosemia («Bona-Soya», «Nutri-Soy», «Humala SL»);
  - adapted from a mix of hydrolysate whey protein for children with severe allergies to cow's milk protein and lactose, with deep prematurity, cystic fibrosis, a violation intestinal absorption in pre- and postoperative period («Alfaro», «Pepty-Junior», «Humala GA 1»);
  4. adapted infant formula fortified with iron, («Detolakt», «Nestohen»);
  5. mixes adapted for feeding infants born prematurely with low weight and insufficient weight gain («Alprem», «NAS pre», «pre Hipp», «pre Humala», «Enfalak!»);
  6. mix adapted for feeding children with vomiting syndrome («Nutralon - AR (antireflyuks)», «Similak Izovok»);
  7. mix adapted for children with intestinal dysbiosis («NAS milk», «Bifidus»);
  8. mixes without gluten: («Al-110», «Soy-Semp», «Hipp 1», «Humala HN»);
  9. mix without phenylalanine («Milupa», «phenyl Free», «Similak»).

Also, modern consumers when choosing a dry milk mix should pay attention to the following clause, namely: first when choosing mix should consider the child's age; newborn care provided absolute needs only adapted mixtures, if the child should use therapeutic mix, you should not choose their own, so as to assign the correct mix baby can only physician; it is desirable that in the mix were pre-and probiotics, as well as mineral and vitamin complex containing iodine, taurine, calcium; also remember that in the first months of life is desirable not to use baby feeding mix comprising palm oil.

**Conclusions.** In a result of the above we can conclude that the best food for the baby at all times been and remains breast milk.

However, the choice of mix - this is a very important matter, which depends largely on the health of the child not only in the present but in the future, because that child did not receive an early age, it is impossible to be offset in the future.

Therefore, we must always remember that before you give your child a substitute for breast milk, consult with your pediatrician first, and then with pharmacist!

# COMPARATIVE CHARACTERISTICS OF SOLUTIONS FOR THE DISINFECTION OF MEDICAL INSTRUMENTS

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**Introduction.** For the disinfection of medical instrument are used different techniques, including chemical methods. The advantage lies in its simplicity, reliability and availability, and is the main disadvantage of solutions aggressive towards metal medical materials.

**Aim.** The purpose of research - a comparative evaluation of corrosiveness of modern disinfectants to metal tools.

Widespread disinfection agents containing chlorine. These substances have a broad spectrum of antimicrobial action. Disadvantages: chlorine compounds are toxic, have a pungent smell, stable solutions in wastewater does not decompose, are corrosive materials.

Iodine has a broad spectrum of antimicrobial activity, but has no effect on bacterial spores. Preparations based on iodine are corrosive to metals, rubber and degrade the quality of some plastics.

Alcohol - the most common component of antiseptics. The ethyl and isopropyl alcohols are used in medicine. All alcohols have a broad antimicrobial spectrum (except spores), evaporate quickly, and after evaporation leaves no residue. Isopropyl alcohol has no effect on some small lipophilic viruses. Alcohols are used as part of antiseptics, agents for the treatment of external surfaces of some equipment (eg, for stethoscopes).

The most promising are drugs which contains peroxide group. They have a broad-spectrum activity, including contra of spore forms of bacteria, to allow the use of this group of tools for sterilization. Solutions have a low toxicity; decompose rapidly, without a specific smell.

**Conclusions.** Further studies will be used to optimize the quantitative and qualitative characteristics of the composition of the solution containing the active peroxide groups. As a result of this work we define the criteria according to which optimization will be performed compositions of disinfectant solutions based on peroxides.

The optimal composition must be different maximum rates sporicidal activity, reagent stability ability, the minimum processing time and minimal corrosive effect on tool materials. The solution to this problem requires the use of mathematical methods of statistical processing.

# THE STUDY OF THE MAJOR MERCHANDISING ASPECTS OF BABY FOOD

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**Introduction.** The best food for a baby is breastfeeding. But it so happens that a baby receives breast milk in insufficient quantity and quality, or a mother loses her breast milk at all. In this case, the best solution is to use the high-quality baby food. According to the data of the Association of baby food manufacturers in Ukraine 22% of nursing mothers naturally breastfeed their children, other women use baby food.

The **aim** of our work was to study the merchandising characteristics of baby food presented at the market of Ukraine.

**Results and discussion.** There are 40 milk substitutes, about 100 kinds of cereals and other types of products at the Ukrainian market. The volume of baby food import into the territory of Ukraine in 2015 amounted to 3987 tons; it is 43 % of consumption of this product by the Ukrainians. The main importers of baby food to the territory of Ukraine are the Netherlands (22%), Switzerland (20%) and Germany (19%).

The share of these importers in the total import of the product to Ukraine is practically the same. Smaller importers are Slovenia (12%) and Austria (10%). The share of other countries in total imports of milk baby food does not exceed 4%. Export of baby food outside Ukraine is insignificant. Ukraine exports milk baby food mainly to one country – Moldova. Minor exports (about 1%) are to USA and Japan.

It is interesting to note that import of baby food to the territory of Ukraine increase by 15% for 3 months in 2016 compared to the same period in 2015.

The range of products for baby food is divided into groups by age:

- group I – products for healthy infants from birth to one year,
- group II – for healthy young children from one year up to three years and preschool children,
- group III – for nutritional therapy of children with special needs.

Baby food for kids can be either in a dry form or as a finished product – in a liquid form. The convenience of a dried product is that an accurately dosed portion can be prepared from the powder. A liquid formula is indispensable for traveling and long trips.

For packaging baby food the following consumer containers are used: jars, bottles, tubes, containers made of polymeric and composite materials. For dry products cardboard boxes with immediate packaging of foil or paper are used, it can be parchment, paraffined, with polymer-coated or lacquered cellophane.

Labeling baby food contains the following information:

- the product name, country, the name and address of the manufacturer,
- the child's age;
- if the baby food needs additional preparation for consumption, the label contains the information concerning the method of preparation or use of the product and the amount of the product for one feeding taking into account the child's age;
- the energy value expressed in kJ or kcal, as well as the content of proteins, carbohydrates and fats.

Today there are only 3 main plants producing baby food in Ukraine: “Khorol dairy canning plant for baby food” PJSC manufacturing baby milk powders “Malyutka”, “Malyatko M”, “Malysh”, “Vitalact M”; “Pridniprovs'kiy” Complex JCS (“Zlagoda” TM) manufacturing milk and dairy products for children; “Balts'kiy dairy canning plant for baby food” JCS, Odessa region, manufacturing baby milk powders “Detolact-1”, “Detolact-2”.

The domestic market of dairy baby food is also presented by such manufacturers as “Favor” LLC (Kyiv), “Baby Food Plant “Salus”” JSC (Odessa), “City dairy factory-kitchen of baby food” Public Utility Company (Kharkiv). In 1992 the Association of baby food manufacturers was created in Ukraine. Its products are presented by TM “Malysh” (Baby) and “Karapuz” (Toddler).

In Ukraine little attention is paid to production of baby food. It can be explained by a number of causes:

- significant obstacles when entering the market in the form of complicated procedures of registration and certification;
- high prices for purchased ingredients (predominantly vitamins and minerals);
- obsolete equipment at most of the specialized enterprises and the lack of benefits for the purchase of a new equipment;
- limitation of production profitability and the limited level of markup in the retail network for the domestic baby food;
- limited entry of domestic baby food products into the European market;
- informed culture of consumption of baby food, the lack of information about the value and advantages of the Ukrainian baby food, including information in the retail chain.

**Conclusions.** Therefore, the baby food market in Ukraine is represented mainly by imported products (Netherlands, Switzerland, and Germany). The main merchandising characteristics of baby food, such as assortment, packing and labeling, have been analyzed.

## COMMODITY ASPECTS IN RESEARCH OF ASSORTMENT OF NASAL ASPIRATORS

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**Introduction.** Nasal aspirators appeared on the national market relatively recently. Therefore, up for now most people have not yet had time to arise definite opinion about them. Using aspirator especially important due to the fact that little children are prone to frequent colds, accompanied by an abundant secretion from the nose. Therefore, you have to clean the nasal passages periodically during a cold. To ease this process, you can use a device called an aspirator.

**Aim.** The aim of this work is the analysis of the range, purpose and application properties of nasal aspirators on the national market.

**Materials and methods.** Information, based on the study of normative documents, materials from online-resources and our own conclusions.

**Results and discussion.** Baby nasal aspirator is designed for cleaning the nose and the treatment of the common cold in a child. It belongs to the category of medical devices, and as the material softer from which it is made, the easier and safer to use it to care for a young child.

Aspirator is an essential household kit for each family, which have a newborn baby. When baby has an excess of mucus, it provokes the development of sinusitis, otitis and infectious inflammation of internal organs. Help of adults during the flu comes in the form of effective remedies for the common cold - nasal aspirator. It is much faster and more efficiently helps rid the nose of the baby from the excretion.

The most important properties for nasal aspirator are its effectiveness, ease of use, speed of the procedure, hygiene.

Based on the principle of action, there are following kinds of nasal aspirators: aspirator-syringe (a small volume syringe), mechanical, electronic and vacuum.

Aspirator-syringe - the most simple and affordable product, but the drawback is the lack of the limiter on the tip and the opacity of the rubber, which does not allow to estimate the size of penetration and there is a risk of the nasal mucosa injury during the application.

Mechanical aspirator is a tube with a holding capacity for mucus and replaceable filter. The principle is simple - an adult inserts a tip of a tube into the nose of a child and suck in an air. After use, the device is sterilized, or if it is disposable, throw away.

Electronic aspirators are more efficient and comfortable, they work automatically - tip with stopper is inserted into the nostril and you just press the

button. Capacity to collect mucus transparent, which allows you to see how well mucus is deleted; all the parts of the machine are easy to clean. The device is compact, able to run on batteries, so it is convenient to take one with you. In most e-aspirators music is embedded, that serves as distraction during the operation on the nose cleaning. Negative qualities of this product are its high cost and short life span.

Vacuum aspirators, whose mechanism of action are based on connecting the device to an ordinary home vacuum cleaner. The design of the aspirator provides power control of the device. The advantages of such vacuum cleaners - safety, hygiene, efficiency and durability; drawback - high price, and the fact that the vacuum cleaner is noisy and can scare the kid.

As for nasal aspirators are of various kinds, therefore imposed requirements for them, that divided into general and special. All of them should be safe and made in accordance with the requirements of regulatory documents. Nasal aspirators – are reused products, therefore they are required to ensure uninterrupted proper operation within the warranty period service and kept proper sterilization (or disinfection). Products must be resistant to body fluids and exudates of tissues of the body, corrosive agents with which they come into contact during use, to withstand mechanical impact. Electrical components of nasal aspirators are required to be protected from moisture.

National standards for nasal aspirators in our country are not developed. ЗАО «Поликом» (Ivano-Frankivsk region) has developed and manufactures products according to TU U 25.1-24681750-007-2004 "Аспираторы детские".

The range of these products on the Ukrainian market is quite wide. In the National register of our country registered a wide assortment of aspirators: ТМ «Bebe Confort», ООО Страйдер (Ukraine); ТМ «Canpol babies», Foremount Enterprise Co., Ltd. (Taiwan, R.O.C.), Johnny Vico Infant & Gift Products (China), Co Ltd. (China); ТМ «Baby Nova», Novatex GmbH (Germany); ТМ «Arianna», Illes Csok es Tarsa KFT (Hungary); ТМ «Nose Frida», Nasalprodukter Sverige AB (Sweden); "Otrivin Baby», Novartis Consumer Health SA (Switzerland), ТМ «Альпина пласт» (Russia). And also in demand by consumers not registered in Ukraine nasal aspirators of following manufacturers: ТМ «Dr. Benny» (Hungary), ТМ «B WELL (England), ТМ «Arctic Light», «Cleanos» and «Coclean», «Baby-Vac» (Russia).

**Conclusions.** Our studies have shown that the presence of national manufacturers of these products is very small. And because the nasal aspirators are necessary and convenient modern means in the treatment and prophylaxis of diseases of the nose, the demand increases for consumers. The results show the potential for further expand in manufacturing of this product.

Pressing issue is the development of standards and quality control procedures to the products.

## COMMODITY ASPECTS IN RESEARCHES OF PEDOMETER

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**Introduction.** This device was invented two hundred years ago. The first inventor of such kind of a device was Thomas Jefferson. The device consisted of a special lever and a magnet. When walking man raised his hand, he began to move all joints. Thus steps were counted. Later the device was improved, became more compact, easier to use, the principle of work also has changed. Pedometers are used to measure energy expenditure of walking person.

**Aim.** The aim of this paper is merchandising analyze of the range, use and consumer properties of pedometers on the national market.

**Materials and methods.** Information, based on the study of normative documents, materials of Internet resources and our own conclusions.

**Results and discussion.** Pedometer – is small sized device, which intended to count the steps, performed during running or walking in a given period of time or for the whole day. Purpose of pedometer is to count your steps, on the basis of which calculation of the length of the traveled distance and number of burned calories is done.

From a medical point of view, in order to avoid inactivity, everyone should pass at least 15,000 steps a day. Pedometer allows you to keep track of the level of activity. Of course, the average number of kilometers can be calculated from the time and guided only by the hour. But it's much more efficient to use your own pedometer, which in addition to considering the number of steps, has a timer that will calculate the optimal rhythm of movement, depending on the time of day and intensity of side exercise stress. They are no heavier hours and very comfortable, so it does not cause inconvenience to wear them and almost imperceptibly. They are very sensitive and can accurately count the number of steps, their length, tempo, intensity, and so on.

The presence of the pedometer is especially important, according to recent studies of British specialists, who carried out that man should do at least a hundred steps per minute during walking to count that one as really beneficial for the organism. The pacemaker will automatically be recorded, and the gadget may report about an unplanned failure during that mode. In any case, a person inner self-esteem will rise after looking at the display, which shows the excess of the minimum number of steps required to maintain health.

They can be mechanical, electronic and electro-mechanical. During the walking, the device transmits impulse oscillation, that are comes from each step of

the person, to the sensor. Counter treats the received data and outputs the specific value.

Mechanical models work by converting energy into mechanical shaking pulses that activates the operation of the system for counting the number of steps. They precisely determine the number of steps and distance covered, with fixing the time.

Electronic-mechanical devices consist of a sensor, which converts mechanical shaking in momentum and an electronic system, which counts your steps.

Electric models are equipped with microprocessors and accelerometers for counting steps. They are more perfect than other types, and allow you to store information in its memory. And if you have a special application for your computer, you can transfer this data into the database and make a schedule of changes. Modern electronic pedometers can be attached to the belt, arm or leg. Also, there a lot of apps for mobile phones, allowing the owner to calculate the activity on their devices.

Pedometers also can be in several forms: stand-alone electronic (they are small devices that can be carried in a pocket or bag, fastened to clothing; design and weight of the device depends on the manufacturer) synchronized with your phone and other devices; pedometers-watches, pedometers-bracelets, mobile applications-pedometers.

Pedometers should meet the following requirements: calculation of steps (basic); calculation of the distance; count number of burned calories and heart rate; monitoring of fat, the burned grams per day; monitoring of additional calories (active energy); protection against vibrations. Some of them have integrated calendars, where you can create a training schedule, these records can be stored in the memory for the certain period of time. All devices are different, so the requirements may vary from model to model, from manufacturer to manufacturer.

The most popular manufacturers of pedometers: “Master Kit” (Ukraine), “OOO Fisk” (Ukraine), “Shagi” (Russian), Beurer (Germany), NOZOMI PD 101 (Japan); OMRON (Japan), KYTO (China), Shenzhen Fastgo Electronics Co., Ltd. (China), Kangfu Medical Equipment Factory (China) and others.

Packing of pedometers performed in primary containers (cartons, packs, blister containers, cases) with corresponding closures, ensuring their safety during storage, sale and transportation. Allowed to transfer by any kind of transport.

Store this type of product protected from precipitation location, avoiding mechanical, chemical and physical effects, with stable temperature, avoiding high humidity and mold.

**Conclusions.** Pedometers by depending on the use, can perform various functions that are necessary to control and maintain the physical condition of the person, determine the level of physical activity and correct lifestyle. It will allow to expand consumer properties of the goods and make pedometers more significant for human use.



## USING IODINE DRUGS FOR RADIATION PROTECTION

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**Introduction.** Nowadays we can't imagine a world without nuclear energy, because humanity needs the huge reserves of energy. Atomic energy is a relatively cheap resource. During the accidents at the nuclear power plants, radioactive isotopes of iodine and cesium generally fall into the atmosphere. The thyroid gland is the only body organ, which captures large amounts of iodine from the outside. Iodine is necessary for the synthesis of thyroid gland hormones. The thyroid gland does not distinguish stable iodine from radioactive. Despite the fact that many residents of our country have endemic iodine deficiency the thyroid gland absorbs iodine at high speed. Therefore, it is important to prevent iodine because of the threat of radioactive contamination.

The **aim** of this paper is to show the versatility of an old drug that continues to be a safe and effective therapeutic option for the treatment of skin diseases, and is an effective drug for the protection of the thyroid gland from the radioactive iodine in man-made disasters.

**Results.** Potassium iodide (or KI, as it's known chemically) is a common form of salt and is known to protect the thyroid gland from radiation and cancer caused by radioactive iodine. Protection is lying in saturating the thyroid gland with non-radioactive iodine. That makes it difficult or impossible for radioactive iodine to be absorbed by the thyroid. If the gland has enough iodine in it, the thyroid doesn't absorb any radioactive iodine and it is flushed out of the system in urine. If radioactive iodide is in the thyroid it increases the chances of cancer of the thyroid in future years. Potassium iodine, however, does not protect against other forms of radiation sickness. Potassium iodide, as a saturated solution, is a valuable drug in the dermatologist's therapeutic arsenal and is useful for the treatment of different diseases due to its immunomodulatory features. The saturated solution of potassium iodide is often the only therapeutic choice available for the treatment of some infectious, inflammatory and immune-mediated dermatoses, no matter whether the reason is specific indication, failure of a previous therapy or cost-effectiveness.

**Conclusions.** Very promising scientific direction of Inorganic Chemistry Department, is the search for new complexes with iodide ion as a ligand having radiopaque properties. Modern contrast agents for intravenous administration typically contain iodine. Distinguish ionic and non-ionic contrast agents. Initially ionic iodinated contrast have been developed, which are currently still used in radiology. The non-ionic contrast agents iodine linked by covalent bonds, which significantly reduces the risk of complications.

## MEANS FOR TEMPERATURE CONTROL OF DRUG TRANSPORTATION

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**Introduction.** One of the main aims for quality preserving of drugs is providing of appropriate temperature regime during all stages of turnover. It's especially important to control it during transportation, because it is performed mainly by non-pharmaceutical personnel, and frequently by outside organizations. Control for temperature regime acquires a special urgency in a case of immunobiological drugs which are the most thermolabile.

So, according to WHO data about 25% of vaccines are delivered spoiled because of violation of transportation and/or storage regimes, moreover, they are not fixed by the control equipment. It is obvious, that application of such drugs can cause direct health hazard and even death for patients.

**Aim.** The purpose of the given work is study of assortment and working principles of means for controlling temperature regimes at all stages of commodity movement of drugs including transportation (shipping).

**Materials and methods.** In the work a lot of information sources were used including normative documents, journal articles, Internet sources, concerning assortment of modern means for control of temperature regime and their comparative characteristics.

**Results and discussion.** For today exists three types of devices for control of temperature regime during delivery of drugs: heat indicators, thermoregistrars and RFID-gauges, i.e. radio-frequency identifiers.

Heat indicators by their action principle are subdivided on capillary, chemical and electronic ones.

Capillary heat indicators allow eliciting the fact of influence of temperature below liquid freezing point.

The chemical heat indicator represents painting substance rendered onto a basis, that irreversible changes its colour under the influence of temperature above a determined threshold during established time.

The working principle of electronic heat indicator is based on measurement of temperature of environment in which there is a heat indicator, and finding time in the specified environment.

To prevent possible falsification of indications each heat indicator should have its own personified number.

The main advantages of heat indicators are simplicity of use and cheapness. The impossibility of determination of the exact moment and duration of negative

temperature influence on controllable product is their basic lack.

Thermal recording devices or electronic recorders are deprived the above-stated lacks and for today are considered as more effective temperature monitors. The most optimal by the sum of parameters are devices ThermoChron made by company Dallas Semiconductor.

ThermoChron provides accumulating in its own memory information about 2048 events within temperature ranges  $-40\text{ }^{\circ}\text{C} - +85\text{ }^{\circ}\text{C}$  with relative error not more  $\pm 1\text{ }^{\circ}\text{C}$ . Value of the minimum gradation of temperature recorded by the device thus constitutes  $0.125\text{ }^{\circ}\text{C}$ . Obtaining of the results which have been saved up by devices ThermoChron, and also task of new values of adjusting parameters for continuation of their work are performed by means of the usual personal computer or specialized portable microprocessor devices.

Devices ThermoChron are placed in the control points of temperature control, for example, in refrigerators with thermolabile medicines or in thermocontainers, used for delivery of drugs critically sensitive to temperature conditions.

In spite of the fact that wholesale price of heat indicators constitutes 1 dollars, and devices ThermoChron – 20 dollars, advantages of thermo registers are obvious: recurrence of application (heat indicators - basically, are of single use), thermal time lag of heat indicators is 5-10 more, than of ThermoChron devices, depending on their modification sensitivity of operation of thermo registers –  $0.125\text{ }^{\circ}\text{C}-0.5\text{ }^{\circ}\text{C}$ ; it's 10 times above, than for heat indicators.

Now the most perspective technology is RFID (Radio-Frequency Identification) allowing completely to supervise and improve logistic processes. However introduction of this technology in warehouse logistics occurs slowly. The reasons for this are: unwillingness to reconstruct the system which has developed by years of work or fear of introduction economic inefficiency, absence of complete and trustworthy information about technological advantages of RFID technology.

Huge advantages of RFID technology is possibility of remote monitoring of cargo condition, especially temperature regime of transportation.

**Conclusions.** The choice for means of registration of a temperature regimens is crucial for provision and preserving of quality of medical products not only during transportation, but also and at their storage in warehouses, in drugstores and pharmaceutical enterprises. The optimal for today is application of thermo registers, proceeding from a ratio price/efficiency/availability/easy in use. The radio-frequency labels which are built-in into drug package are the most perspective technology of the near future. Now this approach becomes more and more cheaper and it seems to be the only and the best, easiest way to ensure quality of drugs and other related commodities.

# COMPARATIVE ANALYSIS OF MILITARY AID KIT

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**Introduction.** It is known that the first aid to the injured during the first half an hour after being wounded, even in case of postponing first medical aid within the day, it reduces the likelihood of death in 3 times. So every soldier of the Armed Forces of Ukraine must be provided an individual aid kit. However, today in Ukraine there is another problem: the absence of regulations act of its content. Moreover today individual aid kit (AI-2) (still the same Soviet orange chest) is outdated. As for economic questions the cost of real functional medicine aid kit can rate, according to data of charities that provide Ukrainians with first aid kits, about 100-150 US dollars. The **aim** of this study was to comparative analysis of national and foreign military aid kit. **Materials and methods.** To conduct a comparative analysis foreign and native literature and aid kit of national and foreign production were used.

**Results and discussion** First aid kit - **set of medical supplies**, dressing materials, tools and equipments for first aid. The content of first aid kit depends on the preconditions of care, the nature of diseases, injuries and amount of people who may need help. The classification of first aid kits in Ukraine: 1. Car first-aid kit: a) Car first-aid kit -1 AMA-1 (up to 9 passengers); b) Car first-aid kit -2 AMA-2 (more than 9 passengers); c) Vehicle kit «Eurostandard». 2. Military first aid kit. 3. Industrial and workplace first aid kit: a) Industrial first aid kit (standard); b) Workplace first aid kit (mobile); c) Workplace first aid kit type K (3-5 people); d) First aid kit office type C (5-10). 4. Universal kits. 5. Home first aid kit: a) Home; b) For babies; c) Personal protection kits. 6. Universal kits

Due to the unstable situation in the world, giving first aid to the wounded soldiers is actual problem. Military First aid kit (AB) - means for providing first aid to the group of soldiers in the mode of mutual aid to crews **of combat vehicles and crawler machinery**. Designed to help the 3-4 wounded and burned. Availability of comfortable and functional first-aid kit is important prerequisite. Order of the State Service of Ukraine on drugs on August 19, 2014 № 1087 registered 4 kinds of military medical kits:- First aid kit medical military individual; - First aid kit medical for military special purposes units; - First aid kit medical military universal; - First aid kit medical military general purpose. We have analyzed the content of the military medical aid kit individual (AMVI) native and foreign production. The supply of national production AVI include: dressing packs sterile medical first aid on one pad (GOST 1179) or pack dressing medical first aid (TU U 24.4- 00306756-011) - 2 units; Hemostatic harnesses (TU U 21.2-24736125-003) - 1 unit;. "Nalbuphine-Farmeks"

injection 10 mg / ml to 2 ml in prefilled syringes №1, №5 or "Nalbuphine" injection, 10 mg / ml and 1 ml, or "Butorphanol Tartrate" solution "Injection 0.2% - 1 unit; Medical latex gloves, sterile examination "IGAR" or surgical gloves Medical latex "Snow White" - 1 unit;. means hemostatic medical sterile (haemostatics) case or carton bag, or Thermo - 1 units. AMVI foreign production is created and adopted in 2005 by the US Army (and later NATO troops) individual medical kit in form of backpack for a soldier (8 kg) with all the necessary tools and medications to provide first aid, Improved First Aid Kit (IFAK). Conducted as part of the development of new military medical research kits, as well as combat experience showed that the main reasons for death of the wounded soldiers before the arrival of skilled care is excessive blood loss and occlusion of the airway. This determined the complete set of advanced kits IFAC. In accordance with the tasks that must be solved in giving first aid in combat, modern military first aid kit should include (in accordance with Rule C-A-B-C):

**C. Hemostatic:** 1) Harness to stop arterial bleeding C.A.T. - Combat Application Tourniquet. 2) Bandage for First Aid with an applicator for the wound pressure - The First Care Bandage Israeli production. 3) Hemostatic agent based on chitosan - Celox, ChitoSam in the form of pellets or in the form of the more modern hemostatic bandage (combat gauze) - Combat Gauze, QuikClot, H & H Compressed Gauze PriMed etc.

**A. Means airway** 4) Nasopharyngeal (nasopharyngeal) duct (The Pro-Breathe, Kendall Argyle, etc.) - Is an important and effective way to restore the airway in case of tongue retraction.

**B. Means against respiratory disorders:** 5) Occlusal Asherman chest patch -Asherman Chest Seal, Halo (or other). 6) Set for decompression - Decompression Kit. (Special catheter needle decompression of the chest - ARS (Air Release System)).7) Special mask with valve for artificial respiration by the "mouth-to-mouth" - CPR Face Shield (or other).

**C. Means for stopping Slight bleeding, maintaining circulation, anti-shock and other means:** 8) Normal sterile bandages, wipes and / or dressing packets; 9) Termoblankets HRS or Blizzard Survival Blanket; 10) An intravenous catheter G18 (green); 11) Triangular scarf; 12) Plaster bactericidal; 13) The patch spool; 14) Scissors; 15) Rubber gloves; 16) Antiseptic (chlorhexidine or others.); 17) Safety pins; 18) Indelible the marker; 19) Medications (- nonnarcotic Analgesics (paracetamol, diclofenac, ibuprofen, or others);- antibiotics (cephalexin, norfloxacin or amoxicillin, or the like.); - other drugs - sedatives, antidiarrheals, eye drops, granules for water treatment, cough, etc. are not the components of IFAK kit, but may be available in view of practical convenience, and preferably in a separate package.

**Conclusion.** As a result, by comparing AMVI national and foreign production it was found that they differ in content greatly. This is due to the fact that today in Ukraine, unfortunately there are no standards and requirements for AMVI for giving first self-help and mutual aid. However, experts of Ministry of Health and the Ministry of Defense of Ukraine are planning to develop these standards.

**SECTION № 20**

**SOCIAL SCIENCE**

## ANOREXIA: GENDER ASPECTS

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**Introduction.** The problem of anorexia in the modern world worries not only doctors but also society. Today more than 2.5 % of women mostly young people of countries with high living standards are victims of anorexia. Unfortunately, this figure is increasing because of the death rates 20 % because of the disease and absence of effective treatment. **Purpose of the study.** The aim of this work is to study the gender dimensions of the phenomenon of anorexia. **Materials and methods.** Research methods are based on the analysis of sociological studies on anorexia published in the British Journal of Psychiatry. The features of male and female anorexia were studied with the help of such methods as synthesis, analysis and comparison. **Results.** Anorexia is considered as a female disease. In 80 % of cases patients with anorexia are girls aged 12 – 14 years. The other 20 % of patients are women of older age and men. Male anorexia is a problem of a larger scale than it is described in the media. The reason is the failure to recognize the presence of the disease and as a result, the reluctance to seek a qualified medical help. Anorexia is a disease associated with malnutrition. In anorexia observed an abnormal desire to lose weight, an intense fear accompanied by obesity. The patient gets incorrect perception of his image. There are some factors of anorexia:

- social (environmental impact, imitation of “ideal” image);
- biological (genetic and biological predisposition to anorexia);
- psychological (influence of family and domestic conflicts).

Between male and female anorexia there are some differences:

- male anorexia is never an independent disease, but a symptom of another disease progression (female anorexia has an extremely independent nature);
- male anorexia is hardly visible (more obvious in women cases);
- treatment of male anorexia is more difficult than the female one.

The report published in 2014 in the British Journal of Psychiatry dealt with the fact that the causes of anorexia can be different: seasonal changes of temperature, sunlight, catarrhal infections or mother’s diet during pregnancy, subconscious psychological influence of men who like only slender girls. It is proved that loss of appetite leading to weight loss may indicate serious problems in the internal organs and systems, metabolic diseases, endocrine, genitourinary and gastrointestinal systems. Tumor processes, chronic pain of any origin and nature, incorrect and uncontrolled medication for weight loss lead to physiological exhaustion. Anorexia is a disease. Its treatment is a prerogative of psychiatrists and psychologists. To develop a method of treatment of this disease it is necessary to identify and neutralize the causes of each patient individually, taking into account the problem of gender. XXI century propagate fashion and the ideal of a slim body that needs a diet or even giving up eating. At the present stage of social development it should be carried out a preventive work with young people who are under the influence of communication provocations of “model look” that can later lead to anorexia. A preventive medicine should replicate the effects of anorexia for male and female health.

## **PROSTITUTION – AN ETERNAL SOCIAL AND ETHICAL ISSUE**

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**Introduction.** Prostitution – is a paid sexual service. Contradictory public attitude to prostitution as a paid professional sex is connected with the ambivalent character of sex. On the one hand sex brings pleasure so sex service can be considered by analogy with any other services. On the other hand sex without childbirth was usually condemned in past. So public morality “taboo” disordered sexual relationships and condemned those people who had sex out of family. This conviction was the stricter in more monogamous society. Rehabilitation of sex started in Western countries only in the last third of the XX century.

**Purpose of the study.** The aim of the research is to consider the historical aspects of prostitution and to identify the “roots” of its survival throughout the history of mankind. The negative attitude to prostitution in society is connected with the prevalence of sexually transmitted diseases in frequent sexual relations. Gonorrhoea was known in ancient times. In Western Europe of New Time Era the negative attitude to prostitution was connected with a large scale of syphilis and AIDS epidemic.

Prostitution in modern world is considered to be a manifestation of deviant behavior. However, can we judge so simple? What sources make the fight against prostitution a hard task?

**Research methods.** Dialectics as a method of studying phenomena in the process of its formation and development contradictory is among the research methods. The study is also based at hermeneutics as a method involving the compulsory registration of the atmosphere and the conditions of a particular era in analysis of historical events.

**Results.** Prostitution emerges a long time ago in completely different parts of the world with some few differences. Men always needed women’s attention. Many centuries “fallen” women were an integral part of society, so they could achieve by their impact on men, helping them in their self-realization.



Sexual life is extremely important for men in aspects of emotional terms and natural biological needs. Prolonged abstinence may be a risk factor of neuroses and erectile dysfunction, which may lead to problems with impregnation. In many religions the attitude to the male self-gratification is negative. But what should do a single man if he wants to maintain his health, refusing self-satisfaction? The only one solution is a girl whose profession connected with sex service.

A strong need of prostitution occurs in crisis times in country with some military conflict when the male psyche has serious congestion. So there is a need to ensure the male population of healthy women who have undergone medical examination.

The main problem is in the fact that prostitution is not legalized in our society (that means lack of proper medical supervision), so men who use a sex service have a risk to be infected by a sexually transmitted disease.

Other countries' example shows that the legalization of prostitution is quite acceptable in the modern world. Prostitution is legalized in eight European countries (Netherlands, Germany, Austria, Switzerland, Greece, Turkey, Hungary and Latvia). In Asia prostitution is legal in Japan.

**Conclusions.** Prostitution as a social phenomenon has a negative side. However, the biological nature of man and his sexual needs turn prostitution into phenomenon that has a strong position. And losing these positions in a short term is unlikely to be possible.

## THE LUBNY FIELD PHARMACY – THE FIRST PHARMACY ON THE LEFT-BANK UKRAINE

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**Introduction.** Lubny belongs to the oldest cities of our country. History of Lubny foundation is associated with the name of the Kyivan Prince Volodymyr Svyatoslavych. The beginning of the pharmaceutical business in Lubny is connected with the Mhar's monastery that was founded in 1619. Using a huge number of wild medicinal herbs, monks prepared medicines and with prayers sold them to patients. The Lubny pharmacy inherited traditions of the Mhar's monastery.

There is a quite common opinion that Peter I personally founded the Lubny pharmacy. After the Battle of Poltava in 1709, the Russian Tsar made a brief stay in Lubny. He noticed an advantageous strategic position of the city. Besides the rich flora and traditions of the Mhar's monastery suggested him an idea to establish a field pharmacy that could provide troops guarding the south of the state with medicines.

Various authors give different dates of the pharmacy foundation. However, personal diary of Yakov Andriyovych Markovych is documentary evidence to the fact that the Lubny pharmacy was established in 1721. We also found archival materials definitely confirming the fact that the Lubny field pharmacy was founded during the life of Peter I, and the Senate's Decree of September 3, 1733 officially registered the existing pharmacy. Three years later, in 1736, the Special Government Commission inspecting the activities of Russian pharmacies held up the Lubny pharmacy as an example to others as the best one.

**Conclusions.** Thus, archival documents show that the Lubny field pharmacy was the first one on the Left-Bank Ukraine and eventually became the centre of pharmacy and cultivation of medicinal plants in the region.

From the second half of the 19<sup>th</sup> century the government gave preference to the purchase of drugs abroad, and then the pharmaceutical business in the Lubny region began to decline. Traditions of the Lubny pharmaceutical industry were revived in the Soviet times.

**TRANSGRESSION AND VIOLENCE**  
**(AFTER "A CLOCKWORK ORANGE" BY A. BURGESS)**

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**Introduction.** This work is devoted to philosophical and anthropological analysis of violence. People have never been alien to the solution of conflicts by means of brute force and violence. However, nowadays, aggression from a single natural psychological impulse or socially motivated act is increasingly transformed into unmotivated but stable pattern of behavior. Thus, spontaneous aggression inherent in the behavior of any teenage individual or transitional community turns into ultra-violence - radically aggressive mode of thought and action. The problem becomes even more acute if we look at it from philosophical point of view. This view helps to understand that the causes of violence are rooted neither in psychological problems of an individual or the humanity in general (as S. Freud supposed), nor in a social disadvantage of certain historical situation, but in universal property of human nature. This property has been characterized by modern philosophy as eccentricity (H. Plesner), or transgression (G. Bataille, M. Foucault, M. Blanchot).

The **aim** of our work is a philosophical theming of problem of violence as one of the aspects of human nature. The research methodology is represented by synthetic approach that combines elements of psychoanalysis, social phenomenology and semiology as well.

The term of transgression describes the phenomenon of human transition the borders that are usually inviolable, such as barrier between possible and impossible, conceivable and non-conceivable, or the border of nature itself. In contrast to the classical philosophical concept of "transcendence", transgression is not so much an act of consciousness as existential challenge carried out by an individual in search of himself: looking beyond limits of our capabilities, we identify the "center" of our own existence.

The concept of "transgression" is to be regarded as morally neutral. Its value indefiniteness is similar to the neutrality of the concept of "free will", valuable content of which found only in the field of choice, to be exact - in its motivation and result. Therefore transgression should not be considered as destruction or self-destruction.

Violence is one of the manifestations of transgression determined the situation "when God died a long time ago" (S. Datsyuk), and the individual puts himself in God's place. Thus, in place of the all-powerful Creator Destroyer comes experiencing the strength of structures, retaining his own identity from the collapse.

Anthony Burgess' novel "A Clockwork Orange" is a story of Alex, a young sociopath, robbed, raped and eventually killed for pleasure. Alex's actions lead him beyond himself and beyond the limits of humanity at all. His cruelty is transgressive, as it is committed frenzy, with abandon and not being substantiated rationally. Victims of Alex and his company are people of different ages and various activities. Crimes committed with no certain preference. Selection of victims is situational: by their appearance, gender or social status. This turns brutality into almost natural disaster or imminent providence, whose motives are beyond human comprehension.

For Alex, incentives of his craving for violence were psychedelics and classical music. Music by Beethoven and Mozart not only charges Alex with destructive energy, but also symbolically transforms the monstrous acts in the actions, reminding ancient mysteries, in which god, the sacrifice and the killer of god merged. An allusion to this motif is a special language that young offenders communicate with. This transgressive language is something more than teenage jargon: it is a parody of sacred formulas, whose meaning is hidden from ordinary mortals. In addition, the Slavic words in English transliteration transform obscenity and brutality into game. In this regard, we can recall Marquis de Sade's books plenty of profanity that sounds like a challenge to decency and silencing of "taboo" topics.

"A Clockwork Orange" ends unexpectedly reassuring: having passed inhumane treatment and having lost the free will, Alex decides to commit suicide. Then, undergoing therapeutic intervention once more, Alex's consciousness returns to form which seems to be its initial state: "posse pecare / posse non pecare". The writer makes his character "outgrow" his attitudes and ask seriously, "What's it going to be then, eh?"

Burgess makes us realize that much more than a challenge, Alex's transgressive acts included the hope that beyond his furious cruelty is something there: the sense of life, the other person, dare to fight back, sincerely disquieted society or incorruptible morality, just state or at least, parental love and devotion of friends.

Georges Bataille believes that "man can't love himself completely unless he condemns himself". This explains why for Alex's self-finding, transgression with the positive content (creative activity, religion or love) does not fit. The world he lives in is trans-human itself. Such a world is silent: its condemnation is rather of a formal than of a moral character. In such a world everything exists beyond human creativity is emptiness, while behind the destruction and self-denial comeback to humanity begins.

# VIEWS ON RELIGION AND ATHEISM IN ALBERT CAMUS PHILOSOPHY

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**Introduction.** To understand if religion has a place in a human life it is needed to understand the concepts related to the question of God existence. Atheism – is a worldview that denies the existence of faith in God.

**Purpose of the study.** A clear understanding of the essence of atheism (by the consideration of atheism in philosophy of Albert Camus) will give each of us the ability of rational evaluation the existing provisions related to religion. “If there is no God, is life worth to live?” – the main question of Albert Camus.

**Materials and methods.** The main sources of the study are the works by Albert Camus. The research method of work is based on the principle of formulation of the question and search of solution.

**Results.** According to the aims of this work the answers to such questions as “What is the essence of atheism in the interpretation of Albert Camus?”, “What is his attitude to it?” or “What is the meaning of atheism in Albert Camus philosophy?” were given.

**Conclusions.** Analyzing Albert Camus views at religion we can emphasize the idea fully reflects his attitude to religion and has an atheistic nature: “If there is a sin against life, it does not seem to be hopeless but it is in rely on the life in the other world and evade the ruthless greatness of this-worldly life”.

According to Albert Camus a consciousness of modern man is deprived of religion and faith in God and he believes that consciousness is located on the boundaries without faith and search of a new point of support. It is very hard for person to accept the idea of senseless search for external support and the fact that he has to rely only on himself. The concept of a “broken” consciousness as a consciousness of absurd was expressed in Albert Camus works and was considered as an attack on religion in France in the 1940-ies. According to Albert Camus atheism can not be the result of a simple analysis of the life situation, it requires faith at more high level than religion. Atheism must be a religion as the most difficult one – the belief in the absurd. The works by Albert Camus such as “The Myth of Sisyphus” – is the gospel for himself. These works are full of atheistic views but it is incorrect to treat it as propaganda of atheism. Camus proved atheism is heroism and heroism can not preach. According to the philosopher's opinion a person can come to atheism not by reading books but instinctively himself.

Albert Camus believes that collision with senselessness of the world leads a non-religious person to the hope as a single output that lies inside him and in the creative openness of his existence.

## PHILOSOPHIZING AS BEING-A-HUMAN

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The **aim** of this work is to rethink the traditional understanding of philosophy as knowledge following "after physics". The main objective of the study includes making clear the existential meaning of philosophizing. Another important objective is to define the correlation between philosophizing as "generic" human activity and human existence as a phenomenon that requires being interpreted from philosophical point of view. That is why the method of existential analysis was applied to the basic philosophical texts devoted to this problem: Aristotle's "Metaphysics", M. Heidegger's "Basic Concepts of Metaphysics" and "What is It - Philosophy?".

Nowadays, philosophy is often seen just as a form of knowledge, which stands in a number of others, such as a common sense, scientific research or religious meditation. This place of philosophy in culture is largely determined by a random sense, incorporated in the term of metaphysics - literally, "what comes after physics". Perhaps it was alleged philosophical "following after science" that has given the reason for later philistine discredit of philosophical studies as insufficient, unverifiable, unsustainable, unpractical, and therefore non-binding. Philosophy is often accused of being unscientific, but it shows not so much the weakness of philosophy as a lack of understanding inherent to its critics. In order to eliminate such misunderstandings we need to disclose true content of philosophizing.

Aristotle, speaking in his "Metaphysics" of knowledge, claims that cognition is a natural need for human. Naturalness, in turn, means to philosopher, the realization of human's own destination. Thus, philosophy in the context of classical European tradition is essential human activity, contributing to the realization of its reasonableness, craving for harmony and integrity. Therefore, being-a-human involves thinking about the world as a whole. We offer a different view of these issue found in the works of existentialist Martin Heidegger: philosophizing means being-human-completely.

In his work "The Basic Concepts of Metaphysics", German thinker defines philosophizing as metaphysics that is, reasoning about Being. Such reasoning, according to Heidegger, is "an eluding into human being darkness". This image characterizes the essence of man as something that is unclarified for himself, "dark depth with no limits", place of his "ultimate solitude", "the last dispute" and

"permanent exertion embracing him completely". Consequently, philosophy as a questioning of the world is not possible without having to be "completely human".

Being-a-human, to Heidegger, has several aspects. First of all, this means the capacity for saving one's own solitude (independent and responsible self-immersed thinking) and the rejection of ready-made answers. However, a person lives as a "com-plicity", (coexistence with Others) imprinted in history and the history of thought, as well. In this sense, humanity includes to "open our ears releasing our hearing for what is told to us in tradition as an Existence of the Being". Third, to be a man, requires one's initial "matching the unity of the Being" turned into "specifically carried out behavior attitude". What does this mean? Man, according to Heidegger, does not exist as a separate fragment of the world, but coexists with it as its organically integrated element: "Accordance with the Being remains our permanent residence". On the other hand, in our daily lives, we tend to be "switched" to the empirical level of existence, where fragmental ideas, individual goals and objectives splitting the world apart appear to be determining things. That is why we are experiencing the discomfort of ignorance, incompleteness, misunderstanding, loneliness and imperfection. This longing for harmony, for the "forgotten" unity of the world Heidegger (following poet Novalis' metaphor) calls "nostalgia, human's craving to be everywhere home". Therefore, human "specifically carried out behavior attitude" should include putting the personal world picture together. The means of such kind of gathering-the-world-together should be our ratio, and its criterion is a sense of unity with the world and being "everywhere home". This is the main function of philosophy - to create a universal and objective project of the world as a unified Being.

**Conclusions.** Thus, the interpretation of philosophy only as a science and philosophizing exceptionally as a cognitive activity impoverishes their meaning and content. Philosophizing is an intense, work which turns a person into a carrier of universal anthropological properties. Understanding this we restore the original meaning, founded by Aristotle and transformed later into the term of metaphysics: "first philosophy". First philosophy is a meditation on ultimate entities which are primary to any "physics" or any special knowledge. And as a man is the only being unable to bear his own ignorance of the foundations of the universe as well as ignorance of his own roots, to philosophize presupposes human's implementation as a human. To realize our own incompleteness on the background of absolute Being means to be human completely.

## ARCHITECTURAL MONUMENTS OF ANTIQUITY IN MODERN ROME

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**Introduction.** History of Ancient Rome is the length of time, spanning more than a thousand years. Rome is deservedly called the "Eternal City", because here are the most preserved architectural monuments of different eras.

**Aim.** To consider all the stages of development of the Roman Empire, characterizing by the monuments of ancient architecture in the modern Rome.

**Materials and methods.** Studying, generalization and analysis of literary sources.

**Results and discussion.** The Romans laid the foundation for a new era of world architecture, in which the principal place belonged to public facilities, designed for large numbers of people. From the earliest stage of Roman history, the king, have survived very little. It is the ruins of the fortress wall of blocks of volcanic stone. From the second, republican, phase, which lasted four and a half centuries, have survived some monuments. This is the ruins Roman Forum, scene of all the important events of the political and economic life, including the so-called sacred road (Via Sacra) and the temple of Vesta. At the foot of Capitol Hill, preserved arcades of Tabularium. The era of the early Roman Empire covers the period from I c. BC. to I c. AD. In modern Rome, it is represented by several objects of universal values. These are so-called Imperial Forums. One of the very well-preserved monuments is the marble Arch of Titus in honor of the successful campaign of the Romans at Jerusalem. One of the main symbols of the entire Roman antiquity is the Flavian Amphitheatre or the Coliseum (75 AD - 80 AD). From the era of the last empire it reached us even more architectural and historical monuments. This is the famous Column of Trajan and a part of the Basilica, the Pantheon, the best preserved other ancient monuments of Rome and Hadrian Mausoleum, built on the right bank of the Tiber to the emperor and his family. About the late Roman Empire remind term ruins and triumphal arches. The biggest of the Roman baths - Baths of Caracalla, occupied the territory of 340 x 330 m. In summer they are used for opera festivals. And in the baths of Diocletian is now in the National Roman Museum. From the triumphal arches of the epoch the best known are two - Arch of Septimius Severus and the Arch of Constantine.

**Conclusions.** In general, we can assume that since ancient times in Rome survived not so little monuments, especially considering the long and turbulent history of the Eternal City.



## **PROBLEM OF LIGHT AND COLOR IN THE WORKS BY CLAUDE MONET**

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**Introduction.** Actuality of the chosen topic is connected with the significant influence of the works by impressionists and Claude Monet on the further development of art. The topic needs a special study.

**Purpose of the study.** The aim of study is to investigate impressionism as one of the art trends of the XIX century in France, to study the main periods of the history of this trend, to analyze the works by the most famous impressionists of XIX century, including Claude Monet.

**Materials and methods.** The sources of the study are the works by Claude Monet and the examples of impressionism art. The main research methods are based on structural analysis and comparative method.

**Results.** Impressionism emerged in France in the 1860-ies. Impressionism largely determined the development of the art of the XIX century. The central figures of this trend were Claude Monet, Edgar Degas, Edouard Manet, Auguste Renoir, Alfred Sisley, Paul Cezanne, Camille Pissarro and their contribution to the art development is unique. Impressionists were against the conventions of classicism, romanticism and academician style, maintained the beauty of everyday reality, simple democratic motives, tried to catch the “impression” of what the eye sees in particular moment, not focusing on drawing specific details. They didn’t use dark and earthen colors and used pure spectral colors, almost without mixing them. Impressionism emerged from the workshops in the open air. An important principle of impressionism was a departure from the typicality. An art got instant and casual look features, it seems that impressionism canvases painted by simple passers-by who walks along the boulevard and enjoys life.

During the two decades impressionism spread all over the world, affected the works by many artists in other countries, they learnt new aspects of reality, mastered the effects of plein air and some new techniques.

Impressionists created a new method of painting trying to express their immediate impressions of things. The essence was to transfer the external impression of light, shadows, and reflections on the surface of objects by separate strokes of pure colors that form visual diluting the surrounding light and air. The favorite genres of impressionists were landscape, portrait, multi-figure compositions in which they tried

to convey their impressions of the world: the scene on the street, in cafes, sketches of Sunday walks, etc. Impressionists portrayed the life full of natural poetry with a person in a harmony with environment that is always changing in pure and bright colors.

Claude Monet is among the few artists whose works represent a whole era in the history of art. Claude Monet paid a special attention to the study of variability of tone and color of objects in the environment every moment that changed. With the help of this approach he reproduced the same scenes several times trying to get exceptional color purity and actually removing from his palette the black paint. Claude Monet was interested in the works by chemist Eugene Chevreul who made a revolutionary observation in physiology of vision and color perception. The artist used a combination of fundamental physical laws and additional colors as strong means of artistic expression. Claude Monet art was characterized by special coloristic system. The system included the expansion of complex tones for certain solid colors of the light spectrum. Some colors gradually imposed on the canvas with the expectation of optical mergers in the eyes of the viewer. This technique created a surprisingly lively, kind of fresh painting.

Early paintings by Monet, such as “Woman in Green” (1866), “Women in the Garden” (1867), and some later, such as “Bridge to Argenteuil” (1874), “Rocks in Belle Ile” (1886) marked freshness and rich flavor. In his later works, such as “Impressions. Sunset” (1873), “Boulevard des Capuchins in Paris” (1873) and especially the paintings of recent years – a series of “Grainstacks” (1890 – 1891), “Poplars” (1891 – 1892) and views of London (1900 – 1904) Monet admired a transmission of subjective, random, fleeting impressions, self-contained experiments in color decomposition. The best works by Monet belong to the world heritage art.

**Conclusions.** Impressionism in art opened for artists and audience a new vision of the nature of color and light. Impressionism is a philosophy and technology, it is a new artistic vision of the world.

**SECTION № 21**

**PHILOLOGY**

## RUSSIAN IDIOMS IN COMPARISON WITH ARABIC

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**Introduction.** At the present stage of development of human society the increasing attention is paid for problems of language development as communication resources and as pantry knowledge and memory of material, social, spiritual, cultural achievements and riches of different peoples and nations. This interest is caused by intensification of intercultural communication.

**Aim.** The aim of the research is determination of the specifics national-cultural component on the basis of a comparative analysis of the Russian and Arabic idioms, which are part of the group "Family".

**Materials and methods.** The main research methods are: a method of component analysis is used when signifkativ phraseological meanings are determining; the method of functional-parametric descriptions – when semantic structure of phraseological units are determining; cognitive method – when the internal phraseological form, it's figurative-associative complex characteristics associated with the individual's ability of representation real world situations reflected in consciousness are determining.

**Results and discussion.** The nationally-cultural specificity of language, relationship with the national and spiritual life of people and their history manifests brighter in proverbs. The higher level, as the ultimate goal, intercultural communication can be achieved when communicators advert to texts of art literature. Only when person mastered the most important resources of language and culture, which includes proverbs and sayings, participants of the intercultural communication will be able to smoothly operate such concepts like "Life", "Death", "God", "Destiny", "Evil", "Motherland", "Love" and so on. Study of these concepts shows a lot of common traits in the mentality of Arabic and Russian people. Such facts must be systematized. There are many international themes and motifs in proverbs and sayings of the different peoples. And it is naturally, because the peoples of different countries and cultures have similar moral ideals. Therefore, studying Arabic proverbs and sayings, comparing them with the Russians, give as a great opportunity to expand our own knowledge of Arabic and Russian languages.

**Conclusions.** The comparative analysis of phraseological units of Arabic and Russian languages allows concluding that phraseological units of both languages are based on the common cultural elements, indicating the commonality of human thinking. The spiritual life of the nation, the ethnic group mentality is reflected in components-names, which is used by every individual in his cognitive activity.

## RUSSIAN AND UZBEK PROVERBS ABOUT THE HOMELAND

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**Introduction.** Proverbs are brief sayings instructive in nature, passed on by people from generation to generation. Patriotism is presented in Russian and Uzbek Proverbs, there are also emotive words expressing a person's place of birth, region, country.

**The aim** of this work is the analysis of linguistic realities for cultures of two nations and their attitude to the ancestors', land, their national character, interests, customs and traditions. The main research **method** in this paper is the comparison of the Uzbek and Russian Proverbs about the Motherland, the peoples' life experience in the history of their existence and development.

Some Russian Proverbs have their "twins" in the Uzbek language. For example, Proverbs, where the homeland is compared to the Golden cradle: rus.: Земля родная словно колыбель золотая. Uzb.: O`z yurtning – oltin beshiging. – You Homeland – the cradle of gold. If in Russian Proverbs native land is compared to Eden, in Uzbekistan – to the throne of Suleiman. Rus.: Горсть родной земли дороже золота. В родном крае и дым сладкий. Своя земля и в горсти мила. Родной край – земной рай. Где родной край, там и рай. Uzb.: Bulbul chamanni sevar, odam – Vatanni.– Nightingale flower garden loves, man home. Odam Vatani bilan tirik, o`rdak ko`li bilan.– People homeland alive, duck lake. O`z yering qadrdon maskan. – Own land touch of heat. O`z yurtning – oltin beshiging.– You Motherland – the cradle of gold. Vatan Sulaymon taxtidan yaxshidir. – Homeland is better than the throne of Suleiman. If "homeland" is always with a positive connotation, the proverb of a foreign country has a negative characteristic. Rus.: На чужбине и собака тоскует. Родимая сторона – мать, чужая – мачеха. На чужой стороне и весна не красна. Uzb.: O`zga yurtda shoh bo`lguncha o`z yurtningda gado bo`l.–It's better to be a shepherd at home than be a Sultan in a foreign land. O`z ayvoning yaxshidir, begona saroydan. Is your house better someone else's yard. O`zga yurtda – har qadamda chuqur. – In a strange land in every step is a hole. O`zga yurtda shoh Lekin o`z yurtiga brgona. – Even in exile you are the Sultan, but in the Fatherland you breathe. Begona joyda it ham dumini qisar. – In exile and the dog shakes the tail. Both peoples personal freedom is inextricably bound to the freedom of their homeland. Uzb.: Vatanni qo`riqlaganing sari mardliging oshar.– When the home guard itself grow. Sergaklikka ulgurding O`z yurtningni asrading Sergak bo`lib turmading Yuz yil g`amga tashlading. – Succeeded veteran that his edge guarding. Instead of guard – a century of adversity to live. Rus.: Жить – Родине служить! Родина – мать, умей за нее постоять. За родной край – хоть умирай!

In **conclusion**, it should be noted that the reasons of the proverbs similarities are connected with the common features of peoples' destinies and a deep patriotism sense of any culture, regardless of their origin.

## PROBLEMATIC ISSUES OF LATIN PRESCRIPTION TERMINOLOGY

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**Introduction.** "Prescription is a magic leaf which remains after the visit of the doctor and gives hope for recovery." Correctly written prescription is a very important element of medical ethics and deontology.

**Aim.** The purpose of our research is to find out the problems of excerpption of prescriptions with mistakes because human life can depend on incorrectly written prescription.

**Work material and methods.** Such methods of research have been used while performing this work: supervision, comparison, generalization, analysis and synthesis, induction and deduction, modeling, hypothetical, historical and logical methods, analogy.

**Results and discussion.** Having analysed the approach of division of prescriptions into different parts, scientific and educational media we have found out that the structure of prescriptions significantly differs from each other. The first part of Inscriptio and the eighth part of Signatura are identical by all the authors and they don't change. The second part is Datum by some authors, and Nomen aegroti by the others. The third part of prescriptions is Nomen et aetas aegroti or Nomen medici, and sometimes even Datum-Inscriptio. The fourth part of prescriptions traditionally has to be Nomen medici, but in some sources it is specified as Invocatio or Aetas aegroti. The fifth part is Invocatio (Ordinatio), but it is Praescriptio by some authors, and Nomen medici by the others. The sixth part is Designatio materiarum. Sometimes it is replaced by Subscriptio or Praescriptio. The seventh part is Subscriptio and mainly it is the same by all the authors. Word order is often changed in the name of the ninth part (Nomen et sigillum personale medici), but the point remains identical - Nomen medici.

**Conclusions.** We consider that the weighed approach to the prescription as to the important document begins with unambiguous and correct approach to its division on parts and to its correct and reasonable name. Especially it is important in structure of insurance medicine which sooner or later will be accepted in Ukraine. And the regulation of this question, in our opinion, is an important task of the Ministry of Healthcare of Ukraine.

## TYOLOGY LOGIC ERRORS AND METHODS FOR AVOIDANCE A PROFESSIONAL SPEECH

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**Introduction.** There are some common logical errors in the speech. Also, an ignorance of logic leads to errors in compiling the text of the official document basic laws.

Logical errors are divided into two classes:

- 1) actually logical errors (errors of thinking errors of the content);
- 2) speech errors (errors of the expression, secondary logical errors).

Do own logic errors include: errors related concepts; separation concepts and their definition; errors on judgment; reasoning errors; argumentation errors; errors regarding compliance with the basic laws of logic; construction text errors.

Logical errors exhibit the full range of mental and semantic violations.

For secondary illogic, besides allocated, include the following:

- Logically inconsistent combination of words, eg .: scary good;
- The use of semantically empty (unnecessary) words, tautology, eg .: the month May, my personal case, I personally, protective immunity;
- Violation of the order of words in a sentence, eg.: Success breeds efforts;
- Comparison of incompatible concepts, eg .: The structure of the company differs from other companies;
- Violation of chronological accuracy, eg .: In the seventeenth century. in Lviv region;
- Substitution of concepts, eg .: Rheumatoid diagnosis does not allow me to go;
- Unclear demarcation of concrete and abstract concepts, eg .: We talked about the famous writer and read his work's abstracts;
- Inconsistency of cause and effect, for example. Increasing of number of violations depends on how actively lead the fight to them.

These kinds of logical errors are quite common in speech, and can lead to misunderstandings in communication. To prevent this, it is necessary to monitor the speech constantly, trying to correct mistakes.

**Conclusions.** Thus, the analysis of logic errors in professional broadcasting give conclusions that for professional figure to be logical in the conventional sense of the word is not enough. For him, the logic should be a fine tool which should be able to enjoy. Logical errors in speech not only generate confusion expressions, distorting its meaning, but also lead to absurdity, comedy broadcasting. Parody sound of certain statements in such cases reject their informative value. A close relation to vocabulary, correct word choice, thoughtful analysis of the logic of speech help to avoid similar mistakes.

## EXOTIC LANGUAGE AS LINGUISTIC PHENOMENON

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**Introduction.** Due to the fact that in the modern Russian language are actively used foreign words, actually seems thorough study of various types of foreign words, one of which is an exotic vocabulary.

Description exotic vocabulary as a linguistic phenomenon is **the aim** of this study. **The material** of the study is served by exotic vocabulary, functioning in the Russian language. Research **Methods** are description, comparison, analysis.

Exotic vocabulary, or exoticisms - is a form of borrowing, which is the name of rites, customs, household items, clothing, household goods of other nations, other countries. The realities designated by exoticisms, no in any country which borrows language.

The exotic vocabulary exoticisms allocated, differ in their origin, especially in nominative value and frequency of use. Words exoticisms constitute passive reserve of vocabulary of the Russian language. However, it is widely understood that some regular exoticisms, have a long history of use.

An important is the fact that the exotic lexicology lexicon traditionally refers to non-equivalent vocabulary.

It must be emphasized that exoticisms as a special type of foreign language vocabulary distinguishes strictly nominative character values: exoticisms are mainly concrete nouns. Define the main linguistic features inherent exoticism: the narrow scope of use; almost zero derivational productivity; inability to semantic variation; low compatibility, as evidenced by the lack of word exoticism synonyms and antonyms; underdevelopment of native speakers.

In conclusion we can draw the following **conclusion**: exoticisms often not translated due to the fact that the events and realities that they designate, characterized mainly to the people in question.

Exoticism may not be exact synonyms in the Russian language, they often have a coloring book, have a weak formative productivity. Exoticism are used in speech and in literature, as well as in journalism.



## COMPARISON OF RUSSIAN AND TURKMEN PROVERBS ABOUT THE HOMELAND

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**Introduction.** There are key words or concepts associated with the notion of "homeland" in Turkmen Proverbs and they are the purpose of our research in comparison with those in Russian Proverbs.

In the Turkmen language the concept of "homeland" the following components are distinguished: 1) a love for native land. The homeland for the Turkmen people is the object of love and respect (Özüň gökde bolsaň-da topraga tagzým et. – Even if you're on top, make a bow to Motherland). Rus.: *Родная земля и в горсти мила*; 2) the native land – is the most important thing in human life, as a family, mother and father (Suw – atadyr, ýer – ene. – Water – father, earth – mother. Watan duzy we süýdi ene – mukaddesdir keramatdyr. – Salt of the Motherland and the mother's milk is Holy, sacred. Adamyň ilkinji Watany enedir. – The mother is the first birthplace of man. Ataňy sylamak, Watanyňy sylamakdyr. – Dad respect – home respect. Atasyny sylamadyk – ýurduny sylamaz, enesini söýmedik – topragyny söýmez. – Who does not respect his father, does not respect his Motherland, the one who doesn't like mother -hates the earth). Rus.: *Береги землю родимую, как мать любимую*; 3) life is impossible without homeland (Ýaryndan aýrylan ýedi ýyl aglar, ýurdundan aýrylan ölinçä aglar. Who breaks up with his wife – will cry seven years, who leaves the homeland – will cry up to death). Rus.: *На чужбине родная земля и во сне снится*; 4) the contradiction of his and others. Everything that surrounds man in his own home, makes his life happy (Özge ýurtda · bolandan, öz ýurdunda geda bol.– Be the poor in homeland – better than to be a Sultan in a foreign country). Rus.: *Как в гостях ни хорошо, а дома лучше*; 5) the pride for the Fatherland. Every person must be proud of the family place and the Motherland will appreciate it. (Beýiklik-diňe watandadyr we beýiklik watan bilen. – It's great only at home and great just with the homeland). Rus.: *Нет ничего на свете краше, чем родина наша*; 6) the condemnation of those who don't appreciate their homeland (Ata watanyna dönükklik eden kişä biziň aramyzda orun bolmaz. – The one who has betrayed his country, there is no place among us). Rus.: *Худая та птица, которая гнездо свое марают.*

In **conclusion**, it should be noted that the historic memory of the people, Turkmen wise sayings brought to generation the whole range of feelings expressing the broad notion of "homeland". In Russian language this concept is more often associated with the concept "mother earth" in all its diversity.

# VERBAL EXPRESSION OF ANGER IN MODERN RUSSIAN PHRASEOLOGY

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**Introduction.** The formation of the anthropocentric paradigm now turn led to linguistic research in the direction of the person. Many, such as E. M. Vereschagin, D. O. Dobrovolsky, V. G. Kostomarov, V. M. Mokienko, A. M. Melerovich, V. N. Teliya, A. D. Rayhshteyn, V. A. Maslov and other scientists have dedicated their scientific works studying this area. More and more interest are the processes the relationship of language and thought, language and culture, language and society, language and psychology. The study of conceptual categories performed at the crossroads of different disciplines: cognitive linguistics, ethnolinguistics, cultural linguistics, psycholinguistics. The group of phraseological units expressing anger, not chosen by chance, since, firstly, idioms characterize manifestation of one's inner emotional life and reflect emotions through a kind of "mirror of human emotions, perceptions and evaluations" (Royzenzon, Avaliani), and secondly, it this group of idioms captures strong emotion. Linguists, as well as psychologists, relatively recently turned to a detailed study of the problem of emotions. Emotions are subjective human relationships, which are expressed in facial expressions, pantomime, intonation and, finally, in terms of speech.

**Aim.** The emotion of anger and its expression in the Russian - not a new topic in linguistics. But not all the expressions selected by the researchers before, are equally commonplace, so the task of our work - determine which are most common idioms in describing the emotions of anger in Russian language picture of the world and how the emotion of anger is conceptualized in the modern Russian.

**Materials and methods.** The material of the research are 50 Russian idioms, which make sense "anger". These idioms were selected from a Russian-French phrasebook. The study is a synchronously-comparative description of the material, based on the study and synthesis of the major achievements of modern linguistics and phraseology theory, their basic concepts. The object of this study selected a group of phraseological units expressing anger in the Russian language. The study of phraseological semantic field is one of the most controversial and complex due to the fact that an important feature of their emotional experiences is inaccessible for direct observation. In this connection, great importance is the question of how the conceptualization of emotional states. The main methods are: comparative-typological method and idiomatic method of analysis, component analysis method, the semantic field, the statistical method of processing results. Practical methods were

observation method, method of description and method of the survey informants - native speakers. The scientific novelty of the work lies in the fact that it is the first experience in the analysis of the semantics of the most common idioms, expressing anger. The paper identified the features of cultural identity reflected extralinguistic realities in phraseology. Also, in an attempt to observations over data idioms in everyday speech of native speakers (informants survey).

**Results and discussion.** Works by contemporary linguists dedicated to the issues of semantics, pragmatics and grammar can not be complete without taking into account the emotional factor. However, despite the recognition of the importance of the emotional factor for language learning, this area of research remains one of the most complex and controversial. In the Russian language picture of the world a large number of metaphorical expressions of anger are subject to coherent scenario of anger as a hot liquid in the container: *(за)кипеть, накинеть, кипятиться, взрывать(ся), бурлить, вспылить, выпускать пар*. This metaphor «anger - hot liquid in a vessel», said that anger can be intense *(напирать, переполнять)*. It can lead to loss of control and loss of control that can be dangerous for others as well as to the subject of emotion. Metaphor of hot liquid in a vessel *(кровь вскипает в жилах)* is related to the danger of explosion. A special case of metaphor anger – heat stands metaphor anger – fire *(довести до белого каления)*. Speaking about the aggressive nature of anger, it should be noted that the emotion of anger, as the material in Russian culture associative corresponds to the male type of behavior.

**Conclusions.** We explored emotive lexis of modern Russian, which discloses the universal features of human verbal abilities, the culturally determined differences in its organization and functioning, as well as the linguistic reflection of correlation between emotions and psychophysiological condition of the human body. Idioms expressing a negative emotion of anger is one of the most important areas of phraseological fund and, accordingly, Russian language picture of the world. In the Russian language picture of the world a large number of metaphorical expressions of anger are subject to coherent scenario of anger as a hot liquid in the container. The number of Russian idioms with negative evaluative prevails over the number of idioms with a positive connotation that can be explained by greater differentiation of negative emotions, more acute emotional and voice reaction of people is the negative phenomena. The variety of types of internal forms of idioms is based on the metaphor: 1) the physiological changes of the internal organs and physiological sensation of the face in a certain emotional state; 2) behavioral response officials, including facial expressions, gestures, body movements, and active human action; 3) the state of the inner experiences.

# THE LATIN LANGUAGE IN THE NAMING OF MODERN COMPANIES

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**Introduction.** Latin language is one of the most ancient indoeuropean languages, belongs to Latin Faliscus sub-group Italian languages. Lot of people associate it with medicine and pharmacy. But this most ancient language has found its use in wider range. With development of business and industry it became popular among businessmen to use Latin language in naming of their companies.

**Aim.** Naming(giving the name)- is a process of working at giving the name of the company or the brand. It is one of the most important problems of every businessman. There are some reasons for that:

- every company will ring reliable and harmonious in Latin.
- The Latin name can draw attention to Your business, marking it out among other competing companis.
- The name will be understandable to foreign partners.
- They bring commercial success.

**Materials and methods.** Eg. Audi corporation Company founder is August Horsch -The imperative mood of the verb “Listen” that matches the Latin verb “Audi”

Lego company. Company founder is Ole Kirk Khristiansen. “Lego” – means “I Read” or “I match”

Lego is the word that means game or company, is easy to pronounce and its name is remembered at once and forever.

Citrus company. The network of shops that deal with trading electronics and gadgets. Its name is easy to remember, it is short and unordinary.

**Results and discussion.** We confirmed the relevance of Latin names to use them in business

**Conclusions.** One of the secrets of maitaining a successful business is naming. It gives much more than just a nice name. Naming is a face of any firm, company and corporation.

## ARABIC BORROWINGS IN RUSSIAN

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**Introduction.** Speaking about the development of science and culture, it should be emphasized that the special role was played by the Arabs in the process. They have contributed to the development of astronomy, geography, medicine, mathematics, chemistry, navigation, architecture and other sciences. Many European languages contain words of Arabic origin, i.e. borrowing.

**The aim** of our work is the consideration of some borrowings that came in the Russian language from the Arabic language.

**The method of the study** of the Arabic borrowings was an analysis of the use of their values in the Russian language.

**Results and discussion.** The number of Arabic borrowings in Russian language has about 450. In Russian language the Arabic words penetrated in the period of the Mongol-Tatar yoke. Besides the words of Turkic origin, the Mongols, being Muslims, used Arabic language. One of the key terms of mathematics, "algorithm" is in Russian science Latinized version of the name of Arabic scientist al-Khwarizmi. One of the words in the title of work of this scholar "al-Jabr" — came into use as "algebra". The number "zero" sounds in Arabic as "cifre" that is why in Russian language it is known as "цифра". The decimal system of calculation in the Russian-speaking science uses numbers that are called Arabic, even though their homeland is India. The Arabic roots can be found in the other borrowings, which seem to come to the Russian language from the western languages. So the word "Admiral" comes from the Arabic word أمير البحر (Amir-al-Bahr) in Arabic means "sea Lord". The word دار الصناعة dār aṣ-ṣinā'a – "Arsenal" – means "the place of production"; "магазин" owes its appearance in the Russian language to the Arabic word مخازن (mahsan) – "the place for trading; treasury, storage". The word "тариф" was once the name of the city between the African and European continents, where customs duties from the ships passing through the Strait were taken. In the Arabic language تاريف ta'rīf is translated as "notice", and in the middle ages it meant "approved product list". The arabic origin in the Russian language also has the following words: карта, сундук, шафран, газель, канон, шаровары, муссон. In the Russian language the word "баржа" comes from the Arabic "al-barija", which means "warship", the word "галера" — from the Arabic "gurob" — "the Raven". From the Arabic language there are many astronomical terms and names, for example, of the stars: Альдабаран, Альтаир, Бетельгейзе.

In **conclusion**, it should be noted that the research of etymology of Russian words have show that a large number of them owes its origin to Arabic language. Knowledge of the history of the penetration of words from Arabic to Russian language allows you to understand the relationship between the two cultures better and to assess the degree of their mutual influence.

## ENGLISH AND PHARMACIST

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**Introduction.** What do we know about English ? We know that English is language of international meaning. Most of people use it every single day. They do it in order to understand each other to arrange matters concerning business and so on. From year to year young generation are interested in learning English. It is not simply. But it is worth learning English.

**Aim of research** to give evidence of importance of English among pharmacists. Why is it important for pharmacist to speak English ? Because pharmacist can have to do with English.

1. First of all English can come into handy unexpectedly if pharmacist runs into person who lives abroad. This person – foreigner speaks English he is from the Great Britain or the USA. He is representative of pharmaceutical enterprise which is located abroad and he is in charge of sale of medicine of this enterprise in other country for instance Ukraine.

2. In the second place this person – foreigner cannot speak Russian and he uses English but he doesn't live in the Great Britain or the USA. He learned English the hard way at school and at University.

3. In the third place foreigner is in search of persons who can speak English he wants to hire them because he wants to go about his own enterprise in Russian speaking country. Because it will take foreigner much time to learn Russian. He cannot let it happen. Time works against him. Russian will be obstacle to overcome.

A graduate is kind of person of Pharmaceutical University. He has advantages over other graduates. Because he can speak English and foreigner wants to engage him as pharmacist at his enterprise or foreigner wants to engage him as person who will be in charge of distributing medicine in Russian speaking country. Or graduate will work at pharmaceutical enterprise and he will be in charge of production of some kind of medicines. In any case a graduate will get better in English because he will have English practise every single day. And graduate will get additional sum of money on account of English. It always happens. Knowledge like this is appreciated. Knowledge is power like the Japanese people say every single day.

**Conclusions.** 1. To summarize all told we came to the conclusions that English played important role for a student of pharmaceutical University – future specialist in the branch of pharmacy being able to work by this speciality and will use English steadily in the course of work. 2. English gives a pharmacist possibility of gaining much more money using English in an oral way. 3. English gives a pharmacist possibility of finding work at a foreign enterprise in an easy way.

**VIOLATION OF ORPHOGRAPHIC AND LEXICAL  
NORMS IN THE NAMES OF DRUGS,  
REGISTRATED IN UKRAINE**

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**Actuality.** The novelty of our study is the fact that nobody thought about the number and typology of orthographic mistakes in the names of drugs, and similar studies have been conducted not only on the basis of our National University of Pharmacy, but in the country, indicating that the problem is poorly understood.

**Problem.** With the rapid development of the pharmaceutical business and the growth of a huge number of new drugs, the pharmaceutical companies engaged in drug naming process (nomination) often forget the importance of names and naming principles of medicines, often ignoring basic rules of orthography.

**The object and subject of study.** The *object* of our study are the names of medicines and dietary supplements, officially registered in pharmaceutical market of Ukraine, both domestic and foreign production.

The *subject* is the analysis of all the names of medicines registered in Ukraine for errors spelling and vocabulary nature (characteristics and specifics paronymy).

**Methods.** The systematic and statistical analysis is used.

**Purpose.** To analyze the pharmaceutical market of Ukraine, which includes domestic and imported drugs for the comments on spelling, and bring to pharmaceutical marketing professionals in the problem of illiteracy of staff of the companies involved in naming (nomination) medicines.

**Importance.** Through analysis and pharmaceutical companies showing their mistakes we could avoid these irrelevant in the future and increase the professionalism.

Today it seems that many pharmaceutical companies sometimes forget the first name and principles of formation of names of medicines. And that is why a lot of inaccuracies and irrelevant in the trade names of medicines that prevent doctors and pharmacists in their professional activities.

During the study we have found numerous errors of spelling character in the names of drugs.

In our opinion, this is due to the fact that they have not appointed as nomenclature.

After analyzing 10 000 names of drugs we can say that most of the names possess spelling mistakes on the "rule of nine." For all that the drug is called, everywhere, all over the world, its name will translate and pronounce as it is written form. Each of these "pharmaceutical borrowing" language spelling conforms to the recipient. Accordingly, in the Ukrainian language in the names of foreign origin after d, t, s, s, c, g, h, l, r to write the letter И. In all other cases – I.

In writing the names of the medicines is subject to all rules of spelling words of foreign origin as the basis for their creation was the Latin language.

It was also noticed that there is the another problem among the names of drugs. This is a paronym. Paronyms are the words sound quite similar in composition and sound but different in meaning. There are paronyms in many names, including names that do not even belong to the same pharmacological group. Is not possible to avoid this phenomenon but we must be very careful with Paronyms. The use of paronyms which may be dangerous for patients may lead to dangerous consequences to human life.

**Conclusions.** Studying language means by which the modern name of medicines is created permits to determine some trends and patterns of naming (nomination) in today's professional languages.

In forming trade names of medicines it's necessary to consider some general principles: possible brevity, euphony, no negative associations, originality, spelling and sound.



## PHARMACEUTICAL CAREER IN THE USA

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**Introduction:** My work is devoted to study of peculiarities of development of the pharmaceutical industry in the United States. I will consider what you need to study at American universities and to work in the specialty pharmacist, the pharmacy technologist, and many others. I will conduct a comparative description of the University in our city and University in the U.S., will lead the advantages and disadvantages of living and working in America. We consider the average annual salary of Americans who work in the pharmaceutical industry, and will draw appropriate conclusions.

**Aim:** The aim of my work is to compare learning in pharmaceutical universities in the USA and Ukraine. I want to show the advantages of working in the U.S. exactly in this area. Moreover, show that pharmacists can earn enough money if you possess a profession on the level. And that our profession is not limited to the sale of tissues in the chemistry shop.

**Materials and Methods:** The work was composed by the evaluations of people undergoing this system, moreover the information was taken from the official websites of employers and universities in the USA.

**Results and discussion:** Career prospects in the U.S. are very good for people who are not afraid to take risks and have the language to native-level. In another case it will be incredibly difficult. From this we can see why this profession is such a high demand in the United States.

**Conclusion:** In conclusion, I would like to say that this is a very hot topic. And we should follow the example of our colleagues and gain experience from each other.

# THE COMPARATIVE ANALYSIS OF PHRASEOLOGICAL SUBSYSTEMS IN THE RUSSIAN AND ARABIC LANGUAGES

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**Introduction.** Intensive development of phraseology in recent decades has raised a variety of questions. On the one hand, the description of phraseological material of different languages focusing on their specific features is the task of phraseological units, on the other hand, comparative study of phraseological systems become very important. The comparative aspect of system studying phraseology represents a great interest for the development of the general theory of phraseology, and for studying common and distinctive features of the investigated languages.

**Aim.** The purpose of the study is to conduct a comparative analysis of Russian and Arabic idioms and identify their common and differential characteristics.

**Materials and methods.** In the research article were used next methods: etymological method when restoring original image internal forms of phraseological units; contrastive method when comparing Russian and Arabic idioms.

**Results and discussion.** Phraseological units are the most difficult for translating units; therefore, the translation of such units is the result of a careful analysis of the various components of the content structure of idioms. When translated an idiom we should convey its meaning and reflect its figurativeness, finding a similar expression in Russian and not losing the stylistic idiom function. If there is not the identical image in Russian translator is forced to finding approximate compliance. The Phraseological translation involves using stable units of varying degrees of proximity between the unit of the foreign language and the translated unit in the text.

The most difficult translation from one language to another is part of phraseological units, which are based on historical events; reflect some custom of Russian people or Arabs or use specific words. Sometimes the apparent semantic transparency is deceptive.

**Conclusions.** Lingvocultural researches provide the opportunity of implementation of the cognitive approach to comparative studying of phraseological units in order to identify their cultural specificity. It was found that in Russian phraseological units are dominated proverbs and sayings of the following type: statement, opposition, contraposition, metaphor and comparison, while in Arabic phraseological units' contraposition almost is not using. It was revealed that the Russian proverbs and sayings had characteristic of evaluation on the principle "It's good, and it's bad," and Arabic was more categorical "You must do so".

## HISTORICAL ASPECTS OF LATIN CHEMICAL NOMENCLATURE

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**Introduction.** Actuality of the subject: one important terminological issue that today require solutions that use in scientific and educational literature in parallel to the two Latin names of the chemical element Arsenic, which leads to the operation of the different names of the same compounds, especially of the names of acids. There are two Latin names of the item: Arsenum, i n and Arsenicum, i n.

**Purpose:** to analyze a certain volume of literature on the subject, to establish what the names of arsenic are we can find and how often, to infer what names are appropriate and properly applied in the academic literature.

The chemical element Arsenic has been known and widely used already in ancient times. The word is derived from the Greek. *Ársen* [αρσενικό] - strong, courageous and served to indicate the arsenic compounds. The Russian name is believed to have derived from "mouse" and "poison", because the use of drugs arsenic is associated with the extermination of mice and rats. Albert first produced metallic arsenic. In 1789. Lavoisier had provided the arsenic metal and gave the element the name "Arsenicum".

The research question, which we put before us is appropriate to begin with the editions of the alchemists, their works and articles. Our first source for treatment information has been scientifically-popular edition. Quote: "Arsenicum – Arsenic." All these publications are called arsenic as Arsenicum. From this article shows that the author uses the name Arsenic - arsenicum that is, the suffix -ic-. Searching for the right information we have not passed a security source - *Materia Medica*- scientific literature which takes ambiguous position to use the names of arsenic, indicating that the name is Arsenicum and Arsenum.

Also ambiguous approach in the British Pharmacopoeia, where we found the name *Anseni Trioxudum*, putting the name of a chemical element with the compound in the nominative case, we get - *Ansenum*. But another name arsenic contrary to the name: *Arsenic Triiodide*. As we see here is based on a name *Arsenicum*.

**Conclusion:** we have been processed 16 educational, scientific publications and sources of Internet resources. After collecting the required amount of material, we noticed that both names are used arsenic - *Arsenum, i n* and *Arsenicum, i n*, as two names acids: *acidum arsenicum* - *acidum arsenicum* and *acidum arsenicosum* - *acidum arsenosum*. However, the latter options are much less frequently. In our opinion, avoiding dualism, is better to use the name element *Arsenicum*, and n and all derivative form it from its base.

## LOAN WORDS IN MODERN RUSSIAN LANGUAGE

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**Introduction.** The appearance of new words or new meanings of old words means that, the world around us has changed. Either there something new has appeared, or something that has been existing has become so important, that the language, in fact, people who speak this language, create a name for them

**Aim.** Consider and analyze some loan words which have appeared in Russian language in recent years.

**Materials and methods.** The research materials are the words of foreign origin, which have been partially or completely mastered by Russian language. The method of research is the analysis of the collected materials.

**Results and discussion.** Mastering of loan words in Russian language – is difficult and long process. It is not only the perception of words from other languages, but their creative development on all levels of language system, formal and semantic transformation according to the original features of Russian language and a high degree of its development. Foreign-language words were subjected to various kinds of changes (phonetic, morphological, semantic), submitting to the laws of development of the Russian language, its functional-stylistic norms. Correspondingly, it is accepted to allocate following stages of adoption of loan words: phonetic, graphical, grammatical and semantic. The process of mastering of words and expressions in Russian language causes us great interest, since at the current stage from long-term it has turned into one, which is happening right in our eyes.

The word *менеджер* (*manager*) appeared recently, it is not in the dictionaries of the 80's of XX century. It seems excessive to Russian language. There is already a word with the same meaning, for example, a *управляющий* or colloquial *управленец*. However, the word *менеджер* (*manager*) is absolutely unique, and there is no substitute for it. In new dictionaries, it is interpreted as a hired enterprise manager. But it's not like that (in this meaning, rather, they would say *топ-менеджер* (*top manager*)), and essentially, the word *менеджер* (*manager*) means almost any hired profession.

**Conclusions.** Thus, contemporary texts, the names of professions, shops, cafes, restaurants, firms and etc. show that the process of adoption of loan words takes place in a very short time. Will all these words included into Russian language or not, time will tell, and at this stage we can make only assumptions.

## ETYMOLOGY OF TEACHING PROFESSIONS NAMES IN LATIN LANGUAGE

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**Introduction.** There are many terms in Latin language, which name persons, who are engaged in education and tuition.

**Results and discussion.** The oldest term is *magister* - a teacher. The initial meanings of this word were the ruler, the boss, the manager and the supervisor. This word is related with the words *magnus* - large, *magis* – more, which have root *mag*. The Romans used this word regarding officials, managers. Later it began to used to designate the notion of the teacher, often in combination with the word *ludus* - school: *magister ludi*, *magister ludi librarii*, *primus magister*.

Next term *litterator* comes from the word *littera* - the letter, because the main litterator`s task was to teach children the alphabet, to read and to write.. The math teacher has been called *calculator*. The term comes from the Latin *calculare* – to count. *Tabularius* was an arithmetic teacher like a calculator.

*Institutor* – mentor, tutor worked at the elementary school in Roman Empire. Boys and girls from plebeian families learnt how to read, write and count here. The word comes from *institutere* – to instruct, to teach. Reading and writing teacher has been called *librarius* or *magister libraries*, came from the word *liber* – a book.

Teens from the rich Roman families have been patronized by the cultural Greek slaves, who have been called *paedagogus*. He followed boy`s education, taught the Greek language and accompanied the boy to school, so he was called *pedisequus* – somebody, who accompanies or *comes*, *custos* – the guardian.

*Grammaticus*, the grammar teacher, led the second stage of the Roman School. *Rhetor*, orator or eloquence teacher, prepared students for the judicial and political work and directed the third stage of the Roman School. Besides the Greek word *rhetor*, synonyms *orator*, *scholasticus*, *graecus* have been used.

The word *doctor* have been used to designate tutor, instructor, mentor. The term comes from the Latin *docere* - to teach. Frequently it has been used to name a teacher of rhetoric, grammar, philosophy, scientist. *Professor* is close meaningfully to the word *doctor*. It comes from Latin *profiteri* – to declare, to lecture. This term has been used for the teacher of scientific disciplines: rhetoric, philology, science, philosophy, law, medicine.

In **conclusion**, some terms, denoting persons engaged in teaching, got over the Roman Empire and became the part of the educational and scientific vocabulary in many modern European countries.

## ROLE OF THE LATIN LANGUAGE IN THE MODERN WORLD

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**Introduction.** There were periods in the history of mankind when Latin was a part of fashion and out of it. However, it always remained a unique phenomenon of human culture to conquer space and time. Today, this language is called a classic, dead, one. Despite this even after its death, the Latin language lives in new – Romanic – languages, Catholic liturgy, terminology systems of modern science.

**Aim.** To identify the significance of the role of the Latin language in the contemporary world.

**Materials and methods.** Review of the literature on the topic, searching information on the Internet, the collection of the material, comparative analysis.

**Results and discussion.** The movement for the use of Latin in the modern life appeared in the early 20<sup>th</sup> century. It was an attempt of a cultural revival based on rich ancient traditions and in the course of tendencies seeking to achieve the more integrated Europe. This movement was called “Latinitas viva” (“Living Latin”). In Germany there was formed a society of “Societas Latina” which issued the “Vox Latina” magazine. On the Internet there appeared a lot of Latin websites promoting “living Latin”.

Nowadays a lot of literature is published in Latin. Modern literature in the Latin language is represented by such well-known writers and poets as Arrius Nurus, Geneviève Immi, Alanus Divutius, Anna Elissa Radke, Ianus Novak, Thomas Pekkanen etc.

In medicine and pharmacy the Latin language has traditionally remained the main international source for the formation of a new terminology in natural science, medicine and pharmacy in modern languages.

Latin is inherently used in some areas. It is indispensable for pharmacology, linguistics and jurisprudence.

**Conclusions.** We cannot state that Latin may eventually regain the position as the international language of science and culture. However, there are no doubts that the Latin language will live and develop in accordance with the needs of our time.

## **BREAKING THE BORDERS**

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**Introduction.** First, I want to start from some statistics. According to the Walk Free Foundation, nowadays there are about 29.8 million people that are literally enslaved. Around 120 thousands of them are Ukrainians. By this I mean real modern slavery, where people get in trap trying to find better life. Those people have to work hard, it's forbidden for them to leave their place of work and living by their so-called "employers". Moreover, "slaves" can't communicate with their relatives or seek help from government. And the worst part is that you can't break this system from inside, so it's in our interests to prevent these crimes against human rights. From moral point we can't say that it's not our problem, because it can happen to anyone: you, your family or friends.

I believe that the main reason of modern slavery is language "border", because there is no point to cry for help if no one will understand you.

So let's dig a bit deeper to see where this problem comes from. Today government try to integrate English into our lives, but it seems that none of it's methods work. Eventually this brings us to another statistical result, according to the English Language Resources less than 4 percents of people can speak English in Ukraine. But no one wants to admit the real problem that leads this situation. I want to start this from a little example. Most of people who know how to ride a bike learned it in their childhood. Here comes the question "why"? It's an easy one. Just because riding a bike seems really cool in childhood, and it's known that children learn everything much better and faster than adults. You might think that we have already English schools for our beloved kids, that we even have English classes in pre-school. You will be right, but normally you have to practice your skills to advance them. "So where is the problem?" you may ask. The problem is that in schools teachers always say that the main subjects are math and Russian or Ukrainian languages. And that's the biggest miss in education. Even if you want your kid to learn English in English schools, you'll have to spend a lot of money. Many families can't just afford their child to be all-side educated. By just accepting this fact as life we are guilty for making English some kind of luxury!

There are big boards with child's rights given us by the United Nations in every school, however as far as I understand there is one great violation against one of rights. "Every child have right to be educated", because we have to understand free education.

By achieving this we'll get a country that has 3 national languages, imagine our culture in 100 years after this victory. A country of culture, business and all kinds of opportunities, a country of diversity and peace. And tell me now, this dream really worth our hard work, doesn't it?

**Conclusions.** Finally to sum up all my words into single thought I want to say that difference is not makes us hate to each other, but misunderstanding is. We start conflicts with one word that was given us by God to find comprehension in each other. It all seems such a childish mistake, because we all want to help one another, that's our nature. We want to live by happiness of each, not by each other's misery. This world has room for everyone and our Earth is rich, it can provide it's treasures for everyone. This life can be free and beautiful, but we have lost our way. Incomprehension has poisoned human souls, has barricaded the world with hate. We have developed speed, but we locked ourselves in. Our knowledge has made us cynical, our cleverness is hard and unkind. We think so much, but feel too little. More than cleverness we need kindness. Without this qualities life will be violent and all of us will lose everything we love.



## RUSSIAN NEOLOGISMS

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**Introduction.** The given work deals with the description of innovations in the lexical sphere in the Russian language of the modern period. The appearance of such innovations is caused by the essential changes of socio-political and economic character. Neologism (neo + Greek. Logos word) - a new word, linguistic innovation (figure of speech), the grammatical feature, which appears in the language. The increased interest to the neology problem is due to the important role of neologisms as a mirror of language development, which reflects the language adaptation to the changing under the influence of external factors, the conditions of its operation. The starting point is the practice of lexical innovation, because cultural and historical, social and political conditions of life and work of the speech community affect the lexical and nominative activity.

**Aim.** Objective: to reveal the presence of neologisms in the speech of the youth of today in Ukraine, based on observations of the student's speech online communities online Facebook and student forums, and to identify neologisms not yet included in the official dictionaries neologisms.

**Materials and methods.** The subject of the research are neologisms in modern Russian. The material of the research are neologisms, which are often found in the speech of young people - Russian native speakers and the material of student of the blogosphere. The study is a description of the material, based on the study and synthesis of the major achievements of modern linguistics and lexicography theory, their basic concepts. The main methods are: the method of observation, description and method of the survey informants - native speakers.

**Results and discussion.** Along with the aging process of certain words much more intensively flows replenishment process of the lexical composition of the language. The last 10 years - a period of historic change in Ukraine and Russia, which have a direct impact on the vocabulary of the state. It emerged in this period, neologisms, are primarily education, which previously did not have, not only in the literary language, but also in other branches of the Russian language (social and regional dialects, functional styles). For example, recently entered the Russian literary language *антирыночник* - 'enemy of transition to a market economy',

*гиперинфляция* - 'rapidly growing inflation, threatening economic collapse', *Майдан* - 'political meeting people', *ватник* - "stupid and aggressive exponent of Soviet ideas". We distributed the modern Russian neologisms in groups you found: 1) transport (*бусик, тачка*), 2) Internet / Media Communication (*гуглить, чатиться*), 3) family (life, home furnishings, etc.) (*киндеры*), 4) Politics and Society (*еврозна, эмо, ватник, сепар, гиперинфляция*),  
5) Music and Film (*блокбастер, триллер, рейв*).

**Conclusions.** Strong innovations represented at the lexical-semantic level (neologisms-borrowings, morphological and syntax neologisms) are analyzed in our work. Some special interest is caused by the characteristics of weak neologisms in the observed sphere. They are connected with the renewal of lexics presented by semantic neologisms characterized by the changes in the word's semantic structure in general or changes in the denotational component of one separate word's sign and its frequency in usage. A large number of new lexical items appear in connection with the development of computer technology. Neologisms are usually formed under the laws of the relevant language, in his productive forms of word formation. We have identified a number of neologisms, has not yet been recorded in any of the known dictionary of neologisms and dictionaries of the Russian language (*майданутый, свидомый, ватник, сепар, добробатовец, укрон* etc.)

**SECTION № 22**

**PSYCHO-PEDAGOGICAL BASES OF FUTURE SPECIALIST FORMATION  
IN MODERN HIGHER EDUCATIONAL ESTABLISHMENTS**

## DEVELOPMENT OF PEDAGOGICAL EXCELLENCE OF FUTURE TEACHERS UNDER CONDITIONS OF POSTGRADUATE STUDIES

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**Introduction.** By its nature the teaching profession has been long and uniquely referred to creative activities and is considered to be a rather hard work. Practically, when conducting any lesson you have something to correct both in the content of the training material and in the teaching methods. Indeed, a teacher becomes an expert, a professional since he/she learns and develops teaching activities, masters pedagogical capital, appreciates the educational values.

The **aim** of our study is in revealing the peculiarities of formation of teaching activities of post-graduate students of the National University of Pharmacy (NUPh) in the process of psychology and pedagogical training at the Department of Pedagogy and Psychology of the NUPh.

**Methods.** Pedagogical training of post-graduate students of the NUPh provides both the lecture course and practical (seminar) classes in accordance with the curriculum. Organization of practical classes and seminars involve cooperation and active communication of equal partners (roundtable seminar, seminar-discussion, classes with the elements of training, etc.) where post-graduate students gain experience in collective team work, responsibility for the results of cooperation communicative, organizational, leadership skills, act as speakers and opponents, raise and solve problems, train in public speech, presentation, etc.

There is also attendance of classes of the leading teachers of the University and young teachers. As a result one should draw certain conclusions for himself / herself, adopt practices, or "learn from the mistakes of others".

**Conclusions and prospects for further research.** Teaching activities have not only quantitative measure, but qualitative characteristics as well. It is due to the fact that the variety of pedagogical situations and their ambiguity require variable approaches to the analysis and solution of arising problems.

It is worth to include the following things to the leading functions of the system of methodical training of a future teacher under conditions of postgraduate studies: formation of self-actualization of a future teacher; formation of the necessary complex of professional knowledge, abilities and skills for creative professional activities; formation of practical professional activity of a teacher based.

The psychological and pedagogical knowledge mastered by post-graduate students will best contribute to development of their personal potential and pedagogical excellence.

# SPORTS AND ACTIVE GAMES AS MEANS OF PHYSICAL EDUCATION IN UNIVERSITY FOR STUDENTS OF SPECIAL MEDICAL GROUP

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**Introduction.** Our society is constantly evolving, so we should improve to keep up with its pace. Modern society requires from employer to act independently, to make decisions, to adapt to different conditions of life. The future expert must have a good physical training. You can't underestimate physical activity even if you lead a healthy lifestyle and have no bad habits.

A common outcome of low muscular activity is increased risk of sickness and reduced capacity for body to adapt. Physical education in Universities should contribute to the harmonious development of personality.

Recently we can see more students, who have deviations in health. Medical examination of Ukrainian students showed not optimistic results - only 10 % belong to the category of healthy. The rest have some shortcomings in health. The reasons of this are bad ecology, bad habits, low level of interest to physical training, social-economic problems that provoke chronic stress. Adaptation of the students to the intellectual, physical and nervous activity has become an urgent problem.

According to the "Regulations on physical education of university students" all students have an annual medical examination. According to the results, the students distributed into three medical groups: primary, preparatory and special.

Tasks that are implemented in the SMG (Special Medical Group) include increasing functional capacity of organs and body systems, strengthening and correction of physical development, learning basic vital motor skills, increasing physical and intellectual capacity of students.

**Aim.** The aim of our work was the determination of specific methods on the classes with SMG of students and searching effective means of motivation for increasing their physical activity. One possible solution is to use such forms of sports activities which can induce interest and inspiration in students.

**Material and methods.** To solve this problem we have to use the following methods: theoretical study, analysis of scientific and methodological literature; methods of empirical research: questionnaire, interview, tests.

The research was attended by students of the experimental group engaged in SMG program. Many students prefer sports and active games, so as a means of physical education they were offered this particular kind of activity. Their general feature is that the key motive is not the result, but the process. The special value of

these games is the ability to simultaneously affect mental and motor scope of those involved.

Also sports and active games all time have a high emotional level and different situation that is constantly changed. Teachers have the opportunity to use those means and methods which let the most difficult exercises be performed through play and competition. That helps to take off monotony of classes, which otherwise make the process of physical education boring.

When organizing and conducting classes with sports we take into account the level of physical fitness of students and their health. Depending on this, we can use the following types of games: at rest (still), inactive (low level of physical activity) and active. Also note that games can be cyclic and acyclic, the last one should be combined with relaxation of muscles and breathing exercises.

Despite the health and rehabilitation orientation classes in special medical group, they shouldn't be limited to medical purposes only. Teachers should aspire to ensure that students of this group become quite diverse and special physical fitness improved their physical development and as a result were transferred to the preparatory group.

**Results and discussion.** Obtained through questionnaires, surveys and testing data show: if you choose the right sport and active games, that can have a positive effect on the cardiovascular, muscular, respiratory and other body's systems. Also increased are functional activity, dynamic engagement of the large and small muscles, mobility in joints.

Especially valuable is the sport game in the open air, because that increases the rush of oxygen, improves metabolism, creates the resistance to adverse weather factors. Depending on the intensity of play, oxygen consumption by body's tissues increases 8-10 times compared to the rest.

Also, the vast majority of students said that sports and active games enable them to restore and improve their liveliness.

**Conclusion.** With the implementation classes of sports and active games for the students in higher educational institutions, we can see a positive impact on the development of physical qualities, maintaining the functionality of the body and the emotional state of those involved. As a result, the students formed a positive attitude to physical training as general and during physical education at the university.

These classes comprehensively improve movement quality, reduced psychological status, develop tactical thinking, culture, communication and generally prepare for professional activity.

## **SPECIFICS OF TEACHING SURGERY TO ENGLISH-SPEAKING STUDENTS**

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**Introduction.** The number of students trained in English increases every year at leading universities of our country. It is an indicator of level of teaching structure of educational institution, ability of employers activity to participate in foreign conferences, to communicate with colleagues from other countries, to exchange experience that raises level and quality of teaching. Specificity of teaching in English demands new standard approach in teaching of the theory especially, in acquisition of practical skills by English-speaking students. Teaching surgery to students of medical university is the obligatory interconnected combination of educational and professional work.

Our experience shows that teaching English-speaking students on fundamental surgical procedures demands special attention. It is impossible to receive practical skills of survey of the patient, to understand semiology of surgical diseases without dialogue with the patient and detailed gathering of the anamnesis.

**Aim:** The aim of our study is to find the way to improve results of theaching surgery to English-speaking students.

**Materials and methods.** Students of 4<sup>th</sup> year of KhNMU were tested for knowledge level on topic of previous class with and without teachers assistance of practice with patient.

**Results.** Students which worked with teachers assistance showed higher level of reproduction of previous class topic. An important component of teaching are relations of students and the teacher, respect of each other, dialogue, a pedagogical step, creation of a situation of success to diffident students, the account of interests and requirements of students and well-founded requirements should be considered in the course of training. The collaboration of teacher and student in practical work with patients and on duty forms good relations between student and teacher and leads to better diligence of students. As a result we get higher level of knowledge of topic even after few weeks in students with good collaboration with teacher.

**Conclusion:** At work with English-speaking students it is necessary to assist them in practical part of work and to form strong collaboration between student and teacher.

# FORMATION OF STUDENT'S HEALTHY LIFESTYLE FOR FUTURE PHARMACISTS

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**Introduction.** Physical and mental health of young people remains one of the actual problems for nowadays society. As a result of fast technologies' development, mass media, and unstable economy situation in the world, nowadays young people tend to be under impact of negative factors that give negative effects on to physical and emotional state of a person. The problem of educating the healthy lifestyle was a hard question for scientists all the time. The formation of habits is rooted usually in adolescence and they have impact on the health state during the lifetime.

**Aim.** Overview of the problem of formation student's healthy lifestyle for future pharmacists.

**Materials and methods.** We used analysis and generalization of scientific-methodic literature, pedagogic testing, monitoring.

**Results and discussion.** Worsening of student's health is not only medical but also pedagogic problem. Analysis of pedagogic literature on valueology showed the following: problem of choice of life style is becoming a leading one in protection and strengthening of health. With it life style is regarded as main reason of preservation or loss of health. Besides, in it, it is noted that the greatest influence on human health is rendered by life style (50-55%). The cause for that is lack of programs, technologies and methodical approaches towards the organization of education, that will be aimed for self-development and forming the basis of healthy lifestyle of youngsters, so that it shows us the topicality of the main theme. But we also believe that among all he ways to prevent bad habits, the leadership of educational institutions does not give enough attention for educating the students how to lead active life, go in for sports, because sport is to our mind one of the cheapest ways towards healthy life. We believe that it would be helpful to create effective informational-propagandistic system that will increase the knowledge about negative impact of risk factors for health and the ability of its decreasing for students.

**Conclusions.** Pedagogical understanding of educational work management in university with formation of students' healthy lifestyle permits to create specific educational environment. In this case the process of formation of disciples' positive firm individual picture of health becomes a necessary condition of their viability. Only in such case culture creating healthy lifestyle can transform into youth' sense of life.



# THE STRUCTURE OF THE PSYCHOLOGICAL READINESS OF FUTURE DOCTORS TO PROFESSIONAL ACTIVITY

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**Introduction.** An important role in the preservation and strengthening of health population of the country belongs to the future doctors - medical students, as one of the most important components of the health workforce. But now the problem is the outflow of young professionals of the health system - from 20 to 60% of graduates of medical schools in the country do not go to work on the obtained profession. That is why special attention should be paid to the system of training of highly qualified and motivated professionals of medical profile. It is important to assess the psychological readiness of medical students at the stages of their study at the university, which contributes to a higher quality of future specialist.

**Results and discussion.** Psychological readiness is a mental condition characterized by the mobilization of the resources subject of work to rapid or long-term performance of specific activities or work problems. This condition helps to successfully perform their duties, properly use the knowledge, experience, personal qualities, to maintain self-control and to rebuild the activity appears to unforeseen obstacles.

There are long-term readiness and the current state of readiness. Long-term readiness is a structure, which includes:

- 1) a positive attitude to one or another kind of activity, profession;
- 2) the character traits, abilities, temperament, motivation, adequate requirements of the activity;
- 3) the necessary knowledge, skills, abilities;
- 4) steady professionally important features of perception, attention, thinking, emotional and volitional processes.

Temporary readiness reflects the characteristics and requirements of the upcoming situation. Its main features are the relative stability, the effectiveness of influence on the process activities, compliance with the structure of readiness optimal conditions for achieving the goal.

Dynamic structure of the state of psychological readiness for complicated activities - is a holistic education that includes a number of personal characteristics, the main ones are:

- 1) motivational - the need to successfully perform a task, interest in activities, the desire to succeed and to show their best side;

2) cognitive - understanding of the duties of labor problems, evaluation of its importance for the achievement of the final results of operations and for itself personally (in terms of prestige, status), the idea of possible changes in the situation, etc .:.

3) emotional - a sense of professional and social responsibility, confidence in success, enthusiasm;

4) volitional - a management and mobilization, focused on the task, a distraction from disturbing influences, overcoming doubt, fear.

The process of forming the state of psychological readiness for activity is a sequence of inter-related procedures and activities:

Stage 1 - the awareness of your needs, demands of society, collective or assigned problems other people;

Stage 2 - awareness of the purpose of fulfilling tasks which will lead to the satisfaction of the needs or carry out the assigned problems;

Stage 3 - understanding and estimation of conditions, in which will take place upcoming events, updated experience with problem solving and compliance with the requirements of this kind;

Stage 4 - determination based on the experience and evaluation of the conditions of the upcoming activities of the most rational and possible (auxiliary) ways to solve problems or fulfill the requirements;

Stage 5 - predicting manifestations your intellectual, emotional, motivational and volitional processes, evaluation of the relation of their capabilities, level of aspiration and the need to achieve a certain result;

Stage 6 - the mobilization of forces according to conditions and the objective, self-hypnosis confidence in the successful achievement of objectives.

**Conclusions.** Of particular importance is the formation of motivational readiness for professional work of future specialists of a medical profile.

Motivational readiness is an important criterion of the quality of training of future specialists of a medical profile, it represents a dialectically interconnected system of cognitive and professional motives, attitudes, which determines the personal's direction of the graduate for medical practice, his self-actualization, self-regulation, self-realization in solving professional problems.

This motivational readiness to professional activity will be a key element in the training of highly qualified specialist, provide him with rapid adaptation in health care facilities, career opportunities, a desire to engage in research work, take an active part in the life of society.

# **PEDAGOGICAL CONDITIONS OF IMPLEMENTATION OF PERSONALITY ORIENTED EDUCATION IN TEACHING DISCIPLINE "PSYCHIATRY AND NARCOLOGY"**

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**Introduction.** The main contemporary goal of high medical education is the personality and its abilities orientation. It updates the introduction of personally focused education at the training of physicians.

**Aim.** To ground a pedagogics of personally focused education to the teaching discipline "Psychiatry and Narcology."

**Materials and methods.** There was used a complex of methods consisted of theoretical (a generalization of the scientific literature, the rationale of personally focused education) and empirical (questionnaires, interviews to explore the subjective experience of students; direct and indirect observation) ones.

**Results and discussion.** In the study, we adhere to the I. Yakimanskaya's viewpoint that the main function of education is to discover personality and to create conditions for its development on the base of subjective individual experience, ensuring the formation of criticality, independency, initiative, creativity and their implementation into ideation and behavior.

The results of the survey of university teachers of Psychiatry and Narcology department show that the scientific and pedagogical staff is aware of contradictions between traditional and personally oriented education.

The study of the responses at the survey and interviews revealed that the result of traditional teaching style is formalization of the relationship between students and teachers. In case of personally oriented education open relations between the subjects of study are possible together with an individual accounting of cognition, values and personal experience of the student.

To make a personally oriented environment the departmental staff elaborated some didactic complex for the "Psychiatry and Narcology" discipline. It provides an opportunity for student to select the style of education.

To ensure professionally significant motivation of the students by using the portfolio analysis we identified individual characteristics and the main features of subjective experience. Students were informed beforehand concerning necessity to create a portfolio (either printed or electronic form) during the first lesson.

Implementation of portfolio to the education is provided an opportunity for teachers to realize the developmental level and abilities of student in ongoing

preparation of doctors of somatic profile. It also helps to outline future directions of incentives, to contribute quality of training improvement, to revitalize medical care to patients with mental disorders.

We have accepted the statements of some scientists about the importance of personally oriented training to the educational process (in particular, the playing, the dialog). For example, an interactive teaching method was implemented during the binary lecture on the theme "Medical and social problems of psychoactive drug abuse."

Realizing by teachers some problematic issues of relevant parts of Psychiatry and Narcology discipline allows future doctors better understand the forensic psychiatric assessment of alcoholism, alcoholic psychosis and drug addiction, to participate in the joint (together with the teachers) development of prevention of substance use directions, making a large-scale thinking, scientific outlook, the moral qualities of the person.

Game method of learning was implemented during the practical training in mental disorders as well as in independent work on the theme "History of Psychiatry Development and Addiction". Students were asked to develop their own intellectual game.

Person-oriented nature of the practical lesson "Reaction to severe stress and adjustment disorders. Post-traumatic stress disorder" was granted thanks to the introduction of elements of training. Ukrainian researchers note that academic training is an intensive form of group work where the emphasis is not so much for the information how to receive personal experience of professional activities. Thanks to the introduction of elements of the training the students received the opportunity to become familiar with the peculiarities of using art-therapy methods for the accumulation of resources by the survivors of traumatic events.

**Conclusions.** Analysis of literature and teaching experience allow to identify the main pedagogical conditions of introduction of person-oriented education in teaching discipline "Psychiatry and Narcology". The pedagogical conditions includes the creation of personality-oriented environment in the educational space of the university, the use of student-centered teaching methods, ensuring internal professionally significant motivation of the students during the study of the discipline.

## **TYPES, FORMS AND METHODS OF ORGANIZATION OF INDEPENDENT STUDENTS STUDY**

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**Introduction.** The questions of improvement of the health system in Ukraine according to market requirements have gained great importance at the present stage of development of Ukraine. There is a need for creative medical worker who would be able to organize and fulfill his/her duties without anyone's assistance. It is possible to prepare such a specialist providing an appropriate learning environment which would include a system of independent study.

**Aim.** Give characteristics to different types, forms and methods of independent study in the discipline "Fundamentals of Economic Theory" at a Medical College.

**Materials and methods.** To solve the given problems we applied theoretical and empirical methods such as observation and discussion.

**Results and discussion.** Theoretical analysis of the term "independent students study" allows to consider it master educational material. It is planned and fulfilled according to the teacher's tasks and under his/her supervision but without the teacher's assistance.

Independent learning as a didactic form of teaching includes the following organization stages: planning, organization process and supervision; effective control and assessment.

Our experience shows that the teacher should provide a variety of types, forms and methods of independent work of students for effective learning in the sphere of economics at a Medical College. Implementation of innovative teaching methods allows to carry out part-investigative, creative and research work in the classroom and extracurriculum independent students work.

Planning of independent students work in the discipline "Fundamentals of Economic Theory" also includes group and individual students work.

Organizing extracurricular work of students we tried to establish interaction between the participants of educational process. Consultations and different support that teachers give to their students create the atmosphere of cooperation between them. These consultations may take up forms of practical trainings and can be held outside the HEE. Analysis of pedagogical sources of literature allows to mention different methods and techniques which help to develop critical thinking among them

there is case method, methods of clusters, mental maps, digests and method of project.

Innovative teaching approach in the discipline of "Fundamentals of Economic Theory" at Medical College consisted of making clusters to memorize the teaching material at the end of the lectures. The use of cluster has allowed to make clear the process of thinking and reflect nonstandard forms of thinking. That is why the method of critical thinking is sometimes called "visual brainstorming". The algorithm for organization of independent learning in making up a cluster is the following: 1. A key word or a sentence which reflects the core idea or a theme is written on a worksheet. 2. The words or propositions on the theme are placed around. 3. The words must be connected with the subject notions that reflects logical relationship. 4. As the result, we have a structure which graphically displays our thoughts.

During seminar classes in the given discipline we applied the case method where each student made his/her decision of situational task and offered his/her decision for discussion in the group.

While making up the mental card during the seminars, students selected opinions, facts, arguments and their symbolic images. Then they gave the main idea of the lesson.

Project activities and intellectual games on separate topics helped us to give the learning process research character.

**Conclusion.** In the teaching process of the discipline "Fundamentals of Economic Theory" it is important to organize individual and group forms of work in the classroom and extracurricular time. The use of critical thinking method gives us possibility to use different methods of problem-searching. The method of projects gives us a good chance to apply creativity and scientific research in the independent learning of students.

# IMPLEMENTATION OF INTERACTIVE METHODS OF TEACHING DURING THE PREPARATION OF FUTURE SPECIALISTS

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**Introduction.** Formation of professional competence of specialists in higher education is not possible without immersing students in active learning activities. A number of modern researchers in their publications highlight the essence of innovative teaching methods and especially their implementation in terms of higher education. Among them: O. Pometun and L. Pirozhenko, L. Stefan, V. Serikov, L. Kaydalova, T. Lutayeva and others.

**Aim** – to summarize the peculiarities of interactive teaching methods when preparing future professionals at the universities.

**Materials and methods.** To solve the tasks used theoretical (study and analysis of pedagogical literature) and empirical methods (observation, interviews).

**Results and discussion.** The concept of interactive (from «inter» - mutual and «act» - act) means suitable of interaction, dialogue. So, interactive learning methods - it organization of learning and the formation of certain abilities and skills through a set of special means organized educational and cognitive actions that are in active interaction those, who learning between each other and construction interpersonal communication in order to achieve the planned result.

Generalization of experience of teachers-innovators lets outline the basic criteria for active learning model: the opportunity of informal discussions during the free presentation, fewer traditional form of lectures, but most - active and interactive forms of workshops, an initiative of students, availability of group tasks requiring collective effort, continuous control during the semester and more.

Our experience shows that the implementation of active learning model expedient to develop and implement a set of classes for blocks. First block - theoretical containing lectures and seminars that are conducted using interactive teaching methods. The second block - practical - includes practical training in the methodology of which introduced interactive teaching methods.

It is important in the development of case studies based on the collection of certain didactic principles, namely: individual approach to each student, taking into account their needs and learning style; providing students with a sufficient number of illustrative materials that affect tasks (newspaper articles, video and audio cassettes and CD-ROMs); reduction of theoretical material; the skills of self-management; focusing on the strengths of the student.

Note that pedagogical potential of case teaching method is much more than the traditional methods. Our observations suggest that the teacher and students while working on case are able to constantly interact, choose behaviors motivate their actions, they argue. The presence of the structure of the case method arguments, discussions, arguments teaches panelists observe the norms and rules of communication.

During the workshops using interactive teaching methods advisable to try to ensure the dominance of the actual content of the future specialist in conditional gameplay, which is an essential factor mastering each player their role. Interactive character practical classes provided means introducing elements of the training. Training primary purpose during the active cooperation of its members to develop, fully disclose potential personal professional opportunities of students.

On the basis of interviews with students and teachers, we can establish a special role in ensuring the design of the complex nature of all participants in the training sessions to obtain educational products for a certain period of time.

**Conclusions.** The basic interactive teaching methods in teaching literature recognized: conversation, discussion, game method, case method, projects and training.

An interactive teaching methodology based on the approach centrobanca on the student that gives the opportunity to update the knowledge, the experience of all the participants, to exchange him. This approach makes learning active, which facilitates the absorption of the material, making this process conscious and therefore more effective.

Interactive teaching methods are part of a student-centered learning, contributing to the socialization, awareness of themselves as part of the team, its role and potential.

Interactive teaching methods contribute to the organization of cognitive activity of a predictable goal - to create a comfortable learning environment in which every student feels his success, intellectual ability. Realization of interactive teaching methods when preparing future professionals promote pedagogical conditions: compliance with the principles of teaching learning readiness of teachers to the innovation, development of teaching materials.



# INTENSIFICATION OF STUDENTS' SCIENTIFIC COGNITIVE ACTIVITY DURING HUMANITARIAN DISCIPLINES TEACHING

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**Introduction.** The problem of intensification of students' scientific cognitive activity in the process of humanitarian disciplines studying is in the centre of the scientists' attention, gains significant importance.

**Aim.** To ground the pedagogical terms of the intensification of students' cognitive activity

**Materials and methods.** There was used a complex of theoretical and empirical methods.

**Results and discussion.** In the results of scientific literature studying and analysis we consider that pedagogical environment for cognitive activity of students intensification – is the pedagogical environment directed by the teacher, system of pedagogical methods, pedagogical interactions complex.

In this system, in the context of humanitarian disciplines teaching, it is reasonable to determine the following: democratic relationships between educational process participants; professional orientation providing; interactive methods of education implementation (teaching methods in the game form, methods of critical thinking, projects methods).

Realization of above mentioned pedagogical terms in the process of future specialists training in the course humanitarian disciplines teaching allows to form and develop such personal skills as: creativity, capability for studying, purposefulness in the cognitive activity process.

With the aim of possibilities creation for individual approach in the process of humanitarian disciplines teaching, it is reasonable to implement into life “pedagogical optimism” principles, to plan and use at auditory classes such methods of teaching which help to create the situation of success during the educational process. Among them:

- the “method of not interfering” – it helps to reach maximal self-sufficiency in the tasks solving by the students;
- “emotional encourage” – students are encouraged to be self-confident;
- “the situation of giving chance” – the creation of situation in terms of which the students get unexpected for themselves possibility to realize their own talents;

- “watch us” – the method gives the students the opportunity to feel the joy due to their intellectual power;
- “emotional brainstorm” – the situation which provides emotional charge of self-confidence to the students by reminding them about great intellectual possibilities;
- “competition situation creation” – the teacher chooses a “worthy competitor” among the group mates and creates a situation of intellectually creative competition under the teacher’s supervision;
- “the friends’ help” – on-time teacher’s or friends aid for difficulties overcoming;
- “eureka” – intensification of the students work for discovery by them well-known facts, what makes them think the problem over; “the intended mistake method” – the teaching method intended for students attention intensification.

According to our point of view, the types of project characteristic by S. Heyns are valuable for teachers. The author identifies such varieties of the students’ projective activities as informative and search projects preparation (reports, presentation etc); projects connected with creative activity (video reports, wall newspaper, intellectual games etc); organizational projects (festivals organization, plays and dramas performing, participation in concerts).

When organizing the students work on the project, we advise to realize intellectual competitive system of cooperation. Thus, it gives possibilities for reaching the most important targets of education – it provides the students, as the subjects of education, the strategy of educational process and help in the process of their own opportunities development accompanied by realizing the fact that they are really competitive. It is reasonable to organize the projects presentation during the last practical class.

**Conclusions.** On the ground of the fact, that humanitarian education is considered to be as the education, which forms individual culture, we think, that it would be purposeful to refer to the following most significant pedagogical terms of the students’ cognitive activity: democratic relationships between the participants of educational process; professional orientation of the educational; interactive methods of education.

# ABOUT DETERMINATION OF ESSENCE OF CONCEPT "DIFFERENTIATED EDUCATION"

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**Introduction.** In the modern transformation period of socio-economic development of Ukraine significantly enhanced requirements for quality education of future professionals who will work in the future development of our state.

**Aim.** Solving this problem requires new approaches to the educational process and study conditions for its implementation. In light of this priority area of educational differentiation is education, which is necessary for high-quality mastering educational material, increased cognitive activity, exercise self-control, improvement of intellectual, practical and communicative abilities of the future professionals.

**Materials and methods.** In the context of the research problem important to emphasize that disclosure of the concept of "differentiation" requires scientific definition of "differentiation". Definition of different approaches to the interpretation of the concept of "differentiation" engaged in such scholars (S. Honcharenko, O. Bratanych O. Buhayov, D. Deykun, V. Volod'ko, A. Kirsanov, Ye. Rabuns'kyi, I. Unt and many other researchers).

Logical-semantic analysis of the concept of "differentiation" was done by studying articles, dictionaries and encyclopedias. The word "differentiation" is derived from the Latin "differentia", which means the difference, contrast. The notion of differentiation is defined thus: 1) separation section, a separation into different parts, forms, meetings; 2) the emergence of a body (or its site) in the development of morphological and functional differences.

**Results and discussion.** It is important to emphasize that education is the principle of unity and differentiation. Most important in the functioning of this principle - is to ensure simultaneous action of these two educational arm lever. Unity means not only access to education for all members of society, lack of social and national barriers, equal rights for graduates continuity of all types of

schools, but the common principles of the educational process, the unity of the programs and curricula across the country.

**Conclusions.** Analysis psychologist and educational literature indicates that different authors approach the definition of "differentiated education" from different perspectives and in different ways:

- holistic process of preparing the individual for life in the light of its interests, abilities, aptitudes and capabilities, a process in which teacher and student advocate equal, willing and active participants (M. Ohurtsov);
- educational system in which there is a division of curricula and programs in areas (humanities, natural - mathematical) (I. Butuzov);
- ability to pick and choose the best way to swim students, given their age and individual characteristics and protecting their sense of human dignity (I.Synytsya);
- creation of optimal conditions to identify instincts, abilities and interests of each student, is focused on social influence in shaping the creative, intellectual and professional potential of society (V. Yeremeyeva);
- specially organized cognitive activity that takes into account individual differences of students, their starting opportunities and social experience aimed at optimal intellectual development of every person and involves structuring the content of educational material selection forms, techniques and methods according to typological characteristics of students (P. Sikors'ky).

## **PROBLEMS OF COGNITIVE MOTIVATION FORMATION IN FUTURE TRAINERS**

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**Introduction.** Formation of cognitive motivation is not possible without a strong motivation for educational and cognitive activity in higher educational establishment. Motivation determines professional orientation and students' activity during their educational and cognitive activity, characterizes the causes and mechanisms of their conscious behavior, and has impact on their professional self-determination and personal development.

**Goal.** Increase the quality of training, formation of their motivation for future trade.

**Main content.** Motivation for students' educational and cognitive activity is variable and it is a continuous process that caused by personal students' orientation, activation of all psychological processes (thinking, perception, and understanding). Students with high level of motivation inherent activity and independence, persistence in achieving goals, confidence in a successful result, enjoying the process of their own professional development, and obtaining the necessary professional knowledge and skills.

Students' educational and cognitive activity is the process of their interaction with the subjects of educational space of a higher educational establishment, so a student reaches deliberately goal, resulting from the emergence of the need to acquire professional knowledge. Motivation for educational and cognitive activity is an indicator of student's individual achievements, which is characterized by complex of emotional and volitional processes, determination of grounds on getting chosen specialty and perspectives of self-fulfillment as a specialist.

Creating of positive educational motivation is the process of formation and consolidation of positive incentives to educational and cognitive activity in future trainers. The basic meaning of educational and cognitive activity is the changes in intellectual, moral, and personal development. Thus, need to learn and to know the features of future professional activity is the base of students' desire for knowledge.

**Conclusions.** Educational and cognitive motivation should always be subordinated to social one. Students studying in higher educational establishment seek not only knowledge, but also after graduation to become competitive specialists useful to society.

# INNOVATIVE APPROACHES TO PROFESSIONAL TRAINING SPECIALISTS

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**Introduction.** The quality of training of modern specialist provided by the combination of basic and specialized knowledge with practical training. Today the model of training graduate students through the transferring of certain amount of knowledge loses its perspective. It becomes necessary to change the strategy of teaching material. In the first place has come the development of personality, ability to independently acquire certain skills and the ability to self-improvement.

**Aim.** Rationale features the use of innovative forms and methods of training future teachers in terms of graduate school.

**Materials and methods.** Psycho-pedagogical training graduate students to professional teaching activities carried out at the department of pedagogy and psychology in the our university include: mastering innovative forms, methods and organizing means of the educational process in higher education. Mastery of educational technology, awareness of the importance of scientific knowledge gained in the theoretical training. Forming skills of solving practical problems faced by professors. Development of creative initiatives.

Among the innovative forms and methods of practical training teachers use such teaching aids as active and interactive methods (discussion, study groups, training, "brain" storm, case method, imitation exercises, a "round table", etc.), information and communication technology (use of electronic textbooks, virtual libraries, tours; video lectures and press conferences), the introduction of multimedia technology. In the process of teaching graduate students provided a harmonious combination of different forms of work: lectures, practical, independent, varieties consultations. In the above examples of classes teachers and future teachers are equal.

**Results and discussion.** The results of graduate teaching practice are report in individual plans, where are show methodological development, including interactive methods, inverted training and other. Future teachers demonstrate modern methods during performances using multimedia presentations designed lectures.

**Conclusions.** Introduction of innovative forms and methods allows graduate students to experience ourselves as professional; leaving future teachers can effectively evaluate teaching personal inclinations. Innovative approach introduced with use different educational technology in the psycho-pedagogical training of graduate students affect not only the formation of motivational and theoretical readiness, but practical necessary training of future teachers for pedagogical practice.

## PLACE OF DISTANCE LEARNING POSTGRADUATE EDUCATION PHARMACY SPECIALISTS

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**Introduction.** Vocational training is one of pharmaceutical regulators and indicators of social development, because actually creates and maintains the viability doctrine of society. Given the current trends continuing professional development, the basic provisions of European integration, the development of modern information technology and the principles of distance education is particularly topical application of new information technologies, including distance learning approaches in training. But in the distance learning there are a number of disadvantages which significantly impair quality of training (lack of personal contact between student and teacher, the impossibility of practicing skills by listener, problem with authentication etc.). Teachers of postgraduate educations institutions are not yet fully prepared for the introduction of this training form, because by traditional technologies the teacher has role of mentor and leader, and in distance education it should to be a coach and consultant. To compensate these disadvantages it needs to harmoniously combine distance with traditional learning.

**Materials and methods.** The special features of distance education include its interactive character, necessity of clear planning, intensive discussions and participation of students in adjusting the structure, content and effectiveness of the course. The distance learning phase in course represents not just a certain amount of information, and a complete process that involves the individual search for new knowledge, exchange of letters with the teacher and those who learns, recourse to electronic periodicals, multimedia application forms. Systematic monitoring carried out in the form operative feedback, automatic and deferred control.

**Results and discussion.** Analyzing during the study advantages and disadvantages of traditional full-time and distance learning we can note that it is a harmonious combination of these forms is the condition for the effectiveness of training, which will use the strengths and advantages of distance learning technologies. During theoretical and practical study on the use of distance learning at the courses for pharmaceutical professionals, we have summarized the scientific approaches to defining the essence and the basic concepts of distance learning. We compared the didactic principles on which based full-time and distance learning, certain advantages and disadvantages of each form of education and their comparison; the content, forms and methods of using distance learning; marked

features using distance learning. It was developed the model of using the distance learning in the system of postgraduate education pharmaceutical specialists, which was held by a series of thematic advanced training in pharmacy; investigated the efficiency of distance learning in the system of postgraduate education of pharmaceutical experts. The possibility of successful professional activity specialist pharmaceutical profile depends on vocational training in educational institutions, on its content and pedagogical techniques used, and the organization which depends on the understanding level of the objectives, content, structure and nature of the profession.

Great attention was paid to the topic and load distribution on the distance and full-time stages of study. In the lecture materials that were made at the remote stage of training for self-study, were included in the results of recent national and international research on effective and safe use of medicines from the perspective of personalized medicine.

Analysis of the final test in the experimental group (which using distance learning) showed that “excellent” mark on exam has had 78% of learners, “well” mark – 22%.

This result suggests that these benefits of distance learning as the possibility of repeated revision of lecture materials, sufficient time for self-training, learning material in handy for students time combined with the benefits of full-time training (practicing skills under the guidance of experienced teachers, etc.) greatly increases the effectiveness of training pharmaceutical experts.

**Conclusions.** So, given the current trend of continuous professional development in pharmaceutical education today is a very important application of new information technologies and distance learning approaches in training professionals of pharmaceutical profile. The use of distance learning at the courses of pharmaceutical professionals has a number of useful features, provides a flexible environment for education, can take advantage of distance learning is relevant and promising direction of development of modern science.



# **PEDAGOGICAL CONDITIONS OF PROFESSIONAL COMPETENCE OF FUTURE SPECIALISTS OF MEDICINE**

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**Introduction.** The new paradigm of higher education focused on education, based on competences. Competence approach is the basis for the development of new standards, updating educational content model professional, organization of educational process, structuring the learning content and training programs, implementation of active and interactive forms of learning technologies and quality training for today's competitive professionals.

**Materials and methods.** Under professional competence we should understand competence that demonstrates possession of knowledge, skills, professionally important qualities necessary for professional work. Our experience shows that instruction, including basic surgical disciplines, students of medical profile, requires special attention. To get practical skills examination of the patient, to understand symptoms of surgical diseases without dialogue with the patient and detailed history taking is impossible. The teacher must work individually with each student at the bedside of patient to translate specific terms, help with the collection of medical history, etc.

An important component of successful learning is the relationship between students and teachers, respect of each other, dialogue, creating a situation uncertain success for students, taking into account the interests and needs of students and reasonable requirements that should be considered in the study.

Improving the quality of training of future specialists of medicine consists of improving its content and structure for student development and acquisition integral relationship to each discipline. Go to active forms of education will prepare the surgeon to be able to quickly adapt to changing conditions.

**Conclusions.** The use of educational technology, particularly active teaching methods, stimulate and enhance cognitive activities to achieve a high degree of autonomy in preparing future professionals of medicine and successfully develop their professional competence.

The prospect of future researches is in finding the optimal combination between traditional models of forms and methods aimed at acquiring professional skills with innovative educational technologies which facilitate formation of professional thinking and personal development for of future specialists of medicine.

# WAYS TO IMPROVE THE QUALITY OF TRAINING GRADUATE STUDENTS TO TEACHING NUPh WAYS TO IMPROVE THE QUALITY OF TRAINING GRADUATE STUDENTS TO TEACHING

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**Introduction.** In training graduate students National university of pharmacy, which mostly do not have basic pedagogical education,, teaching practice is a significant, the main purpose of teaching is formation of readiness of future teachers of the university for research and teaching.

**Results and discussion.** During the psychological and pedagogical training are specified the following principles: individual importance of knowledge, abilities and skills acquired by a teacher; the availability of consistent information about the nature and structure, functions of pedagogical activity; consistent transition from learning (through modeling professional) to professional teaching practices; and the problematic of dialogical communication in the system «student-teacher» and «student-student»; individualization and differentiation of the content of psychological and pedagogical training technologies of educational process organization; gaming simulation and role-playing perspective; the unity of teaching and upbringing, development and improvement; openness to learning (a harmonious combination of various learning technologies both traditional and innovative – there is a harmonious combination of different forms of work: lectures, practical, independent, types of consultations, learning from each other (collective, group, ScrollPane cooperative learning). Introduced Dialogic approach and different teaching technologies in the process of psycho-pedagogical training of graduate students affect the formation not only of theoretical and motivational readiness in a specified plane problems, but necessary and practical readiness of future teachers, the level of which certainly confirmed a fairly high rate of reporting of individual tasks: analysis of the leading methods of teaching; design and implementation of methodologies for the conduct of practical, seminar or laboratory work; presentation skills.

**Conclusions.** In the leading ways of formation of readiness of graduate students for research and teaching include: the formation of identity of future teacher; formation of the orientation of the personality of a future teacher in the creative exercise of their professional activities; formation of the necessary complex of professional knowledge, abilities and skills for creative professional activity of the teacher; formation of practical professional activity of a teacher. The studied psycho-pedagogical knowledge of the graduate students, methodology of pedagogy and research as possible will contribute to the development of their professional-personal potential, the formation of the image of the teacher-researcher, which undoubtedly will evolve and improve themselves during the execution of their professional activities.

# **PEDAGOGICAL CONDITIONS OF FUTURE TEACHERS' SKILLS FORMATION IN THE STUDENTS' INDIVIDUAL WORK IN THE MODERN INFORMATIONAL ENVIRONMENT**

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**Introduction.** Nowadays in heavy flow of information and its transformation into an important strategic resource of mankind the formation of personality capable of self-education throughout life, guided in modern informational space is one of the important tasks of high school. At the same time in higher education institutions the problem of training future teachers to organize the students' individual work in the conditions of existing informational environment is not given much attention.

The aim of the research is to determine the pedagogical conditions of future teachers' skills formation in the students' individual work in the modern informational environment.

To address the goal the following methods of scientific research have been used: analysis of psychological and educational literature, diagnostic methods (questionnaires, tests, interviews, and surveys), observational methods (observation, introspection, and self-evaluation).

**The obtained results.** Based on current research (O. Azhyppo, V. Ashanin, S. Zolotukhina, O. Ionova, L. Kaydalova, V. Lozova, O. Popova, etc.) it has been found that certain factors affect the level of student's cognitive activity. Among the factors there is using of modern informational environment, but under the conditions when students' independent work is motivated and organized correctly by a teacher that has certain necessary skills. It has defined pedagogical conditions implementation of which in practice of training future teachers provides the desired result: the promotion of future teachers' professional cognitive interest, cultivating their valuable attitude to independent work as the main means of self-education and improvement, involving them to creative and search tasks with using information and communication technologies.

Implementation of the above teaching conditions in the training of future teachers in the educational process of the National University of Pharmacy and Kharkiv State Academy of Physical Culture has showed that their use has ensured the growth of future teachers' skills to organize students individual work in the modern informational environment: in the experimental groups the number of future teachers with high level of skills has increased on average by 13.2% and in controlled ones it has been only 4.7.

**Conclusions.** Determined pedagogical conditions of forming future teachers' skills to organize students' individual work in the modern informational environment have been effective enough.

## THE CONCEPT OF PROFESSIONAL IDENTITY IN CONTEMPORARY SCIENCE

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**Introduction.** Recently the problem of "professional identity" has generated researchers' growing interest, because in the current social and economic conditions the requirements to a professional's personality and to the peculiarities of their training grow and constantly change.

**Aim.** Theoretical overview of the concept of professional identity in psychological literature.

**Materials and methods.** Theoretical methods: analysis, synthesis, systematization, generalization, comparison.

**Results and discussion.** Professional identity has been studied by many scientists, among them there are E. P. Yermolayeva, D. I. Zavalishina, N. S. Pryazhnikov, E. A. Klimov, A. A. Rean, D. V. Ronzin, V. I. Pavlenko, L. B. Shneider, V. M. Proselova, J. P. Povarenkov, etc. But despite the number of studies, nowadays, there is no generally accepted and clear definition of professional identity. In general, it implies a set of certain characteristics which help to navigate in the world of professions, to realize personal professional potential.

If we turn to the problem of the place of professional identity in a common identification space, we can see that there is no consensus among Ukrainian scientists. For example, V. I. Pavlenko believes that professional identity is an integral part of personal identity. N. S. Pryazhnikov has different opinion, he argues that the formation of a professional identity contributes to the development of a person in whole, and it is as a fundamental impulse in this process.

**Conclusions.** Many researchers believe that professional identity is a complex personal mechanism that consists of a set of professional constructs: 1) professional identity; 2) professional suitability; 3) development of professionally important qualities; 4) professional readiness; 5) professional development; 6) developing professional life plan.

Generalizing the substantial characteristics, data definitions one can say that professional identity is a multifactorial phenomenon in which complex relationship of personal characteristics, the unity of professional identity, professional identity processes, and professional orientation is expressed.

# METHODS OF CONTROL AND EVALUATION OF STUDENTS' EDUCATIONAL ACHIEVEMENTS IN FOREIGN LANGUAGE TEACHING

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**Introduction.** Educational process is complex and multifaceted phenomenon, with such components as education and upbringing. The objective of higher education is the formation of professional competence of future specialist and organization of the educational process in the high school. One of the most important educational procedures that contributes to the execution of educational objectives are methods of control and evaluation of students' educational achievements.

Unlike the foreign language learning, where the main aim is developing foreign language skills, task of control and evaluation is to determine their level of development. The main purpose of control in the process of learning a foreign language is managing this process.

**Aim.** Opening of the features of pedagogical control and determining the impact of traditional and innovative methods of controlling the quality of students' assessment and their attitude to studying foreign language.

**Materials and methods.** The modern teacher can not remain indifferent to the quality of the work he did, (lecture or practical training) and the most important is, how did the students remember the lesson.

The procedure of control should be an integral part of testing and personal experience of the teacher, the teaching methods and ability to effectively influence on forming of students' knowledge and skills, development of their creative abilities and their attitude to the education.

For the decision of these questions, we used the theoretical and empirical methods. The theoretical are: the analysis of psycho-pedagogical and methodological sources, systematization, comparison and synthesis of scientific sources on the study with a view to the selection and interpretation of actual material. Empirical ones are: observation on the features of organization and conducting of the procedure of different kinds of control and objectivity of assessment of students' knowledge, questionnaires)

**Results and discussion.** During learning the foreign language, it is effective to use such innovative techniques of controlling students' achievements in studying as: group work, test verification of knowledge and skills, problem-based learning, programmed control, using of printed basis exercise books, project work, didactic and role-playing games and using of mutual control and self-control tasks.

These aspects cause the importance of further improvement of control methods and evaluation of knowledge and skills of future specialists, and adding the results of the learning process.

**Conclusions.** During the learning this problem, it was found that the impact of students' achievement would be improved if the teacher focuses his professional work on the next aspects: using innovative methods and forms of control, improving the enabling of environment and emotional foreign language atmosphere for control tasks, involving students to active preparation and searching activities using personal-oriented, interactive and gaming technologies which influence on the improving level of foreign language.

## **PSYCHOLOGICAL AND PEDAGOGICAL COMPONENT OF PHARMACEUTICAL INDUSTRY POSTGRADUATES' TRAINING**

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**Introduction.** The intensification of the processes of European and global integration has led to the occurrence of higher educational institutions of Ukraine to the common European space. This in turn has caused the expansion of students' and young scientists' academic freedoms on choosing their own individual learning strategy, allowing to study and summarize the experience of universities, teachers and experts from different countries, and as a result has significantly increased the importance of the professionalism of teachers in higher education, including the sphere of training of specialists in the field of pharmacy. Because of this the topicality of psychological and pedagogical component during training in postgraduate study is obvious.

**Results and discussion.** The formation of the future teacher's person, his professional and pedagogical skills requires a comprehensive approach that would allow to master person's both personal and professional qualities. It is a cycle of psychological and pedagogical disciplines that aimed at the development and improvement of graduate students' ability of theoretical and practical judgment and reasoning, skills of scientific information objective assessment, the freedom of scientific research and the desire to use the knowledge acquired in the educational activity; development of the ability of the independent scientific and methodological work related to the solution of complex professional and educational goals.

In addition, the process of psychological and pedagogical training involves mastering modern technologies of training and education, development of the ability to synthesize the original ideas in the solution of scientific and methodological issues. Improving communication skills is equally important for the formation of a successful teacher of the university, as it significantly affects graduate students' creative potential.

**Conclusions.** In this regard, the problems of a future teacher's professional skills, a high level of pedagogical culture, which will give him the opportunity to demonstrate pedagogical erudition, to express his pedagogical credo, in a certain way to construct a system of relationships with students, colleagues are put forward to the forefront. Therefore, psychological and pedagogical component plays an important role in the professional development of graduate students; it helps to create the quintessence of professional knowledge, skills, coupled with teaching skills, which in turn will educate highly qualified professionals of "Pharmacy".

## **APPLICATION SHEET**



# FORMATION OF CUSTOMER LOYALTY IN PHARMACIES

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**Introduction.** Today the customer should be won every day. First of all it is necessary to pay attention to increase of degree of loyalty of clients of a pharmacy. The client of a pharmacy is not just a source of receiving money, hi is the full-fledged partner. The true loyalty, along with use of services of your pharmacy, means commitment of the organization, approval of it purposes, means and ways of their achievement. Therefore purpose have to be most transparent and available to each of your clients. And to achieve it, each employee has to be the voluntary carrier and the sincere herald of your ideas. Customer loyalty marketing focuses on incentivizing your current customer base to make more purchases. Its refers to any kind of interaction that builds trust or a desire to maintain relationship with us. To build customer loyalty, customer experience management blends the physical, emotional and value elements of an experience into one cohesive experience.

**Aim.** The aim is to develop loyalty program elements for pharmacy customers. Based on the aim, formulated the following tasks: to study the theoretical foundations of marketing mix in pharmacy as a basis for the formation of customer loyalty; to analyze foreign and domestic experience in building loyalty programs; to identify factors and the most effective methods to increase customer loyalty; to analyze the situation with the client flow in pharmacies and identify problems and lacks of work with clients; to develop of proposals for the formation of loyalty programs for pharmacy.

**Materials and methods.** There are several methods for determining the level of loyalty heuristic (expert); differentiated; graphically mathematics and method of assessing the level of quality and price of loyalty.

**Results and discussion.** During preliminary researches, offered a number of actions for increase of loyalty of clients. Capture customer contact information: when a new customer comes into the pharmacy, want to obtain his/her permission to collect their name, phone number and email. Personally reach out: calling the patients to ask if they have questions concerning their new medications, according to some medication, they need to be followed. Go above and beyond: show the customer that you care, send written personal letters, thanking them for being a loyal customer, without any marketing messages. Remember special occasions: send regular customers birthday cards, sand gifts, but let's be special and unique. Let the customers know what you are doing for them. Create a points or loyalty program: so

important program, to create repeat customer, customer will continue to return in order to earn more points that could help save through merchandise discounts.

A loyal customer is one who is willing to invest in the relationship by sticking with your business even if your price is not always the best, at the same time your pharmacy offer the best service. Loyal customers will become the most effective “sales team” you could ever built, spreading the good news about your pharmacy to everyone in their network.

Along with the proper professional level of the pharmacy and its employees a significant factor in attracting and retaining customers advocate the purchase conditions and the presence of additional (related) services, namely, the extended mode; doctor consultations; availability of parking lots, ATMs at the pharmacy building; service on plastic cards; delivery of goods ordered; demonstration of medical devices in action and learning the rules of their use; the presence of the dressing; having its own pharmacy certificate; packaging buying branded bags and so on.

The call to the client, the letter, a congratulation on a holiday takes only 2-3 minutes of time of your employee, however sometimes they it is much more productive than thousands of dollars spent for advertising. Therefore, basis of any loyalty program of clients this maintenance of continuous human contact, bilateral exchange of positive emotions. However it happens so that the client after all leaves for various reasons: the financial policy of the company has changed, the management, etc. was replaced. But it is impossible to lose really loyal client with whom you managed to construct the deep, positive relations for 100% as even if he also leaves, he leaves happy. The client comes to a pharmacy when he has a problem. If you have managed to solve it from the first, qualitatively, completely, that the probability is high that the client remained happy. It is even better if the client has received more, than he counted. Such client can come again; can make the recommendation, referring not to low price, and to the fact that in your pharmacy he was really helped.

**Conclusions.** Thus, the formation of customer loyalty is a real investment in the long-term and productive relationship with consumers. Learning and development, increasing its professionalism, taking into account trends in the development of self-population, orientation to the intangible pharmacy assets, continuous improvement of product range and price policy, create and work with the customer database allows the pharmacy to achieve financial and economic activity desired results not only in the short term, but also in the long term.

The purpose of further researches it to develop system of loyalty for pharmacy of Lebanon. Pharmaceutical business of Lebanon has the features, which need to be considered during creation of programs of loyalty.

## STUDYING OF STABILITY OF SYRUP WITH ANTIFUNGAL ACTIVITY

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**Introduction.** The steadily increasing fungal resistance to existing antifungal medicines is a serious problem, and therefore there is a great need to search for new classes of antifungal substances, especially from natural sources. Unlike synthetic drugs, antifungal substances of plant origin are not associated with side effects and have a great therapeutic potential to heal many fungal diseases.

Acorus calamus, which is commonly known as Sweet flag is a medicinal plant used for the treatment of various disease and disorders. The rhizome part of Acorus Calamus is found to possess the antifungal activity against the yeast strain of Candida Albicans and other fungi strains. The genus Eucalyptus is known for its rich source of bioactive compounds which show high inhibitory activities against C. albicans.

**Aim.** The aim of our work was to develop composition, the scientifically and experimentally grounded technology of the syrup on the base of Acorus Calamus rhizome extract and Eucalyptus extract with antifungal activity and studying of stability of this syrup.

**Materials and methods.** The object of our researches was an Acorus Calamus rhizome extract, Eucalyptus extract and syrup on its basis. Rhizome alcoholic extract 1: 1 was used for syrup obtaining. Extract was prepared with 70% alcohol by the method of bismaceration followed by evaporation.

**Results and discussion.** At the first stage of the research extracts was obtained and analyzed for indicators such as appearance, solid residue, density, and the authenticity of the sample necessary to justify the composition and further technological research of syrup. It was found that the resulting extracts have a characteristic unpleasant bitter taste and peculiar pungent smell, which confirms the need to develop corrected form of extracts. Further researches on the optimal flavor composition and the basis for a syrup extract were conducted. As a sweetener system mannitol, sorbitol and fructose solutions were used in the following proportions: mannitol and purified water - 70:30; fructose and purified water - 70:30; sorbitol and purified water - 70:30. Concentrated sweetener solutions were prepared by heating to 100 °C. The extracts were added to the cooled syrup. Corrective agents for good taste, flavor and color "cherry", "orange", "cocoa" were added to the syrup base. In the study sorbitol with corrective agents "cherry" received the highest rating of organoleptic properties.

**Conclusions.** Researches on a stability of obtained syrup showed that properties of syrup remained stable during 6 months (observation time).

# DEVELOPMENT OF TECHNOLOGY OF ORODISPERSIBLE TABLETS WITH ELEUTHEROCOCCUS EXTRACT

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**Introduction.** Often people may feel inconvenience in swallowing conventional dosage forms such as tablet and capsule when water is not available, in the case of the kinetosis (motion sickness) and sudden episodes of coughing during the bronchitis, allergic condition and common cold. For these reason, tablets that can quickly disintegrate in saliva have attracted a great deal of attention. Orodispersible tablets are new types of tablets that disperse in the oral cavity within 60 seconds.

Siberian Ginseng (*Eleutherococcus Senticosus*) is useful for maintaining good health, stimulate resistance to stress, restore vigor, improve the memory and increase longevity. It has been used during convalescence and in the treatment of geriatric debility, menopausal problems and a plenty of other ailments.

For adults and children over 12 years tonic herbal medications are prescribed by doctors which should be taken 1-2 tablets 2 times a day for an interval of 15-30 days. Some patients e.g. travelled community are not able to take the complete course due to some reasons. So orodispersible tablets of eleutherococcus are very acceptable dosage form.

**Aim.** Development of the scientifically and experimentally grounded technology of the tonic medicine on the basis of substance eleutherococcus dry extract (10:1) in an orodispersible tablets form.

**Materials and methods.** The research methods were used for tablets according State pharmacopoeia of Ukraine.

**Results and discussion.** The orodispersible tablets were obtained by direct pressing. The sequence of component mixing is very important point during the preparation of medicines. One tablet contained 100 mg of eleutherococcus dry extract. All ingredients were passed through 60 mesh sieve separately. The extract, 1% aerosol, croscarmellose, avicel PH102, mannitol and aspartame were mixed up using a lab mixer. The blends were lubricated with 1% magnesium stearate. The ingredients mixture was compressed into tablets on a laboratory scale single-punch tablet press using a punch with a diameter of 10 mm. The total tablet weight was 300 mg. Tablets prepared were flat. After ejection, the product was stored in airtight containers.

**Conclusions.** The orodispersible tablets with eleutherococcus extract were estimated for all pharmaco-technological parameters which were found to be within the acceptable limits.

# CHOICE OF EXCIPIENTS FOR CAPSULES WITH ECHINACEA EXTRACT AND CRATAEGI EXTRACT

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**Introduction.** Secondary insufficiency of cellular and humoral immunity in patients with chronic heart failure occurred against a background of coronary heart disease and complicated community-acquired pneumonia hypostatic requires recovering of altered immune parameters by including in the therapy immunomodulators. Herbal medicines are becoming more popular throughout the world. The echinacea extract may be used to reduce symptoms, such as cough, pharyngitis (sore throat) and fever, and shorten the duration of the common flu and cold. Echinacea is also recommended to help the body fight infections and help boost the immune system. Crataegi (hawthorn) extract have a wide range of pharmacological actions on the cardiovascular system. Preparations of Crataegus are used traditionally in minor forms of heart failure, coronary heart disease and cardiac arrhythmia. So the creation of new medicines with extracts combination in oral dosage form as hard gelatinous capsules is topical.

**Aim.** The choice of excipients for the development of hard gelatins capsules with echinacea dry extract and crataegi dry extract was the aim of this work.

**Materials and methods.** The extracts, excipients, mixtures for encapsulation and prepared capsules on their basis were research subject. The pharmacotechnological tests which described in State pharmacopoeia of Ukraine were used for researches.

**Results and discussion.** The extracts are polydisperse powders with a predominance of small fraction fines. The particles of two extracts have a rough surface, that stipulates a significant friction force between particles and bad flowability. The bulk density of the active substances mixture was small (0.35g/ml). The results of research have been shown the improvement of pharmacotechnological properties of extracts bland with the use of lactose, light magnesium carbonate and talc. Fifty (50) capsules each with a nominal weight of 250 mg were prepared from powders consisting of Crataegi extract (40.00% w/w), Echinacea extract (20.00% w/w), lactose (33.00% w/w), light magnesium carbonate (5.0% w/w), and talc (2% w/w). Extracts were thoroughly mixed together and with magnesium carbonate, after which lactose was added. The mixture was lubricated with talc and filled into size 0 hard gelatin capsules shells using a manual capsule filling machine.

**Conclusions.** Based on pharmacotechnological studies the excipients for the hard gelatins capsules with echinacea and crataegi dry extracts were selected.

## HEMOSTATIC AGENTS MARKET ANALYSIS

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**Introduction.** Injuries with bleeding ranks first among various injuries in case of accidents, road traffic accidents. injury problem is particularly relevant to disaster medicine.

Injuries are a leading cause of death of people during man-made, natural (earthquakes, hurricanes, landslides), social, military emergencies. Therefore, the task of market research of hemostatic medicines remains relevant.

**Aim.** Market analysis of hemostatic agents in Ukraine.

**Materials and methods.** The research objects were the data of the State Register of Medicinal Products and ATC code. The methods of information retrieval and marketing analysis were used.

**Results and discussion.** According to the ATC classification system hemostatic medicines are a group B - «Blood and blood forming organs» and form group B02 – «Antihemorrhagics» including subgroups B02A – «Antifibrinolytics» and B02B – «Vitamin K and other hemostatics». Subgroups B02A shows 2 pharmaco-therapeutic groups (B02A A – «Amino acids» and B02A B – «Proteinase inhibitors») and 3 positions of pharmaceutical products. Subgroup B02B represented by 4 pharmaco-therapeutic groups and by 13 positions of pharmaceuticals.

According to the State register of medicines, as of January 1, 2016 in Ukraine 49 commercial drugs names of group B were registered (re-registered), which are represented by different dosage forms in accordance with their dosages, among them 73% are solutions for injection (or a lyophilized powder for reconstitution solution for injection), 12.5% - solid dosage forms (tablets, powders, sponges, plate), and the rest - extracts and herbs. At the same time, 50% of the market - it's expensive imported medicines group B02BD - «Blood coagulation factors», which are inaccessible to most people.

Along with the medicines on the market there are medical devices to stop bleeding. This is a different gel dressings, bandages based on chitosan, zeolites, cellulose, powders based granular chitosan and zeolites such Celox, Combat, etc. However, according to Ukrainian legislation only etamsylate, which refers to a subgroup B02BX - «Other systemic hemostatic» is included in the range of medicines and medical devices for emergencies.

**Conclusions.** It is a marketing analysis of the Ukrainian market of hemostatic agents. It was found that only one drug - etamsylate included in the range of medicines and medical devices for emergencies, which is clearly insufficient.

# DEVELOPMENT OF FORMULATION AND TECHNOLOGY OF MEDICINAL PREPARATION IN THE CAPSULES FORM WITH ANTIINFLAMMATORY ACTIVITY

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**Introduction.** Pain, fever and inflammation occupy one of the first places among reasons of population disability. Nonsteroidal anti-inflammatory drugs (NSAIDs) are highly effective in the alleviation of these adverse conditions. Such effective NSAID as diclofenac sodium is commonly indicated in the treatment of rheumatoid arthritis and osteoarthritis, relief of mild-to-moderate acute and chronic pain. Diclofenac is widely used around the world. There is a lack of domestic diclofenac medicines in Iraq. Therefore creation of new medicinal preparations with diclofenac for pharmaceutical market of Iraq is topical.

**Aim.** The purpose of our work was a development of the composition and technology of hard gelatin capsules for oral administration with diclofenac sodium.

**Materials and methods.** The substance, auxiliaries, mixtures for encapsulation and prepared capsules on their basis were research subject. The research methods were used according United States Pharmacopeia (USP).

**Results and discussion.** The composition of capsules with diclofenac sodium was formulated under the supervision of Associate Professor Sichkar A.A. The dose of active pharmaceutical ingredient was 50 mg/capsule. The pharmacotechnological properties analysis of the test substance diclofenac sodium had shown that the substance had poor flowability, hence it was concluded that direct filling of powder into capsules was not possible. It is predetermined application of special inactive ingredients for improvement pharmacotechnological characteristics. Capsule mixtures on the basis of substance were investigated with combinations of lactose monohydrate, potato starch, croscarmellose sodium, aerosil, talc, magnesium stearate in different correlations. Since diclofenac sodium is poorly soluble in water, starch and croscarmellose sodium were used to increase penetration of the stomach liquid into encapsulated mass in capsules. Aerosil and magnesium stearate reduces the friction between particles of the composition and the surface friction between particles of the composition and the equipment surface. It was established that lactose monohydrate and aerosil have more influence on flowability of the active substance. The capsules samples were stored in plastic containers.

**Conclusions.** Auxiliary ingredients and technology of capsules with diclofenac sodium for manufacture in Iraq were chosen as a result of research. The received capsules correspond to all indexes of the USP (39th edition) for capsules.

## **PROJECT MANAGEMENT IN PHARMACEUTICAL INDUSTRY**

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Project management is a discipline that can be applied to all industries and works very effectively in the pharmaceutical industry where major shifts in recent years have significantly impacted the way in which a pharmaceutical company brings a product to market.

In the pharmaceutical industry, project management is the key to addressing the unique regulatory, compliance and quality related needs of the industry. The process of clinical research and drug development, coupled with the critical issue of time to market, can capitalize on project management techniques to effectively apply scheduling, risk management, and comprehensive quality assurance and control to the process of bringing a drug to market in a cost-efficient way.

Project management is a discipline that can be applied to all industries, regardless of the product or service they are designed to deliver. Beyond its basic application across various industries, project management has tremendous value when effectively implemented to significantly increase the success of the product or service being delivered.

The pharmaceutical industry has encountered major shifts in recent years, both within the industry and in its external environment. Some of the factors responsible for this shift include the rising cost of healthcare due to an aging population, the increase in rigorous regulatory requirements, and company mergers within the industry. These factors have led to an increased need for restructuring, cost reduction, and culture change projects.

Every industry has different “stress points”—those points that are most critical to the specific product or service being delivered. The most typical stress points are schedule, cost, and quality.

Depending on the industry, one (sometimes more) of these stress points directly affects that industry’s profit, thereby making that point absolutely critical to the success of the product, and the company delivering it. It becomes, therefore, a priority in the set of processes involved in producing the product.

Specifically in the pharmaceutical industry, there has never been a tougher time to be involved in drug development. In recent years, the market has become much



more competitive, and the political, regulatory, social and economic pressures have become much more intense. Also, each year at least one drug company experiences a recall of one of their drugs, lawsuits from their customers or lawsuits from their competitors.

The most important stress point in the pharmaceutical industry is quality. Poor quality in this industry can literally be a matter of life and death, in its worse cases. Being the first to bring a product to market is also critical, though the course of drug development is unpredictable. Because of the risks involved in the pharmaceutical industry, due diligence is of the utmost importance in terms of quality control measures. So these competing priorities quality and time to market must be well managed through careful process in order to reduce the risks inherent in this industry.

Another current challenge for pharmaceutical companies is the pressure they are under to increase their productivity, as the number of new products reaching the market has been on the decline over the past few years. This productivity decline has led many to believe that the industry is in need of a new and better approach in its management of clinical research, drug development, and product delivery.

The two key challenges in the pharmaceutical industry are quality and schedule, both of which are directly addressed by the tools and techniques used in project management.

## NANOPHARMACOLOGY

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**Introduction.** Nanotechnologies have become widely spread in medicine and pharmacy in recent years. Nanoscale drugs called drugs, which form the structure of molecules equal to or more than 1 nm in all three dimensions. Physical, chemical and pharmacological properties of nanoscale structures are very different from those for ordinary molecules. Nanoparticles similar in its characteristics to natural macromolecules involved in ensuring all biochemical functions. R. Smalley received the Nobel Prize in 1996 for their discovery of **fullerenes**. Fullerene molecule ( $C_{60}$  carbon) is highly lipophilic and its connection to another molecule leads to the formation of a lipophilic substance which pharmacokinetics will be different from the original. Lipophilicity fullerene allows you to enter it into the liposomes for aerosol administration to the lung of cancer patients. Huge prospects has fullerene chemistry, opening the possibility of the production of entirely new material. Fullerene  $C_{60}$  so easily attach free radicals, allowing the molecule called "radical sponge". Polyhydroxyl fullerenes are good antioxidants.  $C_{60}(OH)_{24}$  - fullerenole has a protective effect against oxidative stress caused by Doxorubicine.

The **dendrimers** can themselves act as drugs. Unlike low molecular weight substances capable of forming bonds with the limited number of targets, dendrimers may form a plurality of links. Dendrimers act as inhibitors of the interaction of virus with a cell in the early stages of viral infection. Dendrimers can help fight bacterial strains resistant to antibiotics.

**Dendrosomes** represent an effective system of targeted gene delivery. Another possibility is the use of nanoparticles drug transport to certain receptors by changing the acidity and chemical stimuli. Of particular importance in the development of delivery systems is based nanocarriers drugs aimed at the treatment of cancer, diabetes, Alzheimer's and Parkinson's diseases, diseases of the cardiovascular system as well as antimicrobial, antiviral and gene products and vaccines. At present, it is necessary to solve such problems of nanopharmacology: identification of physical and chemical characteristics of synthetic nanoparticles responsible for the toxicity; development of methods of predicting the potential toxicity of nanoparticles etc.

**Conclusions.** Nanopharmacology can be considered as one of the most important and core technologies of the 21st century. The introduction of nanotechnology in the processes of development of original drugs is already happening and will determine the success of pharmacology and pharmacy in the near future.

# STUDY OF CAPSULES COMPOSITION WITH ELEUTHEROCOCCUS EXTRACT AND GREEN TEA EXTRACT

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**Introduction.** Today the demands of people on nature products to pursue healthy aging are rising. Herbal medicines are considered safer or more harmless than synthetic ones. More herbal medicines have been used for the prevention and treatment of various chronic human diseases and malaises. The medicinal plants are attracting more attention due to their reduced or absence of side effects.

Preparations from *Eleutherococcus senticosus* may be used as a tonic for the relief of symptoms in case of decreased performance such as sensation of weakness and fatigue, loss of concentration and tiredness, and as adaptogen to increase body resistance to stressful exposures.

Green tea extract has neuroprotective and antioxidant effect.

The extracts combination in convenient oral dosage form as capsules can provide increase of capacity for work, reduction of nervous and physical exhaustion, diminution of chronic stress. The medicine on the basis of *eleutherococcus* extract and green tea extract is also may be recommended for patients who live in regions with unfavorable environment.

**Aim.** The purpose of our research work was the choice of auxiliary ingredients for the development of capsules composition with *eleutherococcus* and green tea extract and pharmacotechnological properties study of samples of different mixtures with extracts and other ingredients.

**Materials and methods.** The pharmacotechnological tests were used for mixtures according State pharmacopoeia of Ukraine.

**Results and discussion.** The moisture content of masses for encapsulation was 3.15-3.5 %w/w. The results of pharmacotechnological researches have shown that extracts with poor flowability have large bulk volume. The addition of aerosil and its mixture with magnesium stearate in the amount of 1-3% increased flowability of the extracts mixture. Extracts bulk density increased due to the glidant properties of aerosil. Also the addition of magnesium stearate allowed avoiding of dry extracts adhesion to capsule filling machine working parts during encapsulation process. Size of capsule was "0". Results have shown that average weight of capsule was 205 mg and capsule passed the test for uniformity of weight.

**Conclusions.** The main auxiliary ingredients for the capsules composition with *eleutherococcus* and green tea extract were aerosil and magnesium stearate from the antifriction group of capsules auxiliary agents.

**THE ELEMENTAL COMPOSITION OF GRASS  
*ASPERULA OCTONARIA* KLOKOV**

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**Introduction.** The attention of scientists from different countries attract the plants from genus Woodruff *Asperula* L. family *Rubiaceae* Juss, and among them there is *Asperula octonaria* Klokov. This is a perennial herb which is widespread in the central eastern and southern Ukraine. The plant is unofficial and in folk medicine infusion of herbs is used as a diuretic. Previously, it has been found that underground organs of the plant contain anthraquinones, in herb - hydroxycinnamic acid, flavonoids and iridoids.

The **aim** of this work is determination of the elemental composition of the herb *Asperula octonaria*.

The objects of the study were samples of herb *Asperula octonaria* collected in Kharkov region in June 2015.

**Materials and methods.** The study of qualitative composition and quantitative content of elements conducted by using of atomis - emission spectrophotometry method. The samples were evaporated from craters arc discharge of graphite electrodes by the power of 16A at 60 seconds exposure. As a source of excitation spectra was used SES-28. Spectra were recorded on film using a DFS-8 spectrograph with a diffraction grating of 600 lines/mm and a slit illumination of lens system. The lines of spectra were photometrated at a wavelength from 240 to 347 nm in the samples which were compared with standard samples of the mixture using a mineral elements microphotometer MF-4.

**Results and discussion.** The content of the test samples is determined by 6 macro (K, Na, Ca, P, Mg, Si) and 13 micro elements (Fe, Mn, Al, Pb, Sr, Zn, Ni, Mo, Cu, Co, Cd, As, Hg). The raw materials are absent or are beyond the scope of the definition of the method of Co, Pb, Mo (<0.03), Cd (<0.001), As (<0.001) and Hg (<0.001). The greatest quantity (mg / 100 g) is accumulated in K - 1275, Si - 1020, Ca – 680. The following pattern of accumulation of elements in the raw materials is established: K> Si> Ca> Mg> P> Fe> Na = Al> Mn> Zn> Sr> Cu> Ni.

**Conclusion.** Thus it is established that the content of heavy metals in the raw material complies with the requirements, and significant content elements allows us to consider it as promising source of bioavailable trace elements.

**IMPORTANCE OF STUDY INFLUENCE EXCIPIENTS  
AND PROCESS PARAMETERS ON QUALITY  
CHARACTERISTIC DRUGS**

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Study influence of excipients and process parameters on the quality of new or generic solid dosage forms during the conduct of pharmaceutical development and scale up process is very important for pharmaceutical companies. Particularly noteworthy are the drugs that are in its composition containing bed soluble substance, because of technology and their production significantly affect the ability to release the active substance in the body and consequently their bioavailability. Impact assessment excipients and process parameters on the pharmacological efficacy of drugs that contains in its composition bed soluble medicinal substance, most appropriate to carry out tests "Disintegration", "Dissolution" and comparative studies of the kinetics of dissolution in vitro, in which possibly track the release of substances in the environment close to the physiological and for their optimal dissolution choose appropriate excipients and production technology.

The aim of our research is to study the impact of excipients and parameters production process on quality characteristic solid dosage forms that in its composition containing bed soluble substance. The objects of study are generic and original drugs:

The objects of study are generic and original drugs:

- «Boryzol" and "Rilutek" tablets, film coated shell that contains in its composition 50 mg of drug substance ryluzol;
- «Nimodipine" and "Nimotop" tablets, film coated shell that contains in its composition 30 mg of drug substance nimodipine.

Because of the low solubility of the substances ryluzol and nimodipine problem creating acceptable dosage form that characterized by the need to improve

the solubility of active pharmaceutical substances and their stable uniform distribution in each tablet. Usually, increasing the solubility of these substances is achieved by adding appropriate excipients of the drugs or using technological methods of physical modifications substances.

During the pharmaceutical development of generic drugs "Boryzol" and "Nimodipine" studies on the effect of excipients and process parameters on quality tablets:

- influence of excipients on the solubility of substances ryluzol and nimodipine tablets of drugs was researched;
- influence of various technological methods of physical modification substances ryluzol and nimodipine on dissolution from solid dosage forms was researched;
- influence of excipients on pharmaco-technological properties powders and tablets was researched;
- influence of process parameters on dissolution of the substances ryluzol and nimodipine from tablets was researched.

The resulting enhanced scientific data make it possible to determine the effect of excipients and process parameters on the quality of generic drugs "Boryzol" and "Nimodipine "controlled during their industrial production, and is the key issue highly efficient pharmaceutical industry generic drugs.

Implementation of advanced scientific research at the stage of pharmaceutical development and in the process of scaling the technology of production of drugs in order to understand the product and process of its manufacture tion recommended requirements of ICH Q8 and Q10 for pharmacists, chnymy companies release highly efficient drugs for a period of the whole of their life cycle.

# **USE OF INFORMATION AND COMMUNICATION TECHNOLOGIES IN PREPARATION OF JUNIOR SPECIALISTS IN PHARMACY**

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High rates of the global economy, industry and science strengthen requirements for graduates; constantly growing amounts of new information lead to using of innovative forms and methods in the educational process.

Information and communication technologies (ICT) perform activating effect on the learning process of students as they change the scheme of transfer of knowledge and teaching methods. However, the introduction of ICT into the education system not only affects the educational technologies but also introduces new ones to the process of education. They are associated with the use of computers and telecommunications, special equipment, software and hardware, data processing systems. They are also associated with the creation of new learning tools and knowledge preservations, which include electronic textbooks and multimedia; libraries and archives, global and local educational network; information searching and information reference systems.

One of the ways to interest and encourage students to work independently is the implementation of ICT into the learning process. The use of educational software (GCC), including multimedia systems sufficiently relevant in today's educational space. These systems make it possible to provide effective support to the active perception of educational material.

The advantage of virtual laboratories is that the student can choose different modes of operation of the program; change the parameters of the objects or processes; observe and analyze results; draw conclusions based on their observations; operate independently of a laboratory in any places, using a computer, tablet or smartphone; perform tasks using the Internet. They provide the conditions for understanding the problems, the study of patterns forming hypotheses based on their subsequent experimental verification. Thus, a lot of opportunities appear for student for research and creative activity that promotes cognitive interest.

To effectively enhance learning of students in teaching course "Analytical Chemistry" we have used virtual chemical laboratories that allowed performing

experiments to record experimentally obtained data, use reference books, instructions, etc. on a personal computer and in the Internet.

In conducting laboratory studies of qualitative analysis of experiments and tasks of identifying some inorganic substances, the students performed the task via online portal for virtual laboratory VirtualLab ([virtulab.net](http://virtulab.net)).

In the "Report" section students completed the relevant sections, fixing the value obtained in the course of the experiment of the measured values, analyzed findings and made appropriate conclusions.

As in a real laboratory work, in the virtual one students had to learn research skills, nomination hypotheses and their checking standardization conditions, clear fixation conditions and the experimental results (harvested in laboratory journals or in electronic form), choose the format of presentation of results and then plan an independent research (project). The ability to conduct virtual experiments greatly expanded the list of chemicals that are still traditionally used in laboratory practice and now require special storage usage and also are toxic and poisonous gives the opportunity to work with them during the laboratory sessions. When performing virtual experiments, students were able to work with them; required for a particular experiment equipment and instruments, whose presence in the laboratory can not be thus been able to work out laboratory practice.

For the experimental use of social networks in the learning process, we have created a closed group "Analytical Chemistry" in VK, whose participants were students of EG. Students had the opportunity to receive counseling teacher to communicate with each other, discuss issues that arose during the study subjects. In addition, the group uploaded photos and videos of some experiments, additional literature on the subject "Analytical Chemistry" provided links to specialized sites and online virtual lab.

It is found that ICTs contribute to professional development and self-improvement students develop skills in group skills of self-presentation, laying the groundwork professional skills, changing the ratio of students to teaching in a positive way, stimulate analytical thinking, promote the interest of educational material, increase the activity of teaching and learning activities, positively affect the psychological state and feeling of comfort.



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