МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я
НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ УНІВЕРСИТЕТ

СУЧАСНА ФАРМАЦІЯ: ІСТОРІЯ, РЕАЛІЇ ТА ПЕРСПЕКТИВИ РОЗВИТКУ

Матеріали науково-практичної конференції з міжнародною участю, присвяченої 20-й річниці заснування Дня фармацевтичного працівника України

19-20 вересня 2019 р.
м. Харків

У 2 томах
Том 2

MODERN PHARMACY: HISTORY, REALITIES AND PROSPECTS OF DEVELOPMENT

Proceedings of the scientific-practical conference with international participation, dedicated to the 20th anniversary of the founding of the Day of the Pharmaceutical Worker of Ukraine

September 19-20, 2019
Kharkiv

In two volumes
Volume 2

Харків
НФаУ
2019

УДК 615.1 (06)
С 89

Реєстраційне посвідчення УкрІНТЕІ № 54 від 31.01.2019 р.

Сучасна фармація: історія, реалії та перспективи розвитку : матеріали науково-практичної
С 89 конференції з міжнародною участю, присвяченої 20-й річниці заснування Дня фармацевтичного працівника України, м. Харків, 19-20 вересня 2019 р. : у 2 т. / редкол. : А. А. Котвіцька та ін. – Харків : НФаУ, 2019. – Т. 2. – 498 с.

Збірник містить матеріали науково-практичної конференції з міжнародною участю, присвяченої 20-й річниці заснування Дня фармацевтичного працівника України «Сучасна фармація: історія, реалії та перспективи розвитку», в яких представлено сучасний стан та актуальні питання розвитку наукових напрямів фармацевтичного сектора галузі охорони здоров'я: конструювання, синтез і модифікація біологічно активних сполук та створення на їх основі лікарських субстанцій; сучасні аспекти розробки та промислового виробництва лікарських, косметичних засобів і добавок дієтичних, госпітальна фармація; біофармацевтичні аспекти створення екстемпоральних лікарських засобів, удосконалення складу і технології алопатичних і гомеопатичних лікарських засобів; сучасний стан та перспективи використання лікарських рослин і розробки фітотерапевтичних засобів; фармацевтичний аналіз, стандартизація та організація виробництва лікарських засобів; фармацевтична та медична біотехнологія, нанотехнології у фармації; організація та економіка у фармації, менеджмент та маркетинг у фармації, фармакоекономіка на етапах створення, реалізації та застосування лікарських засобів; механізми патологічних процесів та їх фармакологічна корекція; клінічна фармація: від експериментальної розробки лікарських засобів до стандартизації фармацевтичної допомоги; соціальна фармація; фармацевтична освіта в Україні.

Для широкого кола наукових та практичних працівників фармації та медицини.

Редакційна колегія не завжди поділяє погляди авторів статей.

Автори опублікованих матеріалів несуть повну відповідальність за підбір, точність наведених фактів, цитат, економіко-статистичних даних, власних імен та інших відомостей. Матеріали подаються мовою оригіналу.

Registration Certificate of UkrINTEI № 54 dated January 31, 2019

Modern pharmacy: history, realities and prospects of development: proceedings of the scientific-practical conference with international participation dedicated to the 20th anniversary of the founding of the Day of the Pharmaceutical Worker of Ukraine, Kharkiv, September 19-20, 2019 : in 2 vol. / ed. board. : A. A. Kotvitska et al. – Kharkiv : NUPh, 2019. – Vol. 2. – 498 p.

The collection presents the proceedings of the of scientific-practical conference with international participation dedicated to the 20th anniversary the founding of the Day of the Pharmaceutical Worker of Ukraine "Modern Pharmacy: history, realities and prospects of development".

The current state and topical issues of development of scientific directions of the pharmaceutical sector of healthcare are presented: design, synthesis and modification of biologically active compounds and the creation of medicinal substances based on them; modern aspects of development and industrial production of medicines, cosmetics and dietary supplements, hospital pharmacy; biopharmaceutical aspects of the creation of extemporaneous drugs, improving the composition and technology of allopathic and homeopathic medicines; current state and prospects of use of medicinal plants and development of herbal medicines; pharmaceutical analysis, standardization and organization of drug production; pharmaceutical and medical biotechnology, nanotechnology in pharmacy; organization and economy in pharmacy, management and marketing in pharmacy, pharmacoeconomics at the stages of creation, sales and administration of medicines; mechanisms of pathological processes and their pharmacological correction; clinical pharmacy: from experimental drug development to standardization of pharmaceutical care; social pharmacy; pharmaceutical education in Ukraine.

For a wide range of scientific and practical workers of pharmacy and medicine.

The editorial board does not always share the views of the articles authors.

The authors of the published materials are solely responsible for the selection, accuracy of the facts, quotations, economic statistics, proper names and other information. The materials are submitted in the original language.

УДК 615.1 (06)

METABOLOMICS AS A NEW APPROACH IN MODERN DRUG DESIGN

[1]Burian H. O., [2]Burian K. O., [1]Abu Sharkh A. I.
National University of Pharmacy, Kharkiv, Ukraine
[1]Pharmaceutical chemistry department, [2] General Pharmacy and Safety of drug department
anna_chem@ukr.net

In order to successfully compete in the modern pharmaceutical market, any pharmaceutical company has to invest a lot of resources in the process, including the discovery of drugs and their introduction into practice. Study of numerous opportunities, the creation of new, more effective and safer drugs in today's environment is one of the keys to success.

The pharmaceutical industry worldwide is actively investing into innovation to support the standard of patients lives. Industry requires solutions to overcome the lack of knowledge about the target disease and identify clinical phenotypes that would facilitate the introduction of a patient-oriented drug development model through the active involvement of patients throughout the clinical trial process. One useful tool you can use to solve these problems is metabolomics [5].

Metabolomics is increasingly used in various areas of healthcare, including pharmacology, preclinical drug testing, toxicology, transplant monitoring, screening of newborns, and clinical biochemistry [4].

There are several key factors that influence the health and well-being of patients, and the role of altered metabolism in various signs of the disease becomes the driving force of therapeutic intervention, as well as the stratification of patient groups.

Metabolites are small chemical components that are formed as a result of vital activity and are part of each cell. The main specific features, such as food quality, taste, nutritional value, toxicity, allergenicity, etc. are directly related to the presence or absence of specific combinations of certain metabolites. It is characteristic that this is often a combination of metabolites, and not the presence of individual compounds, that has the greatest biological significance. In special cases, the presence of a complex biochemical medium is also of importance. Therefore, metabolic technologies were developed in order to obtain the widest possible review of the biochemical composition of biological materials without prior knowledge of metabolism.

Metabolomics is a systematic study of unique chemical processes of metabolites in living organism that can be used to define their biological state, so it is the study of their small molecule metabolite profiles [3]. Metabolomes are the collection of all metabolites into a biological cell, tissue, organ or organism, which are the end products of the cellular process. In general, the quality control of certain compounds of substances is based on three important definitions of pharmacopoeia: identity or qualification, purity, assay or quantification. To confirm identity and purity it is necessary to check criteria such as the basic properties of the substance, physical constants, limit tests for purities, moisture, ash content, and residues of solvents.

Studies of absorption, distribution, metabolism and excretion are widely used in the process of creating drugs to maximize the balance of qualities necessary for the safe biotransformation of drugs. The study of these indicators is one of the main tasks of metabolomics. Researches of the characteristic features of metabolites is the main driving force in the process of creating drugs, helping to optimize their properties and increase their level of success.

Recently, additional efforts have been made to solve the problem of research in the field of metabolism using high-performance technology for screening compounds, which, in turn, has led to high demand for faster metabolite identification methods.

Modern discovery of medicines provides a range of scientific disciplines, including biology, chemistry and pharmacology. In the end, it is a process that leads to the identification of new perspective medicinal substances. Traditionally, this path involves screening molecular libraries and

optimizing hits and requires established goals and libraries of molecules to select hits for intracellular, as well as for extracellular, targets. In addition, the optimization of this process includes the improvement of qualities, such as affinity, selectivity, efficiency and potency, metabolic stability and oral bioavailability of a potential medicinal substance. When these requirements are met, drug development begins to send a candidate for clinical trials.

Metabolomics, as autonomous science or as part of systemic biological discovery researches, can offer interesting possibilities for identifying not only diagnostic, but also prognostic, as well as mechanistic markers for a number of basic human diseases. The ability to identify drug toxicity and its efficacy markers is expected to significantly accelerate drug detection and help determine relevant clinical and pharmacological work.

The majority of modern pharmaceutical preparations are usually chosen to affect a specific molecular target. The discovery and validation of a robust biomarker of targeted interactions can create confidence and contribute to future plans for clinical development [1]. Biomarkers of rational target interactions, such as substrates or products in targeted paths, will certainly be the most valuable. For determination of biomarkers can be used almost all the modern physical and physicochemical methods for analysis, such as Ultraviolet/Visible spectroscopy (UV/Vis), Thin Layer Chromatography (TLC), High-Performance Liquid Chromatography (HPLC), Gas Chromatography (GC), Mass Spectrometry (MS), or a combination of GC or LC and MS, can be employed, which are in an arsenal of practical analyst [2, 4]. For example, modern mass spectrometry-based metabolomics make it possible to measure these substrates and products, as well as hundreds of endogenous metabolites, are not directly up or down relative to the corresponding target within the path, regularly reporting widely observed metabolic disturbances in vitro and vivo. Metabolomics offers another attractive option, namely, when a change in one common metabolite may not be diagnostic, changes in the panel of several metabolites may give a signature for a specific path disturbance [5].

In this way, metabolomics is able to give the knowledge about the efficacy and safety of medicinal substances, while at the same time using well-established research designs and biomedical procedures to deliver a large amount of previously unavailable information.

So, knowledge about metabolomics can potentially offer drug researchers and drug regulators an effective, inexpensive route to addressing many of the riskier or more expensive issues associated with the discovery, development and monitoring of drug products, that is why it is necessary to include into the studying process of modern pharmacist` preparation.

Reference

1. Martis Elvis A. Metabolomics in Drug Discovery: A Review / Elvis A. Martis, Deepak C. Ahire, Ruchi O. Singh // International Journal of Pharmacy and Pharmaceutical Science Research. – 2011. – 1(2). – P. 67-74.
2. New frontiers in pharmaceutical analysis: A metabolomic approach to check batch compliance of complex products based on natural substances / L. Mattoli., M. Burico, G., Fodaroni, S. Tamimi et al. // Journal of Pharmaceutical and Biomedical Analysis. – 2016. – Vol. 126. – P. 156-162.
3. Palacios G. The growing landscape of metabolomics and lipidomics: applications to medicinal chemistry and drug discovery / G. Palacios, J. J. Bowling, A. Abdolvahabi // Future medicinal chemistry. – Vol. 11, № 6.
4. Puchades-Carrasco L. Metabolomics Applications in Precision Medicine: An Oncological Perspective / L. Puchades-Carrasco, A. Pineda-Lucena // Curr. Top Med. Chem., 2017. – Sep. 17(24). – P. 2740-2751.
5. Tolstikov V. Metabolomics: Bridging the Gap between Pharmaceutical Development and Population Health // Metabolites. – 2016. – 6(3). – P. 20.