## PHARMACO-TECHNOLOGICAL STUDIES IN THE DESIGN OF SUBLINGUAL TABLETS

Yakovenko O.V.
Scientific supervisor: prof. Ruban O.A.
National University of Pharmacy, Kharkiv, Ukraine
realmanutd.ua@gmail.com

**Introduction.** Stress is a physiological response that mobilizes body reserves and prepares it for physical activity such resistance, struggle. There is a positive and negative stress. The consequences of the latter cause various systemic diseases (coronary heart disease, atherosclerosis, memory impairment, insomnia, etc.). Almost three quarters of adults (74%) claim that they experienced at least one symptom of stress over the past year. After conducting marketing research on the pharmaceutical market in Ukraine, it was determined that the creation of a new combined drug in the form of pills for therapy and prevention of stress conditions is a promising direction.

**Aim.** The aim of the research was to study pharmaco-technological properties of active pharmaceutical ingredients and their mixtures.

**Materials and methods.** Pharmaco-technological studies (flowability, angle of repose) of substances samples was carried out. Flowability was determined on the VP-12A device by measuring the sample leakage time of the powder (100.0 g). Determination of granulometric composition was carried out using a set of sieves according to the requirements of the SPHU. Magnesium citrate, glycine, as well as their mixture were selected as research objects.

**Results.** Determination of the flowability and the angle of repose were carried out using the methods of the SPHU. According to the results, the angle of the repose of magnesium citrate is 36 degrees, which is a satisfactory value, glycine is 50 degrees, which is an unsatisfactory indicator and it requires the use of a vibration dam, and the active pharmaceutical ingredients (API) mixture has the angle of the repose 44 degrees, but during the experiment sometimes we observed the hang of the mixture.

The results of the sieve analysis indicate that glycine is almost evenly distributed between sieves No. 0.5 and No. 0.1 and completely sifted through the latter. Magnesium citrate, in the amount from 0.08% to 0.52%, remains on screens No. 3 – No. 0.1. At that, 98.47% of the substance is completely sifted through the sieve No. 0.1.

**Conclusions.** The results of the studies showed low flowability of the mixture of magnesium citrate and glycine, and the uneven size of the API particles, which makes it impossible to use the method of direct compression for tablets and requires the use of auxiliary substances.

## OBTAINING AND RESEARCH OF NICOTINIC ACID DERIVATIVES

Yeremenko B. V.
Scientific supervisor: prof. Toranik L. A.
National University of Pharmacy, Kharkiv, Ukraine
rmv@nuph.edu.ua

**Introduction.** As aging involves oxidant injury, we examined the role of the recently described Na/K-ATPase oxidant amplification loop (NKAL). First, C57Bl6 old mice were given a western diet to stimulate oxidant injury or pNaKtide to antagonize. The western diet accelerated functional and morphological evidence for aging whereas attenuated these changes. Next, human dermal fibroblasts (HDFs) were exposed to different types of oxidant stress *in vitro* each of which increased expression of senescence markers, cell-injury, and apoptosis as well as stimulated. Further stimulation with ouabain augmented cellular senescence whereas treatment attenuated it. Although N-Acetyl Cysteine and Vitamin E also ameliorated overall oxidant stress to a similar degree as pNaKtide, the pNaKtide produced protection against senescence that was substantially greater than that seen with either antioxidant. In particular, appeared to specifically ameliorate nuclear oxidant stress to a greater degree. These data demonstrate that the NKAL is intimately involved in the aging process and may serve as a target for anti-aging interventions.

**Aim.** With this medicine, people will live up to 120 years.

**Materials and methods.** Aging is characterized by a number of physiological changes including loss of cell division, oxidative stress, DNA damage, nuclear changes, and increased expression of senescence-associated genes. From the phenotypic point of view, aging might be defined as the progressive age-related decline of physiological function caused by cell arrest (senescence) and/or programmed cell death (apoptosis). It has been known for some time that oxidant stress plays a central role in the aging process, and is causally involved in the injury to cellular proteins and DNA. When reactive oxygen species (ROS) accumulation exceeds the detoxifying ability of the cell, the resulting oxidative stress induces damage, senescence, and apoptosis. It is the imbalance between ROS and antioxidant defense mechanisms11 that contribute to impaired physiological function, disease development, and ultimately, the limited life span of an organism.

**Results and discussion.** Effect of pNaKtide on body weight, tissue weight, energy expenditure, locomotor activity, and oxygen consumption in C57B16 aging mice. We evaluated the effects of Na/K-ATPase signaling and pNaKtide *in vivo* using a mouse model of aging and a western diet (WD) regimen to induce oxidative stress. Our results showed that body weight, visceral fat, and subcutaneous fat weights were increased in the old mice and further increased in old mice fed a WD. These increases were significantly decreased by pNaKtide treatment. There were no significant differences in any of these measures between young mice and young mice treated with pNaKtide.

**Conclusions.** We observed that the recently described NKAL regulates the aging process. We previously showed that a western diet induced Na/K-ATPase signaling and increased oxidative stress in mice. We used this dietary approach to investigate the effects of age and oxidative stress in adipose tissue, and heart, which are both affected by the aging processes. In both of these organ systems, old mice and old mice fed a WD had evidence for oxidant injury, which was related to the stimulation or inhibition of the NKAL with the WD or pNaKtide, respectively. As in obesity, aging is frequently associated with an increased proportion of adipose tissue as well as increased concentrations of circulating pro-inflammatory cytokines such as TNFα. In our experiments, old mice had increased fat deposition along with large adipocytes and increased TNFα levels; these changes were accentuated in the old mice fed a WD. Aging of heart tissues is associated with impaired function detectable with echocardiography and fibrosis measurable with histology. These changes were exacerbated by the WD and attenuated by pNaKtide treatment as well. Again, these changes in adipose tissues were negated with pNaKtide treatment.

## THE RELEVANCE OF THE DISCIPLINE «PROCESSES AND EQUIPMENT OF CHEMICAL AND PHARMACEUTICAL PRODUCTION»

Zakhovaeva A.O.
Scientific supervisor: Doctor of Pharmacy, professor Sagaidak-Nikitiuk R.V,
National University of Pharmacy, Kharkiv, Ukraine
paft@nuph.edu.ua

**Introduction.** The relevance and significance of the discipline "Processes and equipment of chemical and pharmaceutical production" based on the achievements of the complex of sciences and is of great importance for the design and construction of devices for pharmaceutical companies.

**The purpose of research**: to justify the need for engineering training of applicants for higher education in industrial pharmacy.

**Materials and methods:** generalization, analysis and synthesis, content analysis.

**Results and discussion**. The purpose of studying the discipline is to obtain knowledge in modern equipment of pharmaceutical enterprises.

The objectives of the discipline "Processes and equipment of chemical and pharmaceutical production" are:

- mastering the foundations of a methodological approach to solving theoretical and applied problems,
- analysis of the mechanisms of the main processes, the patterns of their occurrence in biotechnological equipment,
- modeling and calculation of processes and devices,