

**МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ**

**НАЦІОНАЛЬНИЙ ФАРМАЦЕВТИЧНИЙ  
УНІВЕРСИТЕТ**

**ІНСТИТУТ ПІДВИЩЕННЯ КВАЛІФІКАЦІЇ  
СПЕЦІАЛІСТІВ ФАРМАЦІЇ**



**МАТЕРІАЛИ  
ІІ НАУКОВО-ПРАКТИЧНОЇ ІНТЕРНЕТ-  
КОНФЕРЕНЦІЇ З МІЖНАРОДНОЮ УЧАСТЮ**

**«ФАРМАЦЕВТИЧНА НАУКА ТА ПРАКТИКА:  
ПРОБЛЕМИ, ДОСЯГНЕННЯ, ПЕРСПЕКТИВИ РОЗВИТКУ»**

**«ФАРМАЦЕВТИЧЕСКАЯ НАУКА И ПРАКТИКА:  
ПРОБЛЕМЫ, ДОСТИЖЕНИЯ, ПЕРСПЕКТИВЫ РАЗВИТИЯ»**

**«PHARMACEUTICAL SCIENCE AND  
PRACTICE: PROBLEMS, ACHIEVEMENTS, PROSPECTS»**

15-16 квітня 2021 року  
Харків

## MODERN SUBSTANCES THAT IMPROVE METABOLISM

*Zakirova R.Y., Mirzakhitova I.M.*

*Department of Industrial technology of medicines*

*Tashkent Pharmaceutical Institute, Tashkent, Uzbekistan*

[rakhimova.gulnara@bk.ru](mailto:rakhimova.gulnara@bk.ru)

L-carnitine is an amino acid that is synthesized in the body and takes an active part in the metabolism and functioning of mitochondria. The human body contains 15-20 g of carnitine, most of which (>95%) is localized in the skeletal muscles; this amino acid enters the body with food, mainly from meat and dairy products. During fasting and after eating a large amount of fatty foods, the proportion of carnitine that is acylated in the liver and kidneys increases significantly, and conversely, eating a large amount of carbohydrates causes a rapid decrease in the level of acetyl-L-carnitine in the liver. L-carnitine is considered a conditionally essential micronutrient; in recent years, the term "functional carnitine deficiency" has been actively used in foreign literature, which is used to describe abnormal clinical manifestations corrected by taking this amino acid. In 2013, a systematic review of 13 controlled trials, including a total of 3,629 patients, was published, which showed that the use of L-carnitine leads to a significant reduction in all-cause mortality and, with a high degree of confidence, to a decrease in the incidence of ventricular arrhythmias and the development of angina pectoris. The potential mechanism underlying the positive effect of L-carnitine in cardiovascular diseases is multifactorial and may partly be related to the ability of This substance to improve energy metabolism in the mitochondria of cardiomyocytes by increasing the transport of long-chain fatty acids from the cytosol to the mitochondrial matrix, where beta-oxidation occurs. Moreover, L-carnitine has a beneficial effect on left ventricular remodeling, leading to a significant decrease in its volume after acute myocardial infarction [1]. L-carnitine is widely used to treat a variety of cardiac conditions. A number of studies have shown that L-carnitine reduces the level of triglycerides, total cholesterol, and low-density lipoprotein cholesterol [2]. L-carnitine effectively eliminates the clinical manifestations of HF, improves heart function, and is well tolerated. L-arginine is a conditionally essential amino acid. L-arginine is necessary for the synthesis of proteins and some biologically important molecules, such as ornithine, Proline, creatine, and agmanthine. This amino acid is a substrate for the enzyme responsible for the synthesis of nitric oxide. The latter is formed in endotheliocytes and is responsible for smooth muscle relaxation and lowering blood pressure. "Any improvement in endothelial function will contribute to the prevention of cardiovascular pathology," McRae said. It was found that L-arginine reduces the adhesion of leukocytes to the endothelium, reduces platelet aggregation, the level of endothelin in the blood, and increases the elasticity of arterial walls. A recently published review of the results of 7 meta-analyses convincingly demonstrated the benefits of prescribing L-arginine to patients with arterial hypertension: taking This amino acid reduced systolic and diastolic blood pressure by 2.2-5.4 and 2.7-3.1 mm Hg, respectively. A number of randomized trials in patients with coronary heart disease have revealed positive effects of L-arginine: increased exercise tolerance and reduced platelet aggregation. Effect of L-arginine on platelet aggregation, endothelial function, and exercise tolerance in patients with stable angina, reduction of functional class of angina, normalization of blood

pressure, and improvement of quality of life. The results of numerous studies in recent years indicate the possibility of effective and safe application of the properties of L-arginine as an active NO donor in clinical practice in cardiovascular diseases. Vitamins (lat. vita life + amines) – well-known low-molecular organic compounds of various chemical nature, they are referred to as essential food substances. The human body receives vitamins mainly as part of food. Participating in a variety of chemical transformations, they have a regulating effect on the metabolism and thereby ensure the normal course of almost all biochemical and physiological processes in the body. Most of the known vitamins are represented not by one, but by several compounds-vitamins (all of them have similar biological activity). The body is not able to "store" vitamins for future use, with the exception of fat-soluble vitamins A, D and E, and therefore they must be supplied regularly in a full set and in quantities that meet the daily physiological need. The need for vitamins and trace elements depends on age, gender, characteristics of the biological state, the intensity of metabolism in a particular period of life, physical activity, the presence of chronic diseases and other factors. Recent data indicate that the availability of vitamins and trace elements for children and women of reproductive age is significantly lower than the physiological needs. Hypovitaminosis is a deficiency of vitamins in the body as a result of a reduced, insufficient intake of vitamins (at the same time, a person receives minimal amounts of vitamins, sufficient to prevent severe beriberi from developing, but completely insufficient to fully meet the needs of the body, optimal implementation of all life processes associated with vitamins). Summarizing the data available in the literature, based on the results of clinical and biochemical surveys of different regions of the country, allows us to characterize the situation with insufficient supply of vitamins to the population in the following way: the detected deficiency affects not just one vitamin, but has the character of a combined deficiency of vitamins C, group B and carotene, i.e. it is polyhypovitaminosis; vitamin deficiency is detected not only in spring, but also in the summer–autumn period, which seems to be the most favorable, and thus is a constantly operating unfavorable factor; in a significant part of children, pregnant women and in lactating women, multivitamin deficiency is combined with iron deficiency, which is the reason for the wide spread of hidden and obvious forms of vitamin–iron deficiency anemia; in some regions, multivitamin deficiency is combined with insufficient intake of iodine, selenium, Lack of antioxidant vitamins-ascorbic acid (vitamin C), Tocopherols (vitamin E) and carotenoids-is one of the factors that increase the risk of developing cardiovascular and cancer diseases. Folate - a derivative of folic acid (FA) - was isolated from spinach leaves, which gave it its name, derived from the Latin folia – "leaf". Foliates are involved in the metabolism of purines, homocysteine, choline, and histidine, and synthesize amino acids, nucleic acids, pyrimidines, essential phospholipids, neurotransmitters (serotonin, melatonin, epinephrine, and dopamine), as well as cellular receptors [1, 2].

### References

1. DiMasi J.A., Grabowski H.G., Hansen R.W. Innovation in the pharmaceutical industry: new estimates of R&D costs. *J Health Econ.* 2016; 47:20–33.
2. Zhang D., Luo D., Ding D., Lu C. Preclinical experimental models of drug metabolism and disposition in drug discovery and development. *Acta Pharm Sin B.* 2012;2:549–561.