

The aim of the study was to conduct a search for highly active antimicrobial drugs among a number of new phosphonium compounds.

Materials and methods. The antimicrobial activity of naphthylmethyl phosphonium chlorides was studied using the micromethod using disposable polystyrene tablets and Takachi microtitrators in relation to 6 reference strains of gram-positive and gram-negative microorganisms.

Results. Our preliminary results of studying the antimicrobial and antifungal activity of naphthylmethyl phosphonium chlorides showed that they have high antimicrobial activity. The research was conducted on clinical strains of microorganisms.

Table

Antimicrobial activity of naphthylmethylphosphonium chlorides ($\mu\text{g/ml}$)

Test-culture	Compound I	Compound II
<i>S. aureus</i> 209	1,95	1,95
<i>M. luteus</i> ATCC 3941	3,9	3,9
<i>Y. pseudotuberculosis</i> 623	62,5	125
<i>Y. enterocolitica</i> 1466	125	62,5
<i>H. alru</i> 3168	125	62,5
<i>E. coli</i> O ₅₅	125	125

Note: MIC: minimum inhibitory concentration; MB_cC: minimum bactericidal concentration

The studied substances have high antimicrobial activity against gram-positive microorganisms (*S. aureus* 209, *M. luteus* ATCC 3941). Thus, their minimum inhibitory concentrations against *S. aureus* 209 are within 1,95 – 3,9 $\mu\text{g/ml}$; *M. luteus* ATCC 3941 - 0,975 – 3,9 $\mu\text{g/ml}$. Gram-negative microorganisms were moderately sensitive (*Y. pseudotuberculosis* 623, *Y. enterocolitica* 1466, *E. coli* O₅₅), the minimum inhibitory concentrations ranged from 62,5 to 250 $\mu\text{g/ml}$.

Conclusion. Therefore, naphthylmethylphosphonium chlorides have high antimicrobial activity against gram-positive microorganisms (*S. aureus* 209, *M. luteus* ATCC 3941) and moderate against gram-negative microorganisms. It is reasonable to continue studying their antimicrobial activity in relation to antifungal drugs.

Iftoda O.M.

MICRONUTRIENTS AS COMPONENTS OF NON-SPECIFIC IMMUNOPROPHYLAXIS

Department of Hygiene and Ecology

Bukovinian State Medical University

Introduction. Under conditions of economic instability, the structure of the population's nutrition undergoes significant changes in the direction of increasing the imbalance of the main components of the diet, which negatively affects the state of the body's defenses and increases the susceptibility to seasonal viral diseases. Therefore, during the period of increased incidence of colds, flu, SARS and COVID-19, it is important to support the immune system by obtaining the necessary nutrients in optimal quantities.

The aim of the study. To analyze the influence of certain micronutrients in the diet on the stimulation of the body's immune response.

Material and methods. A review and analysis of foreign sources of scientific and medical literature was carried out (Lim H., 2018; Alexander J, 2020; Joliffe D., 2020; Grant W., 2020; Calder P., 2020; Wessels I., 2020; Sies H., 2021; Skrajnowska D., 2021; Saikat M., 2022) using bibliosemantic and analytical research methods.

Results. As evidenced by numerous clinical studies, vitamins C and D, as well as trace elements zinc and selenium, can favorably stimulate the immune response in case of exposure to viral infectious agents.

The main mechanism of the anti-infective activity of vitamin D is its ability to induce the formation of β -defensins and cathelicidin in macrophages, neutrophils and epithelial cells, which cause the death of microorganisms in autophagosomes. Vitamin D is also able to suppress

inflammatory reactions in the lungs, inhibiting the expression of pro-inflammatory mediators (IL-1 α , IL-1 β , TNF- α) and stimulating the phagocytic ability of macrophages. A meta-analysis of randomized controlled trials on the use of vitamin D supplements found them to be safe and effective in reducing the risk of developing acute respiratory disease. The protective properties were associated with the consumption of a daily dose of 400-1000 IU of vitamin D for 12 months.

Vitamin C acts as a stimulator of leukocyte functions, in particular the movement of neutrophils and monocytes, enhances chemotaxis and phagocytosis, counteracts the increase in TNF- α and increases the level of the anti-inflammatory cytokine IL-10. Vitamin C supplements have also been shown to reduce the duration and severity of upper respiratory tract infections, such as the common cold, especially in people who are physically active. For preventive purposes, risk groups are recommended to consume vitamin C in a daily dose of 500-1000 mg.

Zinc participates in the regulation of the inflammatory response, affecting the activity of leukocytes and lymphocytes, including their proliferation, differentiation and maturation, is a cofactor of thymulin, regulates the activity of mature T cells in the peripheral blood and stimulates their maturation, suppresses the production of pro-inflammatory cytokines (IL-1 β), acts as a signaling molecule in the production of IL-2, γ -interferon and IL-12, which stimulate CD8⁺ T cells. This trace element affects the activation of mucociliary clearance by increasing the frequency of movement of cilia in the respiratory tract, preventing the penetration of viruses into cells. In the long term, a zinc intake of no more than 25-50 mg/day is recommended, as the intake of high doses of zinc can disrupt the copper balance.

Selenium inhibits the protein disulfide isomerase enzyme, which is responsible for joining the viral glycoprotein, preventing the virus from entering the host cell. It thus reduces the level of IL-1 β and IL-6. Selenium supplementation of 100 mcg/day has been shown to improve various indicators of immunological reactivity.

Conclusions. Adequate correction of the diet, competent supplementation of it with individual nutrients can favorably stimulate the immune response of healthy individuals and individuals with an increased risk of developing viral infections.

Kmet T.I.

EARLY AND DELAYED RESPONSE OF BCL-2⁺ PARIETAL CORTICAL CELLS OF RATS WITH EXPERIMENTAL DIABETES TO ISCHEMIA-REPERFUSION

*Department of Hygiene and Ecology
Bukovinian State Medical University*

Introduction. The rapid growth of cerebrovascular pathology, its prevalence and serious consequences attract the attention of many scientists. Special attention is paid to the study of ischemic lesions of the brain, which account for more than 2/3 of all cerebrovascular diseases. The list of diseases against which brain ischemia develops more often includes diabetes mellitus (DM), which increases the risk of developing ischemic lesions of the neocortex, creates a high probability of energy imbalance of nerve and glial cells and ultimately leads to their death. However, from the available scientific literature, it is not known about the state of antiapoptotic processes in the neocortex of rats with DM complicated by bilateral carotid ischemia-reperfusion in the early and remote postischemic periods.

The aim of the study. To investigate the effect of carotid ischemia with reperfusion of different durations on the early and delayed responses of the anti-apoptotic protein Bcl-2⁺ in cortical cells of the parietal lobe of the hemispheres in rats with streptozotocin-induced diabetes.

Material and methods. Experimental studies were conducted on two-month-old male rats, which were modeled with diabetes by a single intraperitoneal injection of streptozotocin (Sigma, USA) at a dose of 60 mg/kg of body weight. At the age of 5 months, some rats, as well as control animals of the same age, underwent bilateral compression of the common carotid arteries for 20 minutes under calypsol anesthesia (75 mg/kg). One group of rats was removed from the experiment