animals. Their key function is acidification of the internal medium of vacuoles, lysosomes, the Golgi apparatus, endosomes, and secretory vesicles (e.g. neuroendocrine secretory granules) in animal cells. V-ATPase is a multisubunit enzyme. In humans such subunits are encoded in 25 genes. Structurally V-ATPase resembles the well-studied complex of F-type ATPase - consists of an intramembrane part (domain) $V_0$ for protons to pass it through, and $V_1$ domain which possesses the ATP hydrolase activity. F-ATPases are connected with the mitochondrion (bacterial plasma membranes and chloroplast thylakoid membranes also). The protein subunits of F-ATPase are encoded in 18 human genes. $F_0$ domain is located in the inner membrane and allows a proton flux both into and out of the mitochondrial matrix. $F_1$ domain looks like a small mushroom in which "head" ATP synthesis or hydrolysis occurs in connection with the direction of proton flow. F-ATPases supply human cells with a large amount of ATP.

P-type ATPases (P – phosphorylation, necessary for the function cycle) is a large group of cation transporting complexes that use energy of ATP. $Na^+/K^+$-ATPase (9 encoding genes), $Ca^{2+}$-ATPase (8 encoding genes) are among the most well-known enzymes. $Cu^{2+}$-ATPase, $Mg^{2+}$-ATPases, $H^+/K^+$-ATPase (nongastric) and some other species belong to transporting P-ATPases also.

**Conclusions.** So we have 3 main types of ion transporting ATPases – V-, F- and P-type. They are practically all multisubunit complexes. ATP supplies energy for the functioning of these enzymes that are widely spread in different living organisms.

## PREVENTION OF SOME TOXIC MANIFESTATIONS OF MEBENDAZOLE TREATMENT BY USING MULTIVITAMIN COMPLEX

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**Introduction.** The correction of drug toxicity is a topical issue of modern pharmacology and medical biochemistry. This is especially specific for therapy, which requires high doses of organotoxic drugs, for example the treatment of echinococcosis with high doses of mebendazole, which has a pronounced depressive effect and induces an encephalopathy in some patients.

**Aim.** In previous experiments, it was marked the ability of the multivitamin complex to reduce the negative effect of mebendazole. The purpose of this experiment was to assess the effect of vitamins on mebendazole neurotoxicity.

**Materials and methods.** The experiment was conducted on 30 female rats, divided into 3 groups. As a vitamin complex we used Vitrum (USA). The experiment period was 7 days. Administration of vitamins has conducted once a day in an hour after mebendazole for a week. The doses for animals ware calculated based on the average daily human therapeutic dose and the intraspecific differences. The effectiveness evaluation was determined by the psychological tests.

**Results and discussion.** Mebendazole intoxication induced anxiety and depression in the experimental rats. However, the combination of this agent with the multivitamin complex led to the decrease in the indicators of anxiety and depressive effect, which were estimated by psychological tests conducted in comparison with the control group.

Results of the open field show an increase in the number of crossed squares by 65%, the interest in the openings increased by 48%, and attempts to examine the vertical wall by 84%. The number of defecations decreased by 29% and urination - by 52%. The number of grooming acts increase by 83% in compared with the control pathological group. In the test "behavioral desperation" it was shown decrease in total immobilization time by 69% and the number of acts of immobilization by 49%. The data of the behavioral test "cross-labyrinth" indicate an extension of the latent period of the entrance to the dark sleeve by 51%, the lengthening of the stay in the light sleeve by 49%, and the increase in transitions by 17% .

**Conclusions.** The results of the study show a positive effect of vitamins-antioxidants on high dose mebendazole-induced neurotoxicity and depression. This finding can help improve existing regimens for the treatment of parasitic diseases