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Studying of lipid metabolism in experimental diabetes and ways of its correction

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Objective: The aim of the research is to study the disorders of lipid metabolism in experimental diabetes and its correction with ecdysten.

Materials & Methods: Research was conducted on white rats, weighing 120-140 g. Model alloxan diabetes was induced by administration of alloxan 15 mg per 100 g of body weight. At 7, 14, 21 days experiment investigated the glucose in the blood. On the 7th day of the experiment, we began administering ecdysten and the rats were treated with this for 14 days. As a comparison, we took glucophage and retabolil drugs.

Results: Main characteristic of dyslipidemia in diabetes is, increasing level of triglycerides in the composition of VLDL and decreased HDL cholesterol. Low-density lipoprotein cholesterol concentrations in diabetic patients does not differ from that of people without the disease, but in patients with type 2 diabetes predominant fraction of small, dense LDL with increased atherogenesis due to the high oxidizing ability. Quantitative changes in lipid profile may occur in isolation, but more often they are combined and are called lipid triad or atherogenic dyslipidemia.

Conclusion: Thus, treatment of experimental animals with ecdysten and glyukofage within 14-21 days, more significantly reduced triglycerides compared to the control. If the 7th day of treatment, triglyceride levels had a tendency to exceed the values of intact rats. By the 14th day, this figure did not differ from the normative values. Treatment with ratabolil slightly reduces the concentration of triglycerides as compared to control. The concentration of HDL cholesterol in the 14-21 days of treatment with retabolil was dramatically reduced as compared with the control animals and intact groups, but treatment ecdysten and glucophage, especially ecdysten, increased HDL-C concentration is almost 2-fold compared with the control. Regarding triglyceride levels, the treatment ecdysten glyukofage and experimental animals with alloxan diabetes within 14-21 days and significantly reduces their contents and retabolil increases.

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¹H-NMR based metabolomic study for identifying serum metabolite profiles associated with thyroid functional disorders

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Metabolomics, a Systems Biology approach focused on the global study of the metabolome, offers a tremendous potential in the analysis of fluid samples. Metabolome represents the complete set of small-molecule metabolites within a biofluid, which are end of products of cellular processes. Metabolomics enables to noninvasively identify the metabolites through ¹H-NMR spectroscopy that could translate into early therapeutic interventions. NMR has the ability to detect and reproduce metabolic components, even at very low concentrations. A thyroid disease is a medical condition impairing the function of the thyroid gland. In this study, we focus on two types of thyroid diseases which are hypothyroidism and hyperthyroidism. Hypothyroidism refers to any state in which a person's thyroid hormone production is below normal whereas hyperthyroidism is a state where the production of thyroid hormone is above the normal level. The aim of this study is to identify and distinguish different disease biomarkers that affect the hypo and hyperthyroidism with healthy controls. A Carr Purcell Meiboom Gill (CPMG) pulse sequence encoded with presaturation along with a ¹H, ¹³C heteronuclear correlation experiment is used to individually identify the serum metabolic profiles in a healthy as well as thyroid affected blood serum samples. Principal component analysis is done by MetaboAnalyst. Initially, we have compared few thyroid serum samples with healthy controls and we observed significant differences between the two groups. Scores plot of PLS-DA analysis showing differences in the metabolites and the relative concentrations of healthy and thyroid affected sera.

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