Pharmacological action adaptogens various origin at experimental diabetes

Elbekyan K.C., Muravyeva A.B., Gevandova M.G.,
Hodzhayan A.B., Pazhitneva E.B.
Stavropol State Medical University

Diabetes is one of the most widespread endocrine diseases caused by absolute or relative insufficiency of insulin hormone. Characteristic symptoms of this disease is the chronic current and violation of all types of a metabolism: carbohydrate, fatty, proteinaceous, mineral and water-salt.

For the purpose of increase of stability of an organism to damaging influences in medicine preparations of the phytogenesis possessing adaptogenny properties for a long time are used. At the same time, melatonin developed an epifizy hormone is also capable to improve adaptation processes. In this regard it was represented interesting to compare biochemical bases and pharmacological activity of a complex plant preparation tonizid to melatonin at experimental diabetes. Experiment was carried out on laboratory mice. They divided animals into 6 groups (N = 60): the first group – control animals to whom they entered the distilled water, the second and third groups – the mice receiving daily within 14 days tonizid (200 mg/kg) and melaksen (0,1 mg/kg) respectively, the fourth group – mice in whom by single hypodermic introduction alloxan tetrahydrate in a dose of 150 mg/kg alloksanovy diabetes was caused, the fifth and sixth groups – the animals who were receiving melaksen and tonizid against alloxan.

For the 15th days of supervision of they were animals decapitated, taken away blood for definition of the maintenance of products carbohydrate (glucose, glikirovanny hemoglobin) and lipidic (cholesterol, lipoproteins of low density, lipoproteins of high density and triglycerides) exchanges, a condition about - and antioxidant system. They determined the content of glucose in blood by a glucose oxidase method by a set of reactants of "Fotoglukose". Concentration of cholesterol (XC), lipoproteins of high (LPVP) and low (LPNP) density and triglycerides (TG) in serum of blood was determined by a fermentativny colorimetric method by a set of chemical reactants (production Human, Germany).

Biochemical research of a carbohydrate exchange showed that for the 10th days after introduction alloxana at animals significant increase of the content of glucose in blood – 6,92±0,9 mmol/l (at intact animal 4,05±0,4 mmol/l, p alloxan; $p < 0,01$) was observed. Level of glicated hemoglobin exceeded intact indicators for 24%, $p < 0,01$.

Introduction of melaksen and tonizid moderately raised level of glucose in blood that can testify to proper response of a pancreas in reply to metabolism changes under influence adaptogens. Such moderate hyperglycemia is one of the main incentives to increase of functional activity and reproduction β- cells islands Langergansa. At mice with the alloxana diabetes, receiving melaksen and tonizid, the content of glucose and glicated hemoglobin in blood was statistically lower, than at animals with alloxana diabetes without correction that it is necessary to recognize as protective influence adaptogens on function of the insular device of a pancreas. Other researches conducted on mice with alloxana diabetes when

hypoglycemic effect of extract of a root of a ginseng was liquidated after serum introduction with antibodies against insulin testify to it also. The preparation on the basis of this plant increased its allocation from a perfecting pancreas of diabetic mice, bringing besides to level, as at healthy animals or sum addition ginsenosides to the isolated islands of pancreatic fabric strengthened development of a hormone and the sekretorny answer of betta-celles to glucose. At epiphysis by means of melatonin also there are close connections with a pancreas and its insular device. The analysis of scientific works showed that epifizarno-pancreatic interaction has generally activation character. In particular, introduction to rats of adequate doses of melatonin (0,1 mg/kg) is accompanied by increase of the plasma content of immunoreactive insulin, and repeated injections of 25 mkg of a hormone increase double level of an insulin- like growth factor in blood of hamsters, reducing level of a glycemia.

In the analysis of a lipidic exchange it was established that the content of cholesterol, LPNP and TG was much higher in comparison with indicators of animals of control group for 32%, 29% and 25% respectively, at simultaneous falling of concentration of LPVP for 29% $p < 0,01$. In the conditions of deficiency of insulin and surplus of cohtrinsulatind hormones, activation triglyceride lipase and high speed lipolysis in fatty tissue with release of free fatty acids and increase in plasma concentration glycerol and phospholipids is observed.

Introduction of preparations melaksen and tonizid an animal with the alloxan-induced diabetes led to statistically reliable decrease in the content of cholesterol with use melaksen for 11,5% and tonizid for 13%, LPNP – for 19,4 and 24% and TG – for 37% and 33% respectively in comparison with indicators of animals with alloksanovy diabetes. Thus the LPVP level under influence melaksen increased by 44%, and tonizida for 36%.

Development of the specified changes in a lipidic exchange under the influence of preparations melaksen and tonizid can indicate braking lipolysis with decrease in plasma concentration of free fatty acids. As studying of activity of extracts of a plant and separate ginsenosides testified, after introduction of substances by an animal strengthening lipolysis, provoked or adrenaline was prevented. At the same time changes affected only the induced process whereas the basal disintegration of fats and inclusion of marked glucose in lipids at intact animals significantly didn't change.

Results of biochemical experiment and the analysis of scientific works and researches, allowed us to assume that pharmacological adaptogens have stimulating impacton pancreas work, and therefore they can participate in protection against diabetes.