

CORRECTION OF METABOLIC DISORDERS UNDER EXPERIMENTAL METABOLIC SYNDROME BY AGMATINE ADMINISTRATION

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The metabolic syndrome is a complex of hormonal and metabolic disorders, which increase hazard of type II diabetes and diseases of cardiovascular system development. One of the main pathogenic factors of such consequences is endothelial dysfunction which causes hypertension.

Earlier we demonstrated that experimental metabolic syndrome was accompanied by changes in the nitric oxide metabolism (decrease of arginine, citrulline and nitrites + nitrates content i.e. decrease of NO production). So the aim of present work was to investigate the effect of agmatine, the endogenous NO donator, on metabolic disorders under experimental metabolic syndrome.

Experimental metabolic syndrome was modulated by fructose-rich diet, containing 18.3% protein, 60.3% fructose and 5.2% fat. Experimental rats were divided into 3 groups: 1) the control group received regular rat chow, 2) the study group received fructose-rich diet, 3) the study group received fructose-rich diet with agmatine in therapeutic dose. Plasma glucose, insulin concentration and total level of nitrites and nitrates were determined after 6 weeks of experiment.

Fructose-rich diet provoked a significant increase in body weight, hyperglycemia, hyperinsulinemia and decrease of plasma ($\text{NO}_2^- + \text{NO}_3^-$) content. These data demonstrate the development of obesity, insulin resistance, and disruption of nitric oxide metabolism.

Upon agmatine administration weight loss was observed that can be associated with neuropeptide Y production decrease of and appetite reduction. Agmatine treatment also normalized plasma levels of glucose and insulin possibly due to its ability to increase of glucose uptake by muscle cells and to enhance the sensitivity of cells to insulin. The total content of nitrites and nitrates increased after agmatine treatment. This may be explained by action of agmatine as imidazoline receptors agonist. It's known that agmatine inhibits iNOS and nNOS but activates eNOS reducing blood pressure.

Thus, the data obtained in our experiment indicate that hypercaloric diet caused significant metabolic disorders. Agmatine administration had the protective action, obviously, because of its pleiotropic effects, including the prevention of obesity and insulin resistance and normalization of nitric oxide production.