

**ACTIVITY OF CARBOHYDRASES AND PROTEASES OF
THE MUCOUS MEMBRANE OF THE SMALL INTESTINE
OF ALBINO RATS WITH DIFFERENT LEVELS OF
CONSTITUTIONAL STRESS REACTIVITY**

**ACTIVITATEA CARBOHIDRAZELOR ȘI PROTEAZELOR MUCOASEI
INTESTINULUI SUBȚIRE LA SOBOLANII ALBI CU NIVEL DIFERIT
DE REACTIVITATE CONSTITUȚIONALĂ LA STRES**

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Introduction. For the development of a sanogenic nutrition system, which provides for the individualization of the diet and for solving the problems of an individual approach to the prevention and correction of disorders of digestive functions, it is important to identify the constitutional features of the functioning of the digestive system. A number of studies have shown the relationship between a person's belonging to one or another basic type of phenotypic constitution (ectomorph, mesomorph or endomorph) and the expression of genes encoding metabolic enzymes, biochemical indicators of metabolism, eating behavior, the size of the digestive organs, structural indicators of the intestine, the level of synthesis some intestinal hormones, predisposition to certain diseases of the digestive organs [1-5]. Along with this, the constitutional features of the activity of digestive enzymes have been studied extremely insufficiently, and, at present, there are practically no ideas about the features of digestion depending on the type of constitution. In a few studies, differences in changes in the enzyme excretory function of the stomach and pancreas in individuals of different somatotypes in response to stimulation of the digestive glands were revealed [6, 8], some structural and functional features of the intestine in model animals with different levels of stress reactivity were shown, corresponding to a certain type of constitution [7, 9-11]. It is known that each type of constitution has its own type of stress reactivity. This is the basis of the methodology for dividing experimental animals into types of constitution corresponding to a certain level of stress reactivity, which was used in this work.

The aim of the work was to study the activity of membrane-bound enzymes (carbohydrases - maltase, sucrase and glucoamylase and alanine aminopeptidase protease) in

different parts of the small intestine of albino rats with different levels of constitutional stress reactivity.

Material, and methods. The studies were performed on male Wistar rats kept in a vivarium on a standard diet with free access to food and water. Rats were divided into three groups, depending on the level of constitutional stress reactivity: 1 - high stress reactivity; 2 – average level of stress reactivity; 3 – low stress reactivity. Constitutional stress reactivity was assessed, using a set of behavioral tests and analysis of histopathological differences in the tissues of the stomach, thymus, and adrenal glands in some animals of each group after immobilization stress. Enzyme activity was determined in homogenates of the mucous membrane of the small intestine (duodenum, proximal and distal parts of the jejunum, ileum), using known biochemical methods.

Results and discussion. The highest maltase activity in the parts of the small intestine, with the exception of the ileum, was observed in rats with an average level of stress reactivity compared to animals with high and low stress reactivity, while in rats with high and low stress reactivity, the values of maltase activity were similar. In the ileum, the highest maltase activity was recorded in rats with high stress reactivity. The highest sucrase activity in the duodenum and proximal jejunum is observed in rats with moderate stress reactivity compared to animals with low and, especially, high stress reactivity (differences between groups reach 62%, $P < 0.05$), and in the distal area in the jejunum and ileum there was a tendency to increase sucrase activity in highly reactive animals compared to animals with an average and, especially, low level of reactivity.

The highest activity of glucoamylase is observed in rats with high stress reactivity in all parts of the small intestine, with the exception of the proximal part of the jejunum, where glucoamylase activity is highest in animals with an average level of stress reactivity, and its minimum values are observed in animals with a low level of stress reactivity. The highest values of alanine aminopeptidase activity in all parts of the small intestine were recorded in rats with low stress reactivity compared to animals with high and moderate stress reactivity (differences between groups reach 38%, $P < 0.05$), and the lowest values were in highly reactive animals except for the ileum. It should be noted that we previously recorded an increased overall proteolytic activity of the small intestine in rats with low stress reactivity [11].

Thus, the results obtained demonstrate the existence of a relationship between the genetically determined stress reactivity of the body and the digestive function of the small intestine and the prospects for further research in this scientific direction. The data obtained confirm the ideas about the essential features of the digestive processes in representatives of different constitutional types, which must be considered when developing sanogenic and preventive nutrition, demonstrate the need for typology and individualization of nutrition, individualization of approaches in the prevention and correction of disorders of the digestive organs.

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