CZU: 599.32:591.53

THE MODIFICATION OF FREE AMINO ACIDS RATS FED WITH PROTEIN RATION

Poleacova Lilia
Institute of Physiology and Sanocreatology, Chisinau, Republic of Moldova
E-mail: bostan-lilia@mail.ru

Proteins are known to be an essential component of most body tissues, acting as an energy substrate in the development of catabolic processes. Free amino acids in physiological fluids act as metabolic regulators, and their metabolism in the cell is extremely extensive because their amount significantly increases the number of amino acids involved in protein biosynthesis. In the literature, although enough data are known about the changes that take place in the intermediate metabolism of free amino acids, the impact of physical exertion on the background of a protein-rich diet on the body is little known. The research aim is the modification the summary content of the functional groups of free amino acids (ALL) in the blood of senile rats fed protein ration in combination with physical effort (PE).

The investigations were performed on ten white laboratory rats (males-old -24-30 months), divided into two experimental groups: group I – with protein ratio (PR) (25% - proteins, 55% - carbohydrates, 20% - lipids) without PE; group II – with protein ration with PE. The animals practiced maximum dynamic PE – swimming daily for 31 days. The water temperature is +27 °C. Duration of the experiment – 31 days. The content of free amino acids in the serum and erythrocytes was determined by the ion-exchange liquid chromatography method. The analysis of the total content of AAL was performed by functional groups, depending on the physiological role of amino acids: non-essential, essential, immunoactive, glycogenic, ketogenic, proteinogenic, and sulfur amino acids.

Analysis of the AAL serum concentration, by functional groups, in group II senile animals compared to group I, which depends largely on the absorption possibilities of enterocytes from the small intestine and partially from the large intestine, shows a decreasing tendency of the group non-essential amino acids (by 4.7%), and a significant decrease in immunoactive, essential, glycogenic, ketogenic, proteinogenic and sulfur amino acids (respectively by 48.0; 39.2; 25.7; 17.6; 36.7; 33.1%). This decrease is possibly due to disorders of the absorption processes of amino acids in food in senile animals, as well as changes in the microbiome of the small and large intestine, which actively synthesize essential AALs. The analysis of free amino acids in erythrocytes of rats from group II compared to group I identified a marked decrease in the content of amino acids. Intensive PE in senile rats causes a downward trend in the summary content of sulfur amino acids by 13.2%, and a significant decrease in other functional groups of AAL (non-essential - by 38.7%; essential - by 64.4%; immunoactive - by 48%; glycogens - by 44.7%; ketogenic - by 66.8%; proteinogenic - by 50.8%) compared to their content at animals without PE. The low content of free amino acids in the animals subjected to dynamic physical effort, fed with protein ration, is probably conditioned by the predominance of energetic mechanisms determined by PE. Thus, the impact of protein ration in association with PE in senile rats is directly related to the AAL content, depending on the functional group, in serum and erythrocytes, causing a decrease in the AAL content in all functional groups.

Keywords: protein ration, modification of free amino acids, physical effort, functional groups, intermediate metabolism.