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THE RELATIVE CONTRIBUTION OF VARIOUS MECHANISMS OF GLUCOSE ABSORPTION IN THE SMALL INTESTINE *IN VIVO*

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Statement of the Problem: Glucose is a key substance that involved in energy metabolism. Understanding of mechanisms of its absorption in the small intestine is important for health. In recently, a remarkable progress has been achieved in this field, however the question about relative contributions of the active transport via SGLT1 and the facilitative diffusion via GLUT2 in glucose transfer across the apical membrane of enterocytes, remains debatable. To solve it, adequate analytical approaches are needed to assess the contribution of each of these mechanisms in the *in vivo* experiments.

The purpose of this study: To develop mathematical approaches for assessing the contributions of different mechanisms of glucose absorption in the *in vivo* experiments.

Methodology & Theoretical Orientation: These approaches are based on the mathematical models, developed by us earlier, that simulate absorption of monosaccharide's in the isolated part the small intestine *in vivo*. The approaches include an analysis of kinetics of glucose and galactose absorption from their mono and two-component solutions, at various concentrations of the substrates.

Results: In the experiments on rats it has been shown that at glucose concentration of 75 mm in the intestinal lumen, a ratio of the active transport via SGLT1 to the facilitative diffusion via GLUT2 was 2.5 - 3.5 at the normal (low) regular carbohydrate load on the small intestine, and was increased to 7.0 in the case of the high load.

Conclusion and significance: In the case of normal and high glucose concentrations in the lumen of the intestine, its absorption is mainly due to active transport through SGLT1. The results may be useful in developing new therapeutic strategies aimed to reduce the negative effects on the body of widespread pathological conditions in the world such as obesity, metabolic syndrome, and type 2 diabetes mellitus.

Biography

Gruzdkov Nikita is student of the Faculty of the Info communication Technologies in the St. Petersburg University ITMO (third year). At present he undergoes training in the Laboratory of Nutrition Physiology in Pavlov Institute of Physiology, RAS. He gets experience in development of mathematical approaches for analyzing kinetic characteristics of mechanisms (active transport and facilitative diffusion) of glucose absorption in the small intestine *in vivo*. This approach may provide new important data for the theory and practice.

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