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Target approach in diabetes prophylaxis

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The violation of glucose transport to the muscle cell plays the key role in the mechanism of development of insulin resistance. The phosphorylation of glucose into glucose-6-phosphate with the participation of the hexokinase enzyme is the first step of intake of glucose by muscle. Therefore, endocrinologists believe that insulin should activate hexokinase, but this is not confirmed by biochemical science. However, there is evidence data that the activity of hexokinase is under the control of the ATP/ADP coefficient, i.e. the intake of glucose is inhibited by reducing the cells energy requirement and increasing the ATP/ADP ratio. Therefore, it can be suggested that the activation of energy-dependent processes should contribute to an increase in the rate of glucose entry into the cell and lead to a decrease of insulin resistance. The ATP/ADP coefficient decreases with physical activity, with activation of protein synthesis at the translation stage (leucine) and with elevation of heat production (thyroxine), at which the blood glucose level decreases. Insulin itself promotes the initiation of the peptide chain, i.e. activation of protein synthesis at the stage of translation (kinase activation of translation). Factors contributing to polysome disaggregation (hypokinesia, cortisol, inflammatory cytokines) lead to a reduction in the expenditure of glucose energy on the anabolic process and promote the development of hyperglycemia. Therefore, the targeted approach in the prevention of diabetes is to increase the efficiency of activities of energy-dependent processes, in particular, to improve the process of protein synthesis.

Biography

E K Mukhamejanov has worked at the Institute of Physiology and also at the Institute of nutrition. He has developed metabolic model of balanced diet coupled with effects of toxic compounds, physical activity and dietary factors. He has developed specialized nutrition products for athletes and for the prevention and treatment of metabolic diseases. He is currently working in the Scientific Center of anti-infective disorders; develop approaches of reducing the negative impact of drugs.