

Abstract:

Insulin reduces glucose levels in blood and has impact on metabolism, cell- cycle and proliferation of target body cells. Its secretion from pancreatic  $\beta$  cells is induced right after food consumption, utilization in digestion system and nutrient elevation in blood circulation. Under physiological conditions molecular mechanisms include simultaneous effect of glucose, fatty acids, amino acids, ions, reactive oxygen species and neural and humoral system. The primary inducer is glucose, which is necessary also for insulin gene expression. Glucose modulates the fate of other nutrients, which enhance glucose stimulated insulin secretion. In general, glucose decreases fatty acid beta oxidation and increases the level of effector lipid intermediates in cytoplasm. The key processes within insulin release pathways are the Krebs cycle, pyruvate cycling and glycerole-3-phosphate/free fatty acids cycle. Moreover, endocrine signaling molecules, hormones and nervous system regulate insulin secretion through their receptors on  $\beta$  cell membranes. Disruption of regulatory mechanisms and insulin sensitivity of peripheral tissues may lead to development of diabetes mellitus.