

Abstract

The study was undertaken to investigate the modulating effect of nicotinamide (NAm) in different concentrations and under different glucose concentrations on the viability and oxidative stress induced by streptozotocin (STZ, 5 mmol/l) and hydrogen peroxide (H₂O₂, 100 micromol/l) on isolated rat pancreatic cells of the Langerhans islets in vitro. Cell viability did not depend on the concentration of glucose in the range of 5-20 mmol/l, and in subsequent studies we used glucose in concentration of 10 mmol/l to protect cells against its hypo- and hyperglycemic action. Cytoprotective effect of NAm in concentrations from 5 to 20 mmol/l on cells survival was the same. It was found that the destructive action of STZ and H₂O₂ during 24 hours on isolated cells of the pancreas resulted in the significant cell death. It was revealed that NAm in concentration of 5 mmol/l not only had cytoprotective effects against STZ and H₂O₂ but also partially reduced the level of oxidative stress in the investigated cells induced by these compounds. High concentration of NAm, 35 mmol/l, causes cytotoxic effect on the viability of pancreatic islet cells and increase of oxidative stress induced by STZ and H₂O₂. Most likely these effects could be associated with direct modulatory action of NAm on important effector mechanisms involved in cell death, including PARP-dependent processes, or/and indirectly, through metabolic and antioxidant effects of the compound.