MITOCHONDRIAL DYSFUNCTION PRECEDS THE DEVELOPMENT OF TYPE 1 DIABETES

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The non obese diabetic mice (NOD) spontaneously develop type 1 diabetes mellitus (DM-1) similarly to humans. The destruction of islet β cells in DM-1 seems to be mediated by a high cellular generation of reactive oxygen species (ROS) that leads to mitochondrial dysfunction and consequently to cell death. The aim of this work was to verify whether alterations in mitochondrial physiology precede the diabetes onset in these animals. The experiments were done with NOD or BALB/c mice (control group) with 10 weeks of age (glicemy < 150 mg/dL). The results showed higher mitochondrial resting respiration and superoxide anion production and lower mitochondrial membrane potential and capacity to take up and retain calcium ions. These alterations are compatible with higher susceptibility to MPT induced by calcium ions. In addition, we observed higher rates of mitochondrial respiration in isolated pancreatic islets and skeletal muscle biopsies in NOD mice. These mitochondrial alterations might be key events in the pathogenesis of DM-1 and may represent potential targets for prophylactic chemotherapy of DM-1.

Key words: type 1 diabetes, mitochondria, calcium ions, reactive oxygen species, pancreatic islet, skeletal muscle.