

## **Abstract**

Mitochondria play a crucial role in cells by regulating the homeostasis of calcium ions, which are essential for a range of cellular processes such as energy production, intracellular signalling, and apoptosis. However, hypoxia disrupts these processes by altering mitochondrial function and calcium homeostasis. Hypoxia affects the function of the mitochondrial calcium uniporter and other mitochondrial transporters, leading to the accumulation of calcium ions in the cytosol and a decrease in these ions within the mitochondria. This can cause mitochondrial dysfunction, increased production of reactive oxygen species, and trigger apoptotic processes. This impact is particularly significant in adipocytes, where hypoxia can influence the development of severe metabolic disorders such as obesity and type 2 diabetes mellitus. This bachelor's thesis summarizes the current knowledge on the effect of hypoxia on the transport of calcium ions in mitochondria and discusses the mechanisms by which hypoxia influences mitochondrial functions and mitochondrial calcium homeostasis in adipocytes.

**Key words:** mitochondria, calcium, hypoxia, adipocytes