

The main goal of this study is to determine the mechanism causing reduction in the level of cholesterol in heart and skeletal muscle "crude" mitochondria induced by prolonged swimming.

It is well known that cholesterol levels in mitochondria are dynamic. Higher levels of mitochondrial cholesterol occur in pathological conditions such as cancer, diabetes or alcohol consumption. Higher level of cholesterol in mitochondria resulted in mitochondrial dysfunction and even cell death.

On the other hand, lowering of the cholesterol level in mitochondria leads to adaptive changes which may act as protective factors in heart and skeletal muscle cells exposed to death factors.

Prolonged swimming is the only one known physiological factor that can reduce the cholesterol levels in heart and skeletal muscle mitochondria. This type of exercise induces adaptive changes, which may act as protective factors.

Research will be conducted on Wistar Han rats. Animals will be divided into following groups: control and exercise, and the next divided into sub-groups: treated with placebo or compound that should inhibit cholesterol lowering in the mitochondria during swimming. From all animals their hearts, skeletal muscles and livers will be removed. From these tissues mitochondria will be isolated. During the course of this study we will measure: mitochondrial cholesterol level and level of proteins related to cholesterol transport, mitochondrial function and markers of oxidative stress damage.

The knowledge of the mechanism(s) responsible for lowering cholesterol in mitochondria induced by swimming exercise seems to be extremely important, both from the point of view of scientific and practical issues.

This study may identify the mechanism(s) of mitoprotection under stress conditions, moreover, may provide new possibilities to treat cardiovascular disease and other disease related to mitochondrial dysfunction.