

In recent years physical activity has gained in significance as a key element of a healthy lifestyle as well as a mean of counteracting many non-communicable diseases. Myokines, proteins released from muscle tissue into blood and interacting with other organs, were discovered to participate in regulating metabolism and homeostasis as well as modulating cognitive functions. Consequently, establishing the impact of various training programs on myokines' synthesis has become an important research issue.

My research will focus on verifying the effectiveness of a specific training programme on mitigating negative implications of non-communicable diseases: stress, sedentary lifestyle and obesity. Previously I applied a single unit of a high-intensity body-weight training (HICT) in a group of different-aged women, in the preliminary experiment following recommendations of the American College Sport Medicine. It was found to have caused a decline in the level of Heat Shock Proteins (HSP 27 and HSP 70), considered as markers of an oxidative stress. The same unit also caused a decrease in the level of Brain Derived Neurotrophic Factor (BDNF) and induced changes in results of the cognitive function tests aimed at memory and concentration. Based on the published data, I assume that irisin, a myokine discovered in 2012, would stimulate an increase in the level of BDNF. Although this assumption was not verified in my preliminary experiment, cognitive functions of women participating in the preliminary experiment improved in the young group and worsened in middle-aged participants.

Considering these observations, determining immunological response to a single HICT session as well as to its regular application with respect to cognitive functions would allow to specify when this type of exercise should be performed in different age groups. The last few years of research demonstrated that an interval training potentiates physical capacity and improves metabolic functions comparatively to an endurance training. Therefore, I opted to broaden the research scope of this project and evaluate the effect of HICT on insulin-sensitivity and levels of myokines and adipocytokines. Previously collected data showed that an interval training applied in a group of 62-year old diabetic patients had induced an improvement in carbohydrates' metabolism. Thus I would like to assess if similar changes will be induced by HICT. Additionally I would determine changes in adipokines concentration and find out if regular HICT will cause a decrease of pro-inflammatory adipokines (leptin, resistin) and a increase anti-inflammatory adipokine (adiponectin). Moreover I will assess the influence of HICT on decorin concentration. This myokine has anti-cancer action.

The proposed HICT unit is an accessible form of exercise, easy to perform in different conditions. Hence, determining its influence on the broad range of protein and their mutual interdependencies would allow me to precisely establish whether it is the most appropriate form of exercise for different age groups boosting pro-healthy benefits.