THE EFFECTS OF DIFFERENT TYPES OF EXERCISE ON mRNA EXPRESSION OF UCP1 AND PPARa OF SUBCUTANEOUS ADIPOSE TISSUE IN HUMANS: PRELIMINARY EVIDENCE FROM A RANDOMIZED CONTROLLED TRIAL

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Peroxisome proliferator-activated receptor alpha (PPARa) is a transcriptional factor that may increase the mRNA expression of uncoupling protein one (UCP1) within a white adipocyte in response to exercise. This may increase resting energy expenditure, which may have positive effects on metabolism. **Aim:** To examine the effects of different types of exercise on mRNA expression of UCP1 and PPARa of white adipocytes in humans in a parallel randomized control trial design. **Method:** Thirty two untrained, healthy men [age: 36.06 ± 7.36, body mass index (BMI): 27.06 ± 4.62] participated in an 8-week exercise intervention. Four experimental groups were included, an aerobic exercise (AE) (n=9), a resistance exercise (RE) (n=8), a combined exercise (CE) (aerobic + resistance) (n=8) and a non-exercise control group (CG) (n=7). Subcutaneous fat biopsies were obtained at baseline and after the exercise period. Measurements also included height, weight, waist to hip ratio, blood pressure, body composition, resting energy expenditure, peak oxygen consumption and one repetition maximum for upper and lower body. **Results:** Repeated measures ANOVA revealed no significant differences in mRNA expression of UCP1 neither between baseline and after the exercise period nor between groups ($p>0.05$). There was a significant difference in mRNA expression of PPARa between AE and CG ($p=0.002$), RE and CG ($p=0.004$) as well as CE and CG ($p=0.003$) however, these differences appeared also at baseline values. One way ANOVA revealed no significant differences between groups in the mean difference between PPARa at baseline and PPARa after the exercise program. Spearman correlations at baseline values revealed a negative association between PPARa and waist to hip ratio ($r=-45.9$, $p=0.01$), BMI ($r=-50.8$, $p=0.006$), as well as fat free mass (kg) ($r=-52.4$, $p=0.004$). Finally, Cohen's sample size analysis revealed a large effect size in AE group between baseline and after the exercise program in mRNA expression of UCP1. Similarly, there was a small effect size in AE, RE and CG groups between baseline and after the exercise program in mRNA expression of PPARa.

Conclusions: Chronic exercise doesn't affect mRNA expression of UCP1 and PPARa of white adipocytes in humans; nevertheless, there is a trend of changing their values after the exercise program.