

Abstract

Irisin Reduces the Metabolic Rate of Beige Adipocytes [†]

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Abstract: **AIM:** Irisin is released in the circulation in response to exercise and may increase energy expenditure by stimulating the browning of white adipose tissue through UCP1 upregulation. We aimed to investigate the effects of treatment with human recombinant irisin on the metabolic profile of 3T3-L1 differentiated beige adipocytes. **MATERIAL & METHOD:** 3T3-L1 cells were differentiated into beige adipocytes in the presence of IBMX, dexamethazone and insulin in DMEM. To assess the mitochondrial respiration activity, an extracellular mitochondrial assay was performed after 2 h and 4 h of treatment with 20 nM irisin. UCP1 protein expression levels were assessed through Western blot analysis at baseline, 2 h, and 4 h. **RESULTS:** We observed that the oxygen consumption rate (OCR) of the differentiated cells was significantly reduced after 2 h of treatment compared to control, untreated cells (40.8 ± 34.1 vs. 71.6 ± 51.7 pmol/min/ μ g, $p < 0.05$, $d = 0.69$). Interestingly, OCR was rescued after 4 h of treatment (57.4 ± 49.2 pmol/min/ μ g, $p < 0.05$, $d = 0.38$). Similar results were observed for the proton leak-mediated respiration (baseline, 26.5 ± 15.1 ; 2 h, 8.7 ± 3.3 ; 4 h, 17.2 ± 2.3 pmol/min/ μ g, $p > 0.05$). The highest expression of UCP1 was observed after the 2-h treatment with irisin ($\Delta_{2\text{ h}-\text{baseline}} = 1.7\text{-fold}$, $\Delta_{4\text{ h}-\text{baseline}} = 1.2\text{-fold}$, $p < 0.05$). **CONCLUSIONS:** Based on these results, we conclude that treatment of beige adipocytes with irisin generated a reverse effect on the thermogenic process. Beige adipocytes are already highly metabolic active cells that work close to their maximal capacity. Further stimulation of the thermogenic pathway can decrease the metabolic profile of 3T3-L1 cells, which can be partially rescued after 4 h of stimulation.

Keywords: beige adipocytes; irisin; metabolic rate



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