

Peroxisome proliferator-activated receptor γ coactivator 1 α expression levels in soleus and EDL muscles after exercise

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Peroxisome proliferator-activated receptor γ coactivator 1 α (PGC1 α) is a transcriptional coactivator that controls the expression of gene involved in the regulation of fatty acid oxidation and glucose metabolism. PGC1 α is considered the “master regulator of mitochondria”, as it regulates mitochondrial transcription factors. It has been reported that PGC1 α and its isoforms are involved in mitochondrial biogenesis, fibre type switching, stimulation of fatty acid oxidation, and resistance to muscle atrophy. Recently, we observed that endurance exercise increased the expression of PGC1 α 1, α 2, and α 3 isoforms in murine soleus muscle (1). In the present study we used thirty healthy male and female mice (BALB/c AnNHsd) divided in sedentary (CN) and trained (TR) groups. TR mice ran for 60 min at a speed of 5.5 m/min and were sacrificed after 30 and 240 minutes after the end of acute bout of endurance exercise (TR-30' – TR-240' respectively). CN mice did not perform any controlled physical activity. All mice were sacrificed by cervical dislocation and soleus and Extensor Digitorum Longus (EDL) muscles were dissected. Further, PGC1 α isoform expression levels were evaluated by qRT-PCR. The obtained results showed a significant increase in total PGC1 α isoform in response to acute exercise in the soleus and EDL muscles in TR-30' mice compared to all the other groups ($p < 0.05$). Acute exercise induced significant increase of PGC1 α 1 isoform gene expression levels in the soleus muscle of TR30' male and female mice ($p < 0.05$) while a significant decrease was observed in EDL muscle ($p < 0.05$). Moreover, PGC1 isoform α 2 and α 3 gene expression increased in male and female TR30' groups only in EDL muscle ($p < 0.05$). We did not observed any change soleus muscle. Furthermore, PGC1 isoform α 4 gene expression level was not detected in any muscle samples. These preliminary results, showing the increased expression levels of the isoform α 2 and α 3 only in EDL muscle immediately after acute exercise, should represent a very interesting and innovative data that might open new ways in the study of the role of these proteins in the skeletal muscle adaptation during exercise.

This work was supported by grants from MIUR PRIN-2012.

References

- [1] Barone et al (2016). Skeletal muscle Heat shock protein 60 increases after endurance training and induces peroxisome proliferator-activated receptor gamma coactivator 1 α 1 expression. *Sci Rep.* 27;6

Key words

PGC1 α , exercise, EDL.