

Original Paper

Effect of 8 weeks resistance training on sphingosine-1-phosphate level and gene expression of SK1 enzyme, isoforms of MHCs in skeletal muscles of male Wistar Rats

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Abstract

Background and Objective: Sphingosine-1-phosphate (S1P) is involved in regulation of proliferation, differentiation, hypertrophy and anti-apoptosis and activation of satellite cells. This study was done to evaluate the effect of 8 weeks resistance training on sphingosine-1-phosphate level and gene expression of SK1 enzyme, isoforms of MHCs in skeletal muscles of male Wistar rats.

Materials and Methods: This experimental study was done on Twenty four 8-week-old 190-250 gr male Wistar rats. The rats were allocated randomly into control (N=12) and training (N=12) groups. Resistance training was done using a 1 meter height ladder with 2 cm grid with an 85 degree incline, and weights attached to rat's tails. The content of S1P present in the chloroform layer was determined by means of high performance liquid chromatography (HPLC). Determination of relative mRNA expression was performed by Real-time PCR. Data were analyzed using SPSS-17, Kolmogorov-Smirnov and independent t-test.

Results: Resistance exercise training increased the total content of S1P in FHL (fast-twitch) and soleus (slow-twitch) muscles in comparison with control group ($P<0.05$). Resistance exercise training changed the gene expression of FHL SK1, SOL SK1, FHL MHC I, Sol MHC I, FHL MHC IIa, Sol MHC IIa, FHL MHC IIb, Sol MHC IIb, FHL MHC IIx, Sol MHC IIx in comparison with control group ($P<0.05$).

Conclusion: This study showed that S1P level and gene expression of SK1, MHCs increased at skeletal muscles after training.

Keywords: Resistance training, Sphingosine-1-phosphate (S1P), Sphingosine-1-phosphate Kinase 1 (SK1), Myosine heavy chain (MHC), Fast-twitch and slow twitch muscles

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