

Effects of systemic photobiomodulation on a cross-sectional area and muscle fiber diameter during the compensatory hypertrophy process in skeletal muscle

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Skeletal muscle is a dynamic and adaptive tissue capable of altering its characteristics to meet its diverse functional demands. Compensatory hypertrophy (CH) occurs due to excessive mechanical load on a muscle, promoting an increase in the size of muscle fibers. Photobiomodulation (PBM) has demonstrated beneficial effects on muscle tissue during CH however there is few information about the transcutaneous systemic application. The aim of this study was to evaluate the effect of systemic photobiomodulation (PBMS) on the volume of muscle fibers during the CH process. Wistar rats were divided into three groups: control group (n=5), hypertrophy (H) group (n = 10) and Hypertrophy + PBMS group (n = 10). CH was induced through the ablation of synergist muscles of the plantaris muscle. The preserved plantaris muscle below the removed muscles was submitted to excessive functional load. PBMS was performed with low-level laser (AsGaAl, $\lambda = 780$ nm; 40 mW; energy density: 80 J/cm²; 80 seconds; 1 point, 3.2 J). Animals were euthanized after seven and 14 days. The plantaris muscles were removed and submitted to histological evaluation with H&E staining to determine the cross-sectional area (AST) and fiber diameter. The results showed an increase in AST after 7 and 14 days in the H + FBMS group compared to the H group. Fiber diameter increased in group H+FBMS when compared to group H after 7 and 14 days. Based on these findings, it is concluded that a FBMS was able to positively influence the morphological aspects considered essential for increasing the size of muscle fibers during the CH process.

Biography

Valéria de Araújo Ferreira Gregio de Souza graduated in Physiotherapy from the Nove de Julho University and postgraduate degree in Intensive Physiotherapy Pediatric and Neonatal by the Faculty of Medical and Legal Sciences FACMED. Currently she is a first-year master's student in the postgraduate master's and doctoral program in Rehabilitation Sciences at Nove de Julho University. The main objective of your research area is to evaluate the plasticity of the skeletal muscle after acute overload and physical

exercise. In her spare time, she performs various activities together with the family. It also performs amateur running as a practice of sports physical activity.

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