

Hsp60 and interleukins expression in the skeletal muscle and its implications in exercise and cachexia

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Heat shock protein 60 (Hsp60) is a chaperon localizing in skeletal muscle mitochondria, whose role is poorly understood. This chaperone has been found also in other cellular localizations. In the three years we studied the levels of Hsp60 in fibres of the entire posterior group of hindlimb muscles (gastrocnemius, soleus, and plantaris) in mice after completing a 6-week endurance training program. In this evaluation we correlated Hsp60 levels with the expression of four isoforms of the peroxisome proliferator-activated receptor gamma coactivator 1 alpha (PGC-1 α). Moreover, the short-term overexpression of hsp60, achieved by in vitro plasmid transfection was performed to determine whether this chaperon could have a role in the activation of the expression levels of PGC-1 α isoforms. The levels of Hsp60 protein were fibre-type specific in the posterior muscles and endurance training increased its content in type I muscle fibers. Concomitantly with the increased levels of Hsp60 released in the blood stream of trained mice, mitochondrial copy number and the expression of three isoforms of PGC-1 α increased. Overexpressing hsp60 in cultured myoblasts induced only the expression of PGC-1 α 1, suggesting a correlation between Hsp60 overexpression and PGC-1 α 1 activation. We are now studying the expression of Hsp60 in the muscles of trained and untrained C26-bearing mice, to understand if Hsp60 overexpression may improve muscle performance and reduce cachexia. Four different interleukins have been also studied in cachectic mice, to understand which can be the effect of them on Hsp60 expression both in the tumor mass and the trained muscle.

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References

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Keywords

Colon carcinoma; metastasis, cachexia; Hsp60, interleukin-6.