

Nutritional strategies to counteract the loss of muscle mass and function characteristic of senescent muscle

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During aging, multifactorial events such as activation of inflammatory pathways and mitochondrial dysfunction lead to the onset of sarcopenia, which is characterized by a gradual loss of muscle protein component. It is well known that changes in the quantity and the quality of dietary proteins, as well as the intake of specific amino acids or antioxidants supplementation, counteract some physiopathological processes related to the progression of the loss of muscle mass and may have beneficial effects in improving the anabolic response of muscle in the elderly. The aim of this research is to delay and hopefully prevent, in a mouse experimental model, the loss of muscle mass and functional capacity of aged muscle by dietary supplementation of micro-nutrients intake. To this purpose we evaluated whether a protein diet rich in arginine and/or taurine, already known to down-regulate the release of inflammatory cytokines in dystrophic muscles (1, 2), modulates the activation of catabolic processes leading to loss of muscle mass characteristic of aged muscle. To this purpose, adult mice were subjected to intraperitoneal injections of taurine, arginine or both, all days for 2 months. The tibialis anterior muscles (TA) were then damaged by cardiotoxin injection. Our results demonstrate that injured TA muscles of mice which received both aminoacids show enhanced regeneration response as demonstrated by the presence of central nucleated fibers, less amount of inflammatory cells and fibrosis, if compared to the control. Moreover the high expression of the inflammation marker, NF- κ B, in injured muscle of control mice strongly decreases in taurine + arginine injected mice. These results suggest a role of taurine and arginine in the down-regulation of inflammation and the enhancement of regeneration in skeletal muscle.

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References

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Keywords

Sarcopenia; taurine; arginine.