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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.

Taurine is a non-essential amino acid expressed in high concentration in several mammalian tissues and particularly in skeletal muscle where it is involved in the modulation of intracellular calcium concentration and ion channel regulation and where it acts as an antioxidant and anti-inflammatory factor.

Here, we evaluated whether the intraperitoneal administration of taurine in aged mice counteracts the catabolic process related to sarcopenia. We showed that, in injured muscle, taurine enhances the regenerative process as demonstrated by the presence of central nucleated fibers, less amount of inflammatory cells and fibrosis, if compared to the control. Moreover, taurine stimulates the PI3K/Akt signaling leading to an inhibition of FOXO transcription factors thus promoting protein synthesis. These results suggest a role of taurine as a promising nutritional agent to counteract the development and progression of sarcopenia.

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Key words

Sarcopenia, taurine, nutrition, aminoacids.