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Tyrosol prevents glucocorticoid-induced skeletal muscle damage

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Excessive oxidative stress is linked to the pathogenesis of a variety of skeletal muscle disorders [1]. Therefore, natural antioxidants could play a relevant role to counteract skeletal muscle damage. In particular, Tyrosol, a flavonoid present in virgin oil and known for its protective effect against oxidative injury in various cell models [2], could be active in skeletal muscle too, even if, until now, its effective antioxidant actvity, both in vitro and in vivo, has not been extensively studied in this tissue.

Here, Tyrosol action has been investigated, through morpho-functional approaches, in C2C12 myotubes exposed to dexamethasone, a molecule usually used to mimic muscle wasting in vitro [3].

Dexamethasone-treated cells show a diffuse damage and, in particular, a reduced fiber size, if compared to control condition. In fact, if long and confluent myotubes progressively forming a larger fiber can be observed in control samples, those exposed to dexamethasone appear as immature, smaller syncytia. Moreover, differently from control cells, treated-myotubes show mitochondria alterations, characterized by disorganized cristae and loss of mitochondrial membrane potential and mass. Tyrosol administration before glucocorticoid treatment prevents muscle wasting and improves mitochondrial morphology and functions.

Therefore, these preliminary data encourage the use of this natural antioxidant as "mitochondrial nutrient", able to delay mitochondrial dysfunctions and to prevent glucocorticoid-induced muscle atrophy. Further studies are in progress to highlight tyrosol molecular pathways involved in muscle mass preservation.

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References

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Key words

Muscle wasting, mitochondrial damage, natural antioxidant.