



University of Naples Federico II

Department of Pharmacy

PhD course

Nutraceuticals, Functional Foods and Human Health

DIPARTIMENTO di FARMACIA



XXXLX cycle

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Natural Sulfur Compounds as a new alternative/adjuvant strategy in skeletal muscle disorders

The reverse transsulfuration pathway (TSP) is the enzymatic route deputed to the generation of several sulfur metabolites, including L-cysteine, glutathione (GSH), taurine, and the gasotransmitter Hydrogen Sulfide (H₂S). It is well known that all these sulfur compounds have anti-inflammatory and antioxidant properties. In addition, alterations in L-cysteine and GSH metabolism have often been associated with aberrant redox homeostasis that underlies a variety of diseases such as cancer, neurodegenerative diseases, diabetes, and vascular inflammation. Recently, the role of TSP metabolites in skeletal muscle (SKM) disorders has been investigated. Indeed, we have demonstrated that TSP-related metabolites: GSH, taurine, and H₂S, are strongly downregulated in *mdx* mice, the most used animal model of Duchenne's muscular dystrophy. Moreover, it has also been shown that the treatment with an L-cysteine precursor improves muscle strength and reduces oxidative stress in *mdx* mice, implying a main role for TSP in SKM function. This hypothesis is also confirmed by the finding that glucoraphanin, a natural sulfur compound derived from *Brassicaceae*, improves sarcopenia, a skeletal muscle age-related disorder. To date, the treatments for myopathies are still based on high doses of drugs, such as steroids and/or glucocorticoids with several side effects that limit their application. In this regard, there is a great interest in the development of herbal supplements as novel/adjuvant therapeutic approaches for improving muscle performance. Therefore, this proposal project aims to evaluate the beneficial role of natural sulfur compounds such as Garlic-derived sulfur compounds (diallyl disulfide, diallyl trisulfide) or sulforaphane or *Brassicaceae*-derived sulfur compounds (erucin, glucoraphanin) in the prevention and as adjuvant therapy for the management of skeletal muscle disorders.

References

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