



Antioxidants

---

an Open Access Journal by MDPI

---

CiteScore: 12.4

Indexed in PubMed

Impact Factor: 6.6

Special Issue Reprint

## Antioxidant Response in Skeletal Muscle

**Edited by: Jan Górski and Elzbieta Supruniuk**

The high oxygen consumption and elevated metabolic activity of skeletal muscle fibers result in the continuous generation of reactive oxygen and nitrogen species (RONS) under resting conditions, with further increases during muscle contraction. An imbalance between RONS production and the antioxidant defense system leads to oxidative stress, which induces molecular damage and disrupts key physiological processes, including excitation–contraction coupling. Skeletal muscle possesses a complex and highly coordinated antioxidant network composed of both enzymatic and non-enzymatic components, such as superoxide dismutase, catalase, glutathione peroxidase,  $\gamma$ -glutamylcysteine synthetase, and heme oxygenase-1. Growing evidence indicates that antioxidants not only neutralize excessive oxidants but also finetune RONS levels to enable redox-dependent signaling pathways essential for normal muscle function. Acting as sensitive biosensors of the intracellular redox state, these systems confer metabolic and functional plasticity to skeletal muscle in both physiological and pathological conditions. Importantly, RONS regulate protein turnover, thereby contributing to muscle hypertrophy, remodeling, and regeneration. This Reprint provides a comprehensive and integrative overview of skeletal-muscle-specific antioxidant responses to both physiological stimuli, such as exercise, and pathological challenges. The latter include muscle injury, metabolic disorders, muscular dystrophies, inactivity, and immobilization, conditions that profoundly disturb redox homeostasis and alter muscle structure and function.



**<https://www.mdpi.com/books/reprint/12567>**