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**Title: ENDURANCE EXERCISE ATTENUATES JUVENILE IRRADIATION-INDUCED SKELETAL MUSCLE FUNCTIONAL DECLINE AND MITOCHONDRIAL STRESS**

**Abstract**

Proper skeletal muscle development, maintenance, and function is necessary for movement. Decline in muscle function with age and disease is directly associated with a diminished quality of life. Radiation therapy is used commonly to treat certain forms of childhood cancer based on the cytotoxic effects of radiation on cancerous tissue. However, the adverse effects elicited by radiation are not always constrained to the diseased tissue and can accelerate muscle wasting and decline, which is particularly detrimental to juvenile cancer survivors. Here, we show that following juvenile radiation, one month of voluntary wheel running significantly improved muscle function in mice by promoting adaptations in intracellular calcium handling, improving mitochondrial turnover and reducing oxidative stress resulting from radiation-induced, mitochondrial damage. These findings have implications for other diseases where similar mechanisms of calcium handling and mitochondrial function are disrupted.