

Redox signaling and its impact on skeletal and vascular responses to spaceflight

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Abstract: Spaceflight entails exposure to numerous environmental challenges with the potential to contribute to both musculoskeletal and vascular dysfunction. The purpose of this review is to describe current understanding of microgravity and radiation impacts on the mammalian skeleton and associated vasculature at the level of the whole organism. Recent experiments from spaceflight and groundbased models have provided fresh insights into how these environmental stresses influence mechanisms that are related to redox signaling, oxidative stress, and tissue dysfunction. Emerging mechanistic knowledge on cellular defenses to radiation and other environmental stressors, including microgravity, are useful for both screening and developing interventions against spaceflight-induced deficits in bone and vascular function.