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PHYSIOLOGICAL ADAPTATIONS AND WELL BEING IN SPACE-FLIGHT: INSIGHTS AND MITIGATION STRATEGIES

Abstract

Spaceflight poses unique challenges to the human body and mind, necessitating adaptations and considerations for the physiological well-being. The changes that occur in the human body are in response to the unique conditions of space, including microgravity, radiation exposure, confinement, and altered sleep patterns. This includes metabolic alterations, musculoskeletal changes, fluid redistribution, and cardiovascular adjustments. Studies in human physiology contribute valuable insights not only to space exploration but also to our understanding of human performance and well-being in various environments. So, performing simulations assist in developing strategies and interventions to enhance human physiology for astronauts. The controlled nature of simulations allows for systematic investigations and the development of targeted countermeasures to optimize astronaut health and performance in space.

This paper focuses on how these adaptations can have significant effects on various physiological systems. It also addresses the reductions in body water and plasma volume, which affect the renal, metabolic, musculoskeletal, and cardiovascular systems and thereby impacting fluid and electrolyte requirements. It also emphasizes on how these adaptations can have significant effects on various systems and upholds the necessity of addressing physiological well-being to ensure mission success and astronaut safety, suggesting potential strategies to mitigate risks associated with long-duration space travel.