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HUMAN PHYSIOLOGY AND HEALTH IN SPACE MISSIONS: CHANGES, EFFECTS, AND COPING STRATEGIES

Abstract

Living on long-term space missions and space stations is a demanding experience that has an array of impacts on human physiology and health. Space exploration missions are one such example. This review aims to look into how living in space affects human physiology, health consequences, and coping mechanisms.

While in space, astronauts are exposed to a series of physiological changes due to acceleration, lack of gravity, and cosmic radiation. Loss of bone density, weakened muscles, altered cardiovascular function, immune system suppression, and visual impairments are some of these alterations. Furthermore, body fluids shift from lower to higher areas in microgravity, causing symptoms including face puffiness, congestion in the nose, and the distinctive "bird legs" image. Microgravity also slows down the passage of oral medications through the stomach, their absorption in the intestines, and their metabolism in the liver. These changes impact the effects of the pharmaceuticals and their bioavailability in the space environment. These modifications directly impact astronauts' performance and well-being, with substantial ramifications for the health consequences of extended space missions. Long-term bone illnesses can result from bone density loss, and working for longer periods on space stations may be hampered by cardiovascular and muscular alterations. Additionally, immune system suppression might make people more vulnerable to diseases and microbes. Space agencies have created several coping mechanisms to assist astronauts in overcoming the psychological and physiological strains of space travel. Exercise regimens, food and nutrition plans, medical supervision, and psychological assistance are some of these tactics. Furthermore, medications and medical equipment for use in space are being created to address health problems encountered there.

Planning space missions and preserving astronaut health requires thoroughly understanding physiological changes and health-related challenges in space. To ensure the sustainability of space exploration and the advancement of humankind as a permanent presence in space, future research should concentrate on improving astronaut health and comprehending the implications of living in space.