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EFFECTS OF REDUCED GRAVITY ON THE CARDIOVASCULAR SYSTEM - CURRENT UNDERSTANDING AND FUTURE RESEARCH

Abstract

The cardiovascular system is an immensely vital and complex part of the human body, fulfilling a number of functions to maintain life. Therefore, it is essential to maintain a healthy cardiovascular system while in spaceflight. The study of how the system adapts in a reduced gravity environment, whether weightless on the International Space Station or in the partial gravity of celestial objects such as the Moon or Mars, will allow for appropriate countermeasures to be taken against detrimental effects, such as loss of hydrostatic pressures and decreased sensory stimulation.

Additionally, individual differences in astronauts, such as gender, must be considered to allow for development of appropriate countermeasures. Challenges to such studies include the ability to accurately simulate a reduced gravity environment beyond long duration flights on the ISS (where only the weightless environment can be accurately studied), or the limited time period of a parabolic flight (which allows for a variety of gravity environments) since conclusions for long term effects can only be predicted with a small degree of confidence. This paper will discuss the current understanding of the effects of microgravity on the cardiovascular system, identify areas for future research, and propose ways to address the knowledge gap.