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Spaceflight and the Central Nervous System

Clinical and Scientific Aspects

 Springer

Effects of Microgravity and Space Radiation on the Nervous System

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Abstract

Humankind has always focused on outer space, especially the planetary system of our solar system. Space exploration exposes travelers to a variety of gravitational stresses. Examples include increased acceleration forces during launch and landing, partial gravity on extra-terrestrial locations such as the Moon or Mars, and microgravity during orbital missions and flights between planetary bodies. Space flight environments usually have additional stressors associated with them in addition to the lack of a gravitational vector. Isolation, noise, radiation, toxin buildup, and operational pressures all combine to create a uniquely stressful environment.

Short-duration spaceflight onboard the space shuttle is a unique experience that includes a unique set of stressors that contribute to the dysregulation of nervous system. Astronauts on ISS missions experience many similar stressors for a much longer duration. In this chapter, we have discussed the physiological effects of microgravity and space radiations on the nervous system. Emphasis is laid on understanding the neurological alterations that could occur in outer space. It gives an overview of how nervous system that evolved in a gravitational field changes its function upon exposure to microgravity and space radiations. Furthermore, accessible countermeasures will be deliberated, including a description of microgravity analogs. Eventually, the knowledge of changes in the nervous system due to microgravity and radiation will provide vision into the functioning of nervous system on our planet earth.

Keywords

- **Microgravity**
- **Radiations**
- **Central nervous system**

- **Microgravity analogs**