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SPACE RADIATION SAFETY FOR FEMALE ASTRONAUTS: A THOROUGH STUDY ON
RADIATION-INDUCED CANCER

Abstract

Venturing out into space involves numerous detrimental health risks for astronauts. On missions beyond Earth's magnetosphere, these health risks increase with long-term space radiation exposure from Solar Particles and Galactic Cosmic Rays (GCR).

Radiation exposure is one of the most concerning health risks and has profound and fatal effects on the human body. Doses of highly energized space radiation increase the risk of developing radiogenic cancer and cause prolonged consequences such as Cardiovascular Diseases, Central Nervous system (CNS) decrements, degenerative tissue effects, and acute radiation syndrome.

Due to the variety of radiation types in space and the lack of epidemiology data, there is a significant knowledge gap in understanding the specific biological impacts of space radiation on male and female bodies. Based on the review of the current literature, the few existing studies and countermeasures are primarily based on the default male model even when females are recognized to be at a greater risk of radiation-induced cancer. With the increase in the participation of female astronauts in future missions to the Moon and Mars and commercial spaceflights, it is imperative to include women in the studies to ensure safety for all astronauts.

This paper begins by examining the effects of space radiation on the human body followed by an analysis of the development of radiogenic cancer in various organs. The focus of this research is on studying such impacts on female bodies while presenting effective countermeasures against space radiation.