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DIVERSIFICATION OF THE CURRENT SCREENING TO INCLUDE COMPREHENSIVE GENETIC
AND MOLECULAR PROFILING TO DEVELOP TARGETED COUNTERMEASURES

Abstract

Introduction: Long-duration spaceflight presents unique physiological challenges to the human body. Current screening batteries for astronaut selection and monitoring primarily focus on physical and psychological health, but neglect genetic and molecular profiling. This paper aims to discuss the potential benefits of incorporating comprehensive genetic and molecular profiling into the screening process, with a focus on developing targeted countermeasures and risk/susceptibility calculations.

Methods: A literature review was conducted using several databases, including PubMed, Scopus, and Web of Science, using a combination of keywords related to genetic and molecular profiling, spaceflight, and astronaut health. Studies that reported on the potential benefits and challenges of incorporating comprehensive genetic and molecular profiling into the screening process were included in this discussion.

Results: The discussion highlights the potential benefits of incorporating comprehensive genetic and molecular profiling into the screening process, including the ability to identify genetic variations that may increase an astronaut's risk for certain conditions, the development of personalized countermeasures, and the ability to monitor an astronaut's response to environmental stressors. However, several challenges must be addressed, including ethical considerations, standardization of data analysis, and the need for a comprehensive and coordinated approach.

Conclusion: Incorporating comprehensive genetic and molecular profiling into the screening process for astronauts has the potential to improve individualized risk/susceptibility calculations and targeted countermeasures. However, several challenges must be addressed, including ethical considerations, standardization of data analysis, and a coordinated approach. Continued research in this area is essential to optimize the health and safety of astronauts during long-duration spaceflight.