

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)  
Medical Care for Humans in Space (3)

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IMPLICATIONS OF PERSONALIZED ASTRONAUT DIETS VIA NUTRIGENOMIC ANALYSIS AS A  
COUNTERMEASURE FOR NUTRIENT-RELATED ADVERSE HEALTH AFFECTS IN LONG  
DURATION EXPLORATION MISSIONS**Abstract**

Nutrigenomics is an emerging field which investigates how single nucleotide polymorphisms and point mutations in DNA sequences impacts diet responsiveness. Specifically, nutrigenomics analyzes how nutrition and genetics interrelate which allows healthcare professionals to reduce the risk of food intolerances, sensitivities, and to better understand how a person's genetic makeup plays a role in nutrient absorption and chronic disease risk. If applied to astronauts partaking in future exploration missions, nutrigenomic analysis could be included in holistic countermeasures to maintain health status. Through individual genetic analyses, space agency dietitians could create a nutrition plan with specific bioactive nutrients which accounts for varying physiologic reactions to food components based on genetic polymorphisms; thereby mitigating nutrient-related health risks exacerbated by the microgravity environment.

This report examines the current literature on nutrigenomics and presents implications for the integration of personalized nutrition for astronauts and cosmonauts as well as suggestions to improve Crew Specific Menu Containers (CSM's) to create a harmonious balance between genetically determined foods and crewmember food requests. Additionally, ethical and moral implications of the use of genetic testing to determine personalized nutrition will be discussed.