

INTERDEPARTMENTAL NUTRITION RESEARCH SEMINAR SERIES

NUTRITIONAL BIOCHEMISTRY OF SPACEFLIGHT

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Beering Hall (BRNG) | Room 2290



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Spaceflight is associated with several physiological and environmental hazards, including microgravity, radiation, confinement, isolation, and a limited food system. Nutrition is a cornerstone of exploration missions and can drive the success - or failure - of these endeavors. As we enter the gateway of space exploration, given the nature of these vehicles, environments, mission durations, and resource limitations - nutrition will serve as one of the most important human health countermeasures. Beyond basic requirements, nutrition will provide protection for many of the physiological systems affected by extended space travel, including: Ophthalmic, Musculoskeletal, Cardiovascular, and Immune systems.

One specific concern is related to ocular health. A subset of astronauts develop Spaceflight Associated Neuro-ocular Syndrome, or SANS, a condition characterized by optic disc edema among other pathologies. The cause of SANS is unknown. Biochemical and genetic evidence have documented differences in the one-carbon (1C) metabolic pathway in affected astronauts. Furthermore, bed rest studies have documented that subjects with similar 1C genetic patterns developed greater optic disc edema. An experiment being conducted on the International Space Station right now is testing a B vitamin countermeasure. Ultimately, understanding the mechanism(s) behind the ocular changes will provide a means to predict, prevent, and/or treat these ophthalmologic pathologies in astronauts.

As humans move beyond low-Earth orbit and seek to establish extended, if not permanent presence on the Moon and Mars, nutrition will be critical for the maintenance of crew health and ultimately for mission success.

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