

IAF/IAA SPACE LIFE SCIENCES SYMPOSIUM (A1)
Human Physiology in Space (2)

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SPACEFLIGHT AND CARDIO-POSTURAL INTERACTIONS: MBRSC SPONSORED MBRU
COLLABORATIVE PROJECT.**Abstract**

Risk of orthostatic intolerance during re-exposure to gravity. Post-flight orthostatic intolerance, the inability to maintain blood pressure while in an upright position, is an established, spaceflight-related medical problem. Although countermeasures such as fluid loading and compression garments have been implemented with some success, gaps remain in the mitigation of orthostatic intolerance. This ISS research program will investigate post-flight orthostatic intolerance using an integrative model with a novel component of muscle-pump baroreflex control of blood pressure. With this model, we will be able to describe the inefficiency of blood pressure regulation during standing (i.e., orthostatic intolerance) more clearly through both cardiovascular and skeletal muscle-pump components. Over several years of research, we have validated the existence of a baroreflex mediated skeletal muscle pump with significant contributions to blood pressure regulation during standing. In a 60-day head-down tilt bed-rest study) we found a 61% decrease in blood pressure regulation during standing. By the end of the project, the proposed research will establish profiles of how these baroreflex control functions on blood pressure are affected with spaceflight, as well as their adaption processes post-flight. These new data will be assessed along side with cerebral blood flow and postural control; components already shown to be compromised in some astronauts post-spaceflight. This comprehensive systems approach will thus provide more insights in the identification, design, and implementation of countermeasures to mitigate post-flight orthostatic intolerance.