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ASSESSMENT OF ASTRONAUT'S VASCULAR FUNCTION IN SPACEFLIGHT: A JOINT  
MOHAMMED BIN RASHID SPACE CENTER AND EUROPEAN RESEARCH INSTITUTES  
PROJECT

**Abstract**

Presented here is a novel, first of its kind, sponsored project of Mohammed Bin Rashid Space Center, UAE. This joint project, which includes additional partners from Austria and Belgium examines the vascular changes that occur astronauts during and after missions of varying durations at the International Space Station (ISS). The vascular endothelial function will be assessed using non-invasive clinical diagnostic methods such as flow mediated dilation (FMD), changes in retinal microvasculature, vascular stiffness using Pulse Wave Velocity (PWV), and intimal medial thickness in astronauts before, during and after ISS spaceflight. Changes to be monitored in the retinal vessels include central retinal arteriole equivalents (CRAE) and central retinal venule equivalents (CRVE) and the ratio between these parameters will be influenced by spaceflight. Additionally, various inflammatory and oxidative stress biomarkers in the blood will be monitored. Furthermore, transcriptomic, targeted genomics and circulatory miRNAs involved in endothelial function and angiogenesis in astronauts will be investigated and analyzed pre-, during- and post-spaceflight. Finally, the effects of different flight durations on vascular parameters will also be assessed. This project is important as spaceflight environment is known to result in vascular damage, including endothelial dysfunction. The analyses of vascular function and biomarkers may result in the identification of novel diagnostic and prognostic biomarkers for cardiovascular diseases. Understanding those mechanisms is critical not only for the development of effective countermeasure tools for potential vascular disorders of the space traveler in the future, but also for combating the greater number of cardiovascular diseases on Earth.