

Institute of Aerospace Medicine

Institute Seminar, March 13, 2018, *Abstract*

Prof. Dr. Jörn Rittweger

¹German Aerospace Center (DLR), Cologne, Germany,

²Department of Pediatrics and Adolescent Medicine, University of Cologne, Germany

SARCOLAB3: PILOT-STUDY AND PRELIMINARY RESULTS FROM 4 CREW MEMBERS

In microgravity, 'ground' contact forces are low during treadmill training on board the Space Station. Muscular forces are normally the greatest source of musculoskeletal forces. In addition, confinement, workload, disrupted sleep and thermoregulation, radiation, diet and other factors can negatively affect muscle metabolism and adaptation.

The ISS-experiment 'Sarcolab3' assesses the myotendinous and neuromuscular adaptations to spaceflight. A pilot study in two astronauts has suggested that a) musculoskeletal loading forces are an important determinant of exercise effectiveness, b) that even training with relatively high loads is not fully effective to maintain muscle mass and strength, and c) that the persisting atrophy in space may be linked to the organisms energy metabolism. Four more crew members have meanwhile been studied with a more extensive protocol. This includes also first-time in-flight measures of plantar flexor and knee extensor muscle function, along with B-mode ultrasound assessment of muscle architecture. Preliminary results will be presented at the seminar.