It is well known that exposure to microgravity in astronauts leads to a plethora of physiological responses such as headward fluid shift, body unloading, and cardiovascular deconditioning. When astronauts return to Earth, some encounter problems related to orthostatic intolerance. Impaired cerebral autoregulation (CA), which could be compromised by the effects of microgravity, has been proposed as one of the mechanisms responsible for orthostatic intolerance. CA is a homeostatic mechanism that maintains cerebral blood flow for any variations in cerebral perfusion pressure by adapting the vascular tone and cerebral vessel diameter. The ground-based models of microgravity are useful tools for determining the gravitational impact of spaceflight on the human body. The headdown tilt bed rest (HDTBR), where the subject remains in the supine position at -6 degrees for periods ranging from few days to several weeks is the most commonly used ground-based model of microgravity for cardiovascular deconditioning. head-down bed rest (HDBR) is able to replicate cephalic fluid shift, immobilization, confinement, and inactivity. The dry immersion (DI) model is another approach where the subject remains immersed in thermoneutral water covered with an elastic waterproof fabric separating the subject from the water. Regarding DI, this analog imitates the absence of any supporting structure for the body, centralization of body fluids, immobilization, and hypokinesia observed during spaceflight. However, little is known about the impact of microgravity on CA. Here, we review the fundamental principles and the different mechanisms involved in CA. We also consider the different approaches in order to assess CA. Finally, we focus on the effects of short- and long-term spaceflight on CA and compare these findings with two specific analogs to microgravity: HDBR and DI<sup>1)</sup>.

## 1)

Kermorgant M, Nasr N, Czosnyka M, Arvanitis DN, Hélissen O, Senard JM, Pavy-Le Traon A. Impacts of Microgravity Analogs to Spaceflight on Cerebral Autoregulation. Front Physiol. 2020 Jul 3;11:778. doi: 10.3389/fphys.2020.00778. PMID: 32719617; PMCID: PMC7350784.

From: https://neurosurgerywiki.com/wiki/ - **Neurosurgery Wiki** 

Permanent link: https://neurosurgerywiki.com/wiki/doku.php?id=orthostatic\_intolerance

Last update: 2024/06/07 02:54



1/1