

Why astronauts experience low blood pressure after returning to Earth from space

25 October 2012

When astronauts return to Earth, their altitude isn't the only thing that drops—their blood pressure does too. This condition, known as orthostatic hypotension, occurs in up to half of those astronauts on short-term missions (two weeks or less) and in nearly all astronauts after long-term missions (four to six months). A new research report published online in *The FASEB Journal* solves the biological mystery of how this happens by showing that low gravity compromises the ability of arteries and veins to constrict normally, inhibiting the proper flow of blood. Prevention and treatment strategies developed for astronauts may also hold promise for elderly populations on Earth who experience orthostatic hypotension more than any other age group.

"The idea of space exploration has been tantalizing the imagination of humans since our early existence. As a scientist, I have had the opportunity to learn that there are many medical challenges associated with travel in a [weightless environment](#), such as orthostatic hypotension, [bone loss](#) and the recently recognized [visual impairment](#) that occurs in astronauts," said Michael D. Delp, Ph.D., a researcher involved in the work from the Department of Applied Physiology and Kinesiology, and the Center for Exercise Science at the University of Florida in Gainesville, Florida. "Although I have come to realize that it is unlikely I will ever get to fulfill my childhood dream of flying in space, I take great satisfaction with helping in the discovery of how microgravity alters the human body and how we can minimize these effects, so humans can safely explore the bounds of our universe."

To make this discovery, Delp and colleagues examined arteries and veins from mice housed at [Kennedy Space Center](#) in Florida with blood vessels from groups of mice flown on three of the last five space shuttle missions—STS-131, STS-133 and STS-135. Mice flown on the STS-131 and STS-135 missions were tested immediately

after returning to Earth, whereas mice from STS-133 were tested one, five and seven days after landing. Not only did they find that these mice experienced the equivalent of orthostatic [hypotension](#) in humans, they also discovered that it takes as many as four days in normal gravity before the condition is reversed.

"There has been considerable interest in sending humans to the moon, asteroids, and Mars," said Gerald Weissmann, M.D., Editor-in-Chief of *The FASEB Journal*, "but what we're finding is that extended space missions have their own inherent risks above and beyond the obvious. If we ever hope to visit distant worlds for extended periods of time—or colonize them permanently—we've got to figure out how to mitigate the effects that low and no gravity has on the body. This report brings us an important step closer to doing just that."

More information: *FASEB J*
[doi:10.1096/fj.12-218503](https://doi.org/10.1096/fj.12-218503)

Provided by Federation of American Societies for Experimental Biology

APA citation: Why astronauts experience low blood pressure after returning to Earth from space (2012, October 25) retrieved 12 November 2019 from <https://phys.org/news/2012-10-astronauts-blood-pressure-earth-space.html>

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