

# Micro-gravity a health hazard for astronauts: research

October 2 2009, By Dan Gaffney

---



(PhysOrg.com) -- UNSW researchers may have pinpointed the cause of muscle wasting and bone-density loss experienced by astronauts who fly lengthy missions under the weightless conditions of space.

Australian scientists may have pinpointed the cause of muscle wasting and [bone-density](#) loss experienced by [astronauts](#) who fly lengthy missions under the weightless conditions of space, new research reveals.

University of New South Wales researchers used a NASA rotating-wall vessel to reproduce [microgravity](#), which is experienced by astronauts in low Earth orbit, to analyse its effect on human [embryonic stem cells](#).

Seventy five per cent of the proteins from the cells exposed to microgravity were not found in those grown under normal gravity. The microgravity-exposed cells produced more proteins that negatively regulate bone density and fewer proteins with antioxidant effects. Antioxidants protect the body from reactive oxidants that can damage DNA.

"The finding may explain loss of bone density and muscle wasting experienced by astronauts," says Dr Brendan Burns, a UNSW biologist who led the study with researchers Elizabeth Blaber and Helder Marcal.

"A lot of work has been done on microgravity at a systemic level, such as the effects on the immune system. No-one has really looked at the effect of microgravity at a cellular level and we think that is a huge gap.

"What we've found is a range of different proteins that are potentially important for astronaut health were more or less predominant in terms of different gravity."

NASA has hinted at plans to construct a solar-powered outpost at one the Moon's poles by 2024. The base would permit sustained human presence on the Moon, which would serve as a staging post for future missions to Mars and beyond.

But prolonged exposure to microgravity would pose increased health risks to astronauts. The absence of normal Earth gravity causes physiological changes, such as bone loss, muscle atrophy and loss of blood volume, which could cause astronauts to feel lightheaded and dizzy once they arrive at the surface of Mars after a long voyage.

It has long been known that microgravity affects bone density but so far nobody has pinpointed the genes and proteins that are affected by microgravity which might promote this condition. Research aimed at

understanding the effects of microgravity on human physiology could assist the development of health and safety practices for astronauts.

The research is being presented this week in Sydney at the 9th Australian Space Sciences Conference.

Provided by University of New South Wales ([news](#) : [web](#))

Citation: Micro-gravity a health hazard for astronauts: research (2009, October 2) retrieved 13 August 2024 from <https://phys.org/news/2009-10-micro-gravity-health-hazard-astronauts.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.