

# Astronauts' Core Body Temperature Increases on Extended Space Missions



By Alex Berezow, PhD — December 3, 2017



Space fever. (Credit: Public Domain/Wikipedia) [1]

Astronauts do not live glamorous lives. Though tumbling about in low gravity looks fun, there are perils to the job. Their muscles atrophy. They are exposed to higher levels of radiation. They have to eat lousy food. They re-enter Earth in a blazing fireball.

Now, researchers have added yet another potential health risk: Astronauts' core body temperature increases by roughly 1° C (1.8° F) on long-duration missions.

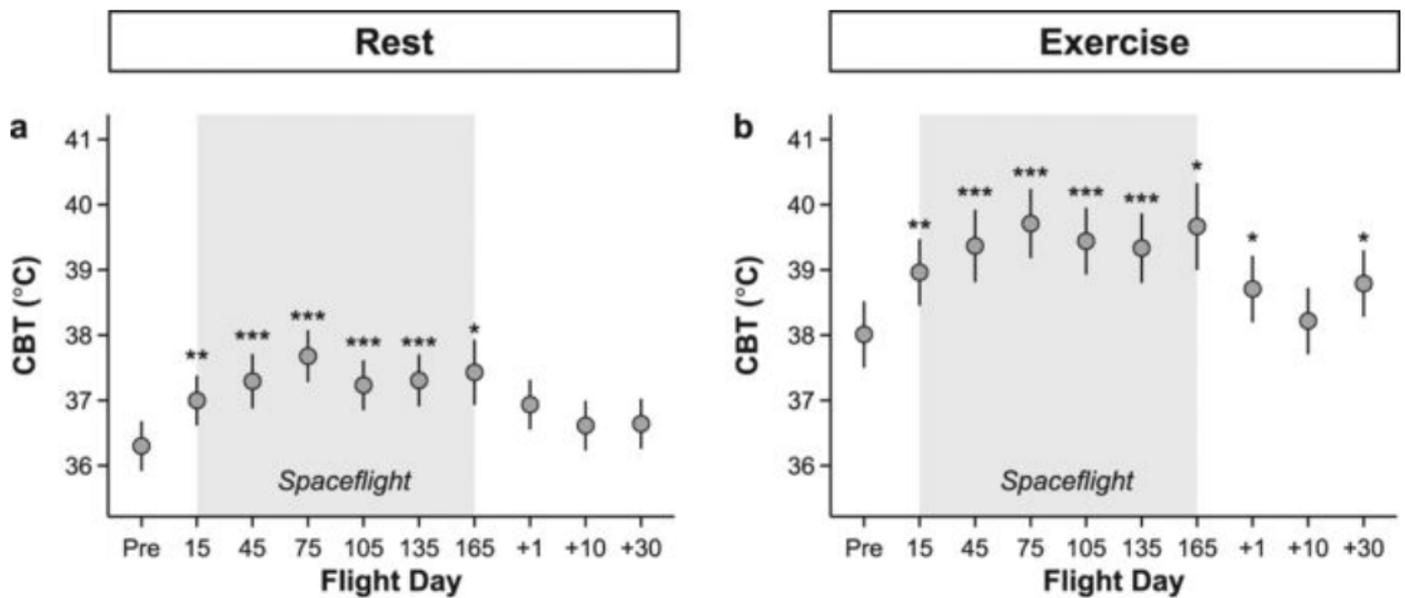
Our brains, via the hypothalamus, tightly regulate our body temperature. The average person's body temperature is 37° C (98.6° F). Eliminating heat is vital to maintaining a proper temperature. That's why, for instance, we sweat during exercise; as the water evaporates, our bodies cool off.

Such natural cooling mechanisms don't work as well in space. The relative lack of gravity hinders both evaporation and convection. (Convection is the process by which heat is transferred by the movement of a fluid, like air.) This is problematic because it is not only uncomfortable for the astronauts, but it is potentially unhealthy. An elevated body temperature impairs physical and cognitive performance and may even induce a mild state of systemic inflammation.

Making things worse is the fact that astronauts, in order to keep their bodies in shape, absolutely must exercise while in space. This could increase their core body temperature to dangerously high levels.

To investigate these matters more closely, an international team of scientists monitored the body temperatures of 11 astronauts before, during, and after missions on the International Space

Station. The team's primary finding is depicted below:



As shown, the astronauts' body temperatures were about 1° C higher while at rest during spaceflight (left panel). Similarly, during exercise, their body temperatures were about 1.4° C higher than they were while exercising on Earth (right panel). For some of the participants, core body temperature during exercise exceeded 40° C (104° F). That's not quite a brain-frying temperature (42° to 44° C, or 107.6° to 111.2° F), but it's still high.

Additionally, biomarkers indicated that the astronauts were experiencing mild systemic inflammation, as well.

Obviously, these findings have implications for the health and comfort of astronauts. The fury of Earth's atmosphere is not the only way an astronaut might "burn up" in space.

**Source** [2]: Alexander C. Stahn, et al. "Increased core body temperature in astronauts during long-duration space missions." *Scientific Reports* 7, Article number: 16180. Published: 23-Nov-17. doi:10.1038/s41598-017-15560-w

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[1] <https://en.wikipedia.org/wiki/Astronaut#/media/File:Astronaut-EVA.jpg>

[2] <https://www.nature.com/articles/s41598-017-15560-w>