

Impact of Microgravity on Body Temperature

Prelims (GS I) – General Science.

Why in news?

Recent research by Indian Institute of Space Science and Technology (IIST) researchers have developed a 3D model shows that microgravity increases core body temperature in astronauts.

- **Microgravity** - It refers to a condition where the effects of gravity are significantly reduced, creating an apparent state of weightlessness.
- This is ***often seen in space***, where objects in orbit experience a continuous state of freefall.
- **Research model** - 3D computational model of human thermoregulation in microgravity developed by scientists researchers from IIST.
- This model imitates how heat moves through the body in a space environment, taking into account factors like sweating, shivering, clothing, organ heat and blood redistribution.

Key Findings of the Research

- **Core body temperature changes** - Microgravity consistently increases core body temperature.
- Core body temperature may increase from 36.3°C to 37.8°C (with 30% lower sweating and 36% higher metabolism) in 2.5 months under the influence of microgravity.

Core body temperature, is the operating temperature of an organism.

- **Temperature distribution changes** - The temperature change is varying in different parts of the body with,
 - Feet and hands become cooler in microgravity.
 - Head, abdomen, and core become warmer.
 - Blood redistribution from lower limbs to upper body significantly impacts temperature distribution.
- **Impact of Exercise** - It causes faster temperature rise in space than on Earth.
- During exercise in microgravity, body temperature could approach 40°C.
- **Model validation** - Successfully matched temperature data from Mir space station (Russia) and International Space Station
- **Applications** - The model has applications for space travel that keeps astronauts make informed decision.
- Clothing design for temperature regulation.
- Building architecture to reduce heat stress.
- Calculating universal thermal climate index.

Reference

[The Hindu| Microgravity increases core body temperature](#)

