

# Whole-body heat stress lowers exercise capacity, blood flow in men

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Researchers have found that prolonged exposure to high temperatures can raise both the skin and core temperature, reducing blood flow to the brain and limbs during exercise and limiting the ability to exercise for long periods. The study, the first of its kind to separate the effects of skin- versus internal-raised temperature (hyperthermia), is published in *Physiological Reports*.

Nine male volunteers (average age 26) exercised on a stationary bicycle after spending time in a hot environment created by wearing a suit that circulated 122-degree Fahrenheit water. Before one [exercise test](#), the volunteers were exposed to heat for 13 minutes, enough time to raise their skin temperature ("mild hyperthermia"). Another exercise test took place after 52 minutes of heat exposure, during which the temperature of the participants' [core body temperature](#) increased ("moderate hyperthermia").

Researchers took blood samples in the last minute of each exercise test. Skin and core body temperature was measured throughout each exercise test. The research team also measured [blood flow](#) to the brain and legs during each test.

The findings showed that moderate, but not mild, hyperthermia led to a lower threshold for [exercise capacity](#) and decreased blood flow. The researchers found that the body is able to compensate when heat stress is restricted to only the skin, but "the combination of multiple stressors triggered by whole body hyperthermia, however, resulted in a

compromised aerobic capacity." Blood flow to the legs and brain was also lower with moderate hyperthermia.

**More information:** Steven J. Trangmar et al. Whole body hyperthermia, but not skin hyperthermia, accelerates brain and locomotor limb circulatory strain and impairs exercise capacity in humans, *Physiological Reports* (2017). [DOI: 10.14814/phy2.13108](https://doi.org/10.14814/phy2.13108)

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