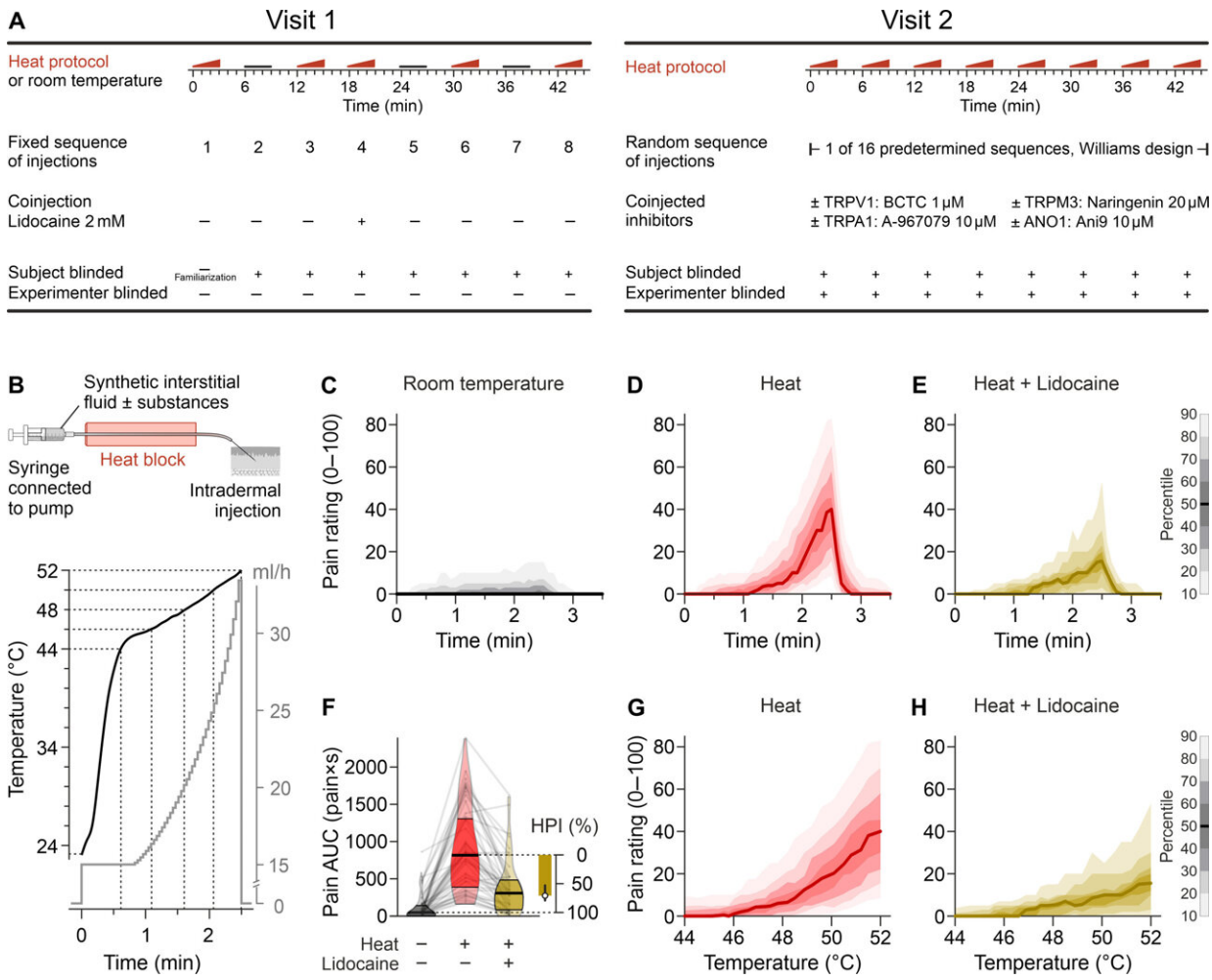
Team identifies cell structure responsible for heat perception in humans

September 5 2024



Study design and experimental heat pain model. Credit: *Science Advances* (2024). DOI: 10.1126/sciadv.ado3498

A study by the Medical University of Vienna has made important progress in understanding heat perception in humans. The research team was able to identify a specific cell structure that plays a role in recognizing heat. However, most of the protective recognition of heat in everyday life depends on other, as yet unknown structures.

The findings were recently published in the journal *Science Advances*. Recognizing heat is a fundamental protective function for all organisms. A research team led by Michael Fischer from MedUni Vienna's Center for Physiology and Pharmacology investigated the question of how the human body recognizes harmful heat.

In the study, 48 healthy test subjects were examined using a newly developed heat pain model in order to clarify the role of various cell components in heat perception. It was found that the perception of heat pain differs significantly from the way it works in mice, in which the cell structures TRPV1, TRPA1 and TRPM3 are redundantly responsible for heat perception and a role for ANO1 was also described. These are proteins that play an important role in detection of environmental and internal conditions.

It turned out that three of these four cell structures, which are responsible for recognizing heat in mice, play no role in humans. By developing a new heat pain model and conducting the comprehensive study in humans, MedUni Vienna was able to rule out a contribution of TRPA1, ANO1 and TRPM3 to heat perception. The fourth structure, TRPV1, which is also responsible for the perception of spicy food, proved to be the most sensitive for recognizing heat in humans.

Heat perception in humans not yet clarified

Thus, while TRPV1 remains as the central detector of noxious heat, interestingly, in humans, the majority of protective heat avoidance in

everyday life depends on other as yet unknown molecular mechanisms. This was shown when the inhibition of TRPV1 reduced pain at harmful temperatures, but the majority of heat-induced pain was still perceived.

"These findings open up new avenues in research into recognizing and preventing heat damage and could lead to new therapies in the long term," explains study leader Michael Fischer.

More information: Stefan Heber et al, Human heat sensation: A randomized crossover trial, *Science Advances* (2024). DOI: 10.1126/sciadv.ado3498

Provided by Medical University of Vienna