Food temperature linked to nerve activity in taste cells

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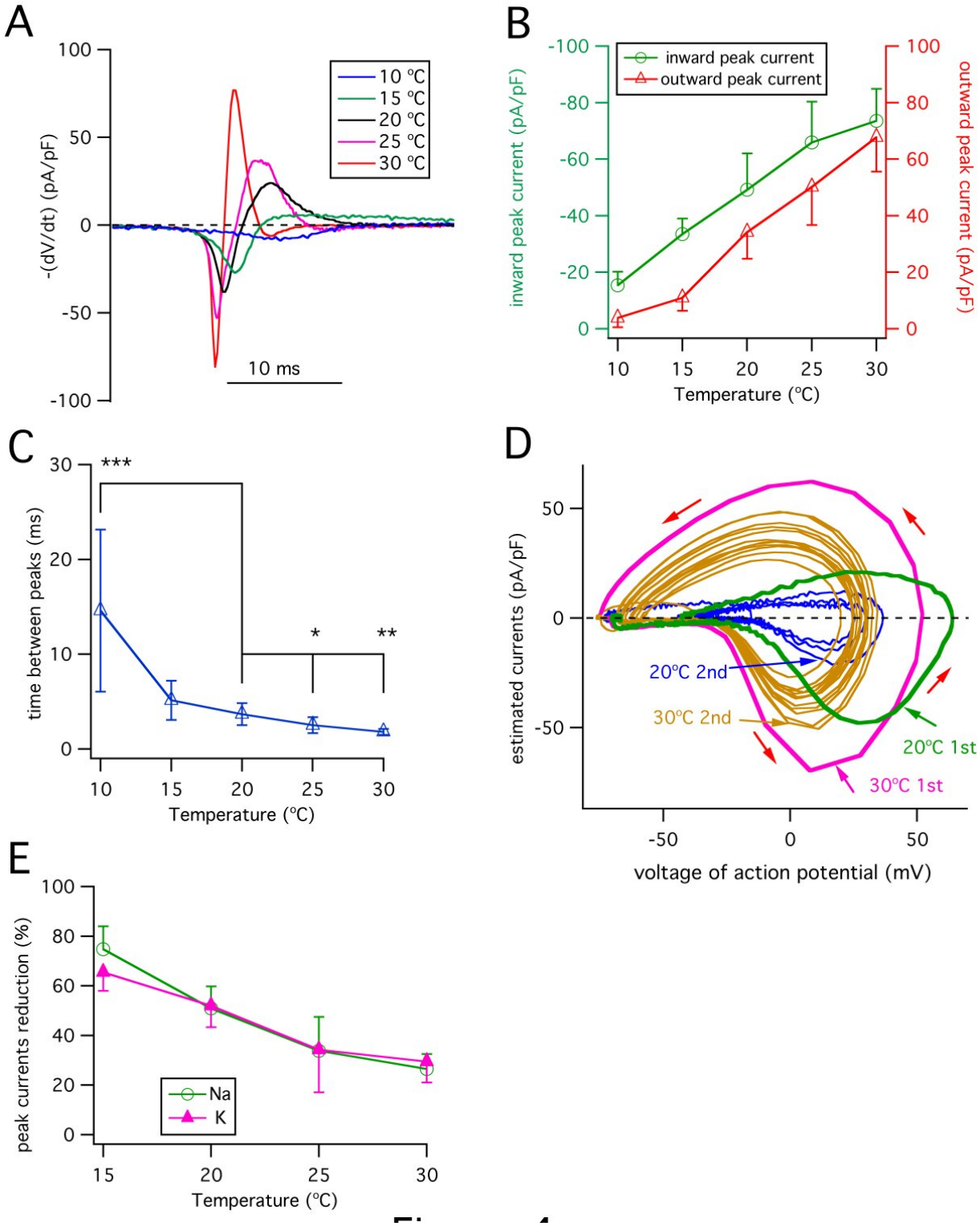

Effects of temperature on ionic currents during action potentials. Credit: *American Journal of Physiology-Cell Physiology* (2023). DOI:

10.1152/ajpcell.00413.2022

A new study finds temperature affects electrical activity levels in taste bud cells, which could greatly influence perception of taste. The study is published ahead of print in the *American Journal of Physiology-Cell Physiology*.

Each taste bud in the tongue contains around 100 cells that are categorized as Type I, Type II and Type III. The taste buds sense molecules in food and transmit information about taste to nerves called gustatory nerves. Type II taste cells share a signaling pathway and sense sweet, bitter, umami and salty flavors.

The temperature of food influences how people perceive taste, and researchers believe it is likely that molecular mechanisms in the taste buds themselves play a role in this process. However, the exact underpinnings are less clear.

In a new study, researchers isolated single Type II taste cells from the taste buds of mice and treated them with solutions ranging in temperature from 50 to 86 degrees F.

The research team measured the action potentials (nerve signals) of the cells. They found that lower temperatures increased the action potential duration—the length of each signal—of the taste cells. However, cells exposed to higher temperatures had a decrease in interval time between action potentials and an increase in firing frequency (more signals being produced).

"A major finding in the present study is that the temperature significantly modulates the firing frequency of actional potentials in type

II taste buds," the researchers wrote. "These mechanisms enable type II cells to transmit thermal information associated with ingestion of bitter, sweet or umami substances and [salt concentrations], influencing perception of the intensities of these tastants."

More information: Zhongming Ma et al, Effects of temperature on action potentials and ion conductances in type II taste-bud cells, *American Journal of Physiology-Cell Physiology* (2023). DOI: 10.1152/ajpcell.00413.2022

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