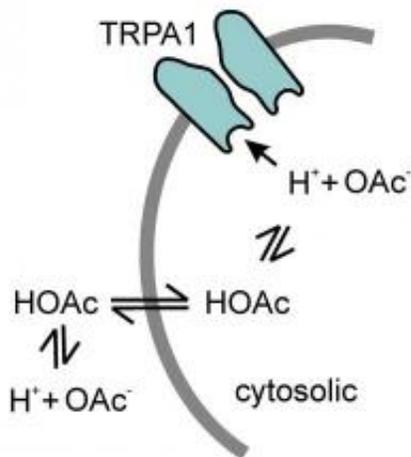


# Researchers explain how animals sense potentially harmful acids

May 16 2011



Proposed model for how acetic acid might activate the ion channel TRPA1. A new study in the *Journal of General Physiology* identifies TRPA1 as the sensor in animals responsible for identifying weak acids, an important class of potentially harmful chemicals. Credit: Wang, Y.Y., et al. 2011. *J. Gen. Physiol.* doi:10.1085/jgp.201110615.

All animals face the challenge of deciding which chemicals in the environment are useful and which are harmful. A new study greatly improves our understanding of how animals sense an important class of potentially harmful chemicals: weak acids. The study appears online on May 16 in the *Journal of General Physiology*.

Weak acids like acetic acid (vinegar) and propionic acid (present in

fermented foods like Swiss cheese) are shunned by many animals, and with good reason. Many [organic acids](#) in the environment can have widespread detrimental effects. Humans ingest these substances despite the fact that they actually elicit "irritating" sensations, a [physiological response](#) that may have been vital for our ancestors' survival.

So what are the molecular sensors and mechanisms involved when animals detect these substances? Although researchers have identified sensors for many [harmful chemicals](#), the mechanisms involved in the detection of weak acids have been a mystery. Now, University of Southern California researcher Emily Liman and colleagues identify the sensor as none other than the ion channel TRPA1. The authors show that TRPA1 responds to weak acids when they acidify the cytoplasm within the cell. Such cytoplasmic acidification can have very [negative consequences](#)—even triggering cell death—which explains why this process raises such alarm bells in animals.

Researchers have been surprised in recent years to discover how many different types of noxious stimuli can be sensed by TRPA1, explains Brandeis University's Paul Garrity in a Commentary accompanying the study. With this latest research, weak acids can be added to that growing list.

**More information:**

Garrity, P.A. 2011. J. Gen. Physiol. [doi:10.1085/jgp.201110657](https://doi.org/10.1085/jgp.201110657)

Wang, Y.Y., et al. 2011. J. Gen. Physiol. [doi:10.1085/jgp.201110615](https://doi.org/10.1085/jgp.201110615)

Provided by Rockefeller University

Citation: Researchers explain how animals sense potentially harmful acids (2011, May 16)  
retrieved 21 September 2024 from

<https://medicalxpress.com/news/2011-05-animals-potentially-acids.html>

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