

## **Beyond Sour: the proton channel OTOP1**

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To detect and discriminate among potential foods before ingestion, animals use a constellation of sensory receptors tuned to biologically important chemicals and expressed in taste receptor cells. One class of stimuli detected by taste cells is acids, which evoke a sour taste in humans. Previously we used RNAseq from taste cells to identify a novel proton channel, OTOP1, that is specifically expressed in sour (Type III) taste receptor cells and required for activation of taste receptor cells and gustatory nerves to acid stimuli. Thus, OTOP1 can be considered the sour receptor. However, *Otop1* knockout mice do not display deficits in behavioral responses to acid stimuli, suggesting OTOP1 may subserve other sensory functions. In addition to acids, Type III taste receptor cells respond to ammonium chloride, which alkalinizes the cell cytosol. We find that OTOP1 is required for responses of taste receptor cells and gustatory nerves to ammonium chloride, and sensitive behavioral aversion. We further show that a highly conserved amino acid is required for activation of the channel by ammonium chloride but not acids. These data suggest that OTOP1 evolved as a gustatory sensor to detect a variety of compounds that elicit changes in either extracellular or intracellular pH.

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