

New Class of Bitter Taste Receptor in Mammals

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BACKGROUND

Opsins are G protein-coupled receptors (GPCRs) best known as light sensors; however, GPCRs are central to the perception of taste and olfaction, as well as light. Gustatory perception is the result of the expression of multiple types of GPCR taste receptors, and in humans, there are twenty-five known taste receptors for detection of bitter taste. A large suite of in vitro tools for measuring chemosensory properties of chemical entities is being developed, wherein GPCR taste-sensitive proteins are used to identify and evaluate the gustatory taste attributes of tastant ligands. The food and beverage industry, medical industry, and health and beauty industry rely on the chemosensory properties of their products; flavor and smell are of critical importance. Massive efforts are expended to ensure that products have appealing taste and smell. Sensory perceptions are integral to the global flavors and fragrances market that is estimated at over \$25 billion dollars per year.

DESCRIPTION

Researchers at the University of California, Santa Barbara, have identified a previously unknown class of mammalian taste receptor called Opn3, an opsin GPCR expressed in Type II taste receptor cells of mice and humans. Unlike classical taste receptors, Opn3 recognizes and responds to bitter flavonoid compounds found in common foods like cocoa, citrus fruits, green tea, and soybeans. Functional studies show Opn3 activation by these flavonoids triggers bitter taste perception through engagement of key bitter taste transduction pathways, including the canonical G protein α -gustducin. This new receptor can be expressed in vitro for high throughput screening aimed at identifying flavor modulators to reduce bitterness in food, medications, dietary supplements, and oral care products, significantly impacting flavor science and product development and opening new avenues for flavor modulation and taste research.

ADVANTAGES

- ▶ Enables activation and modulation of a previously undiscovered mammalian taste receptor
- ▶ Provides in vitro expression systems for efficient high throughput screening of taste modulators
- ▶ Targets specific bitter flavonoids to improve palatability in foods and oral products
- ▶ Expands understanding of taste biology by revealing evolutionary conserved opsin roles beyond photoreception

APPLICATIONS

- ▶ Food flavor enhancement and bitterness reduction in food additives and beverages

CONTACT

Donna M. Cyr
cyr@tia.ucsb.edu
tel: .

INVENTORS

- ▶ Chandel, Avinash
- ▶ Montell, Craig
- ▶ Zhan, Yinpeng

OTHER INFORMATION

KEYWORDS

taste receptor, flavor, food additives, taste buds, orally-administered drug, oral care product, dietary supplements, artificial sweeteners

CATEGORIZED AS

- ▶ **Biotechnology**
- ▶ Food

RELATED CASES

2021-874-0

- ▶ Development of modulators to mask bitter taste in orally-administered drugs and dietary supplements
- ▶ Flavor improvement in oral care compositions such as toothpaste and mouthwash
- ▶ Screening platforms for new flavor modulators and bitter taste inhibitors

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20240142474	05/02/2024	2021-874

University of California, Santa Barbara
Office of Technology & Industry Alliances
342 Lagoon Road, Santa Barbara, CA 93106-2055 |
<https://www.tia.ucsb.edu>
Tel: 805-893-2073 | Fax: 805.893.5236 | padilla@tia.ucsb.edu



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