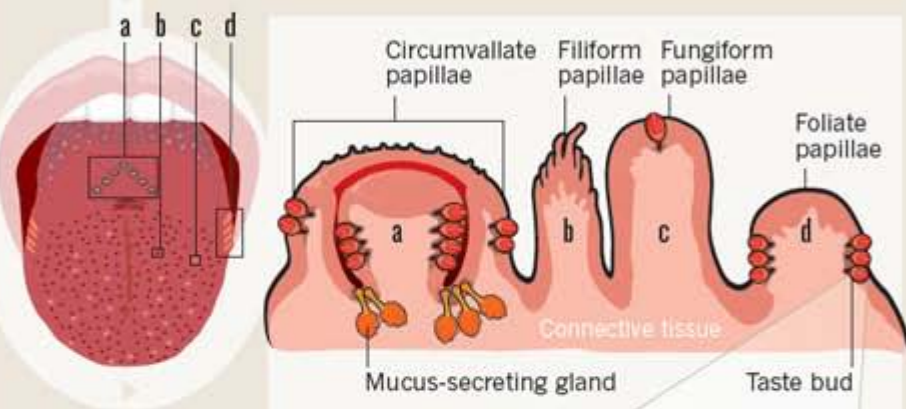


# TASTE DISCOVERY

Study of the basic tastes, and how these are detected by the tongue, is an evolving field.

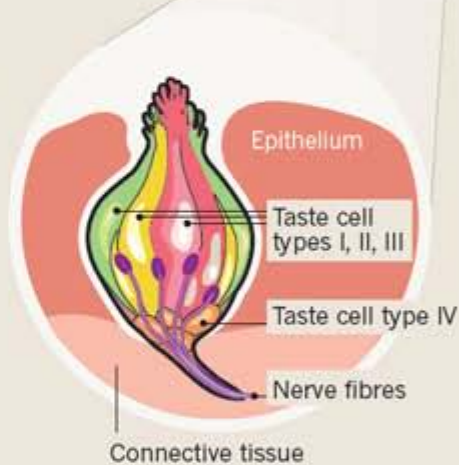
## ORGAN

The tongue contains four types of papillae. Circumvallate, fungiform and foliate papillae contain taste buds, whereas filiform papillae detect only the texture of food.



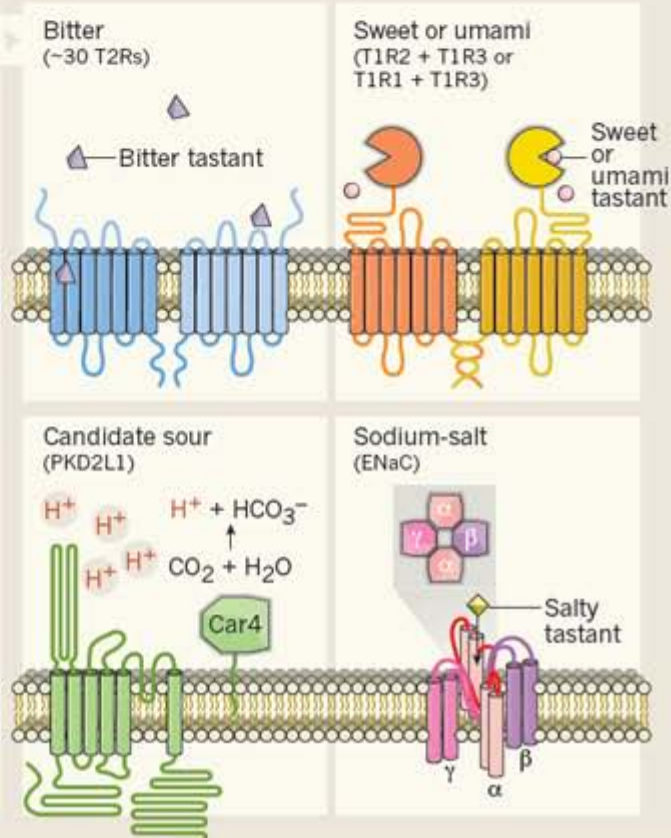
## CELLS

Each taste bud is an onion-like structure packed with 50 to 100 taste cells, anatomically classified into four types. Type II cells contain receptors for sweet, bitter, umami and possibly salty tastes; type III for sour; type I are probably supporting cells. Type IV are suspected to be stem cells that supply new taste cells every two weeks.



## RECEPTORS

Sweet, umami and bitter receptors belong to the superfamily of G-protein coupled receptors. ENaC, the receptor for sodium-salt taste, is an ion channel. Less is known about PKD2L1, but taste cells expressing it respond to the presence of protons (H<sup>+</sup>), a breakdown product from acids.



1901

D. Hänig publishes a paper containing data on taste sensitivity in different regions of the tongue. The data are later misinterpreted, giving rise to the myth of the 'tongue map'.



350 BC

Aristotle writes about the basic tastes, sweet and bitter, which can be modified, he says, by salty and acidic.



350 BC

1900

1908

Fifth basic taste discovered: savoriness, described as umami, which is conferred by glutamate.

1910

1931-1932

Geneticists confirm findings about sensitivity to bitter tasting PTC and discover non-tasting is a recessive genetic trait<sup>2,11</sup>.

1931

Bitter taste sensitivity found to vary among humans<sup>1</sup>.

1920

1930



1939

Geneticists show that chimpanzees, like humans, vary in their ability to perceive the bitterness of PTC (see 'The lost appetites', page S16).

1940

1950

1992

Discovery of gustducin, a taste cell-specific G-protein, in the taste buds. Gustducin is later shown to mark bitter, umami and sweet cells<sup>13</sup>.

1960

1970

2000 / BITTER

First taste sensors, the T2R bitter receptors, discovered<sup>3</sup>.

2002

Bitter taste receptors found<sup>14</sup> in the gastrointestinal tract.

1980

2001 / SWEET

The sweet receptor is discovered<sup>5</sup>: a combination of T1R2 + T1R3.

1990

2002 / UMAMI

Amino acid detector, T1R1 + T1R3, identified<sup>6</sup>.

2005

Sweet taste receptor found<sup>15</sup> in the gastrointestinal tract.

2000

2006 / SOUR

Cells for sour taste discovered, identified by PKD2L1 (refs 4-7).

2010

2010 / SALTY

ENaC identified as the sodium-salt taste receptor<sup>9</sup>.

2009

The Car4 receptor, which senses the carbon dioxide in fizzy drinks, is found on sour cells<sup>8</sup>.

