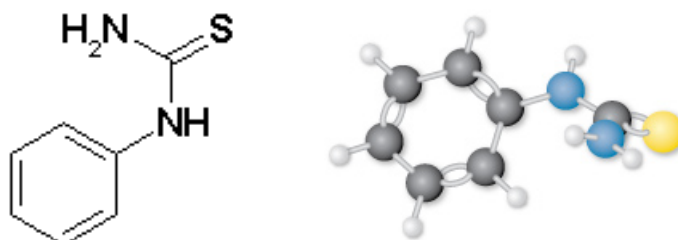


PTC: Phenylthiocarbamide

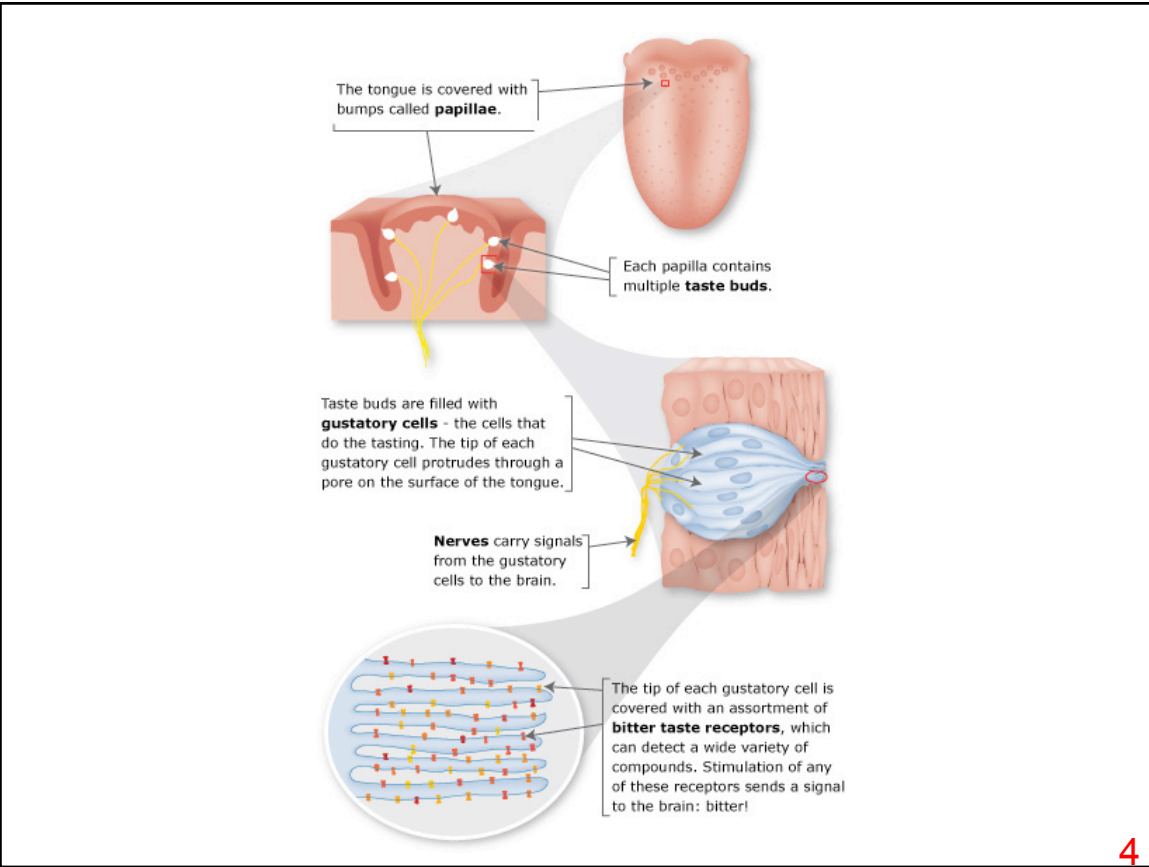
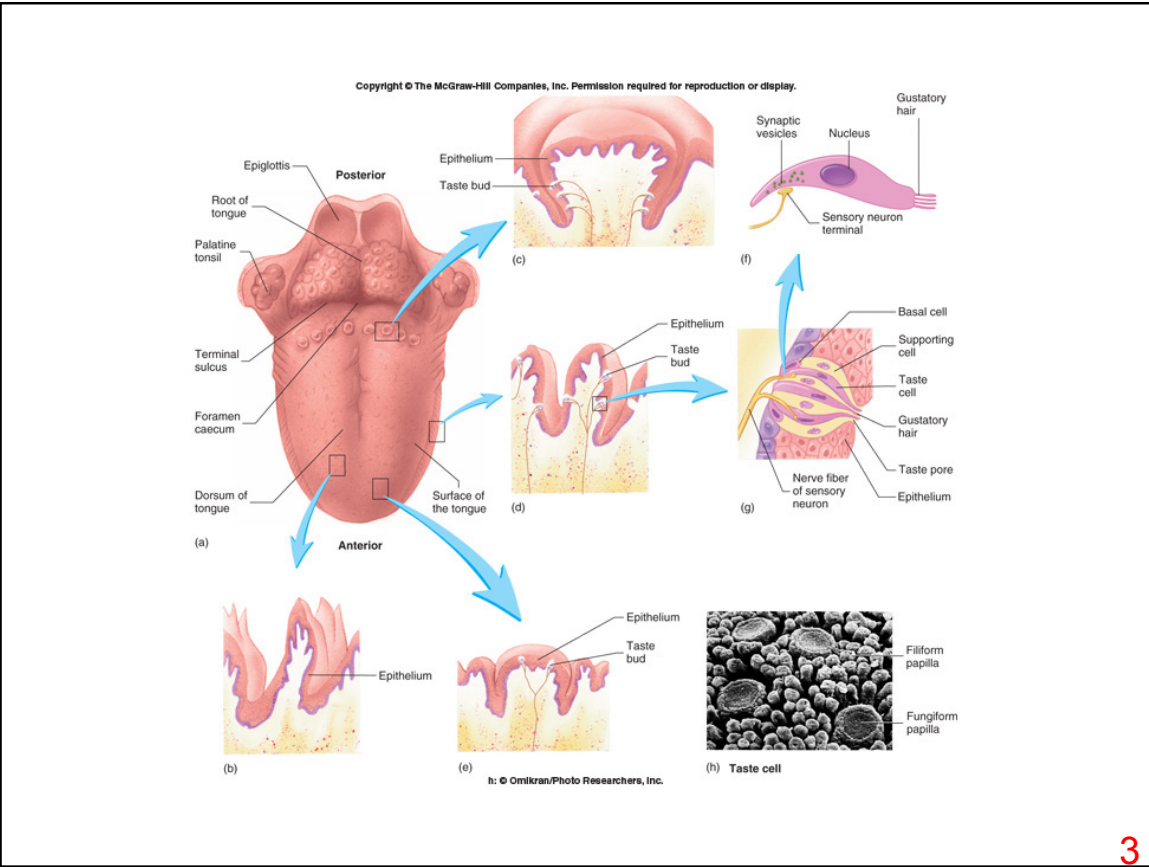


1

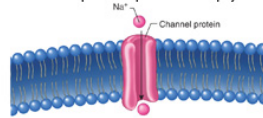
PTC Tasting

- PTC stands for phenylthiocarbamide.
- In 1931 a Dupont chemist, Arthur Fox, accidentally released some PTC powder into the air.
- His colleague complained about the taste, but Fox noticed no taste.
- They both directly tasted the powder.
- The ability to taste PTC (and related compounds) is genetic.
- PTC tasting became one of the earliest genetic tests.
- The taste of PTC is bitter.
- PTC does not occur in nature, but many related compounds do, and any of them creates the sensation of bitterness.

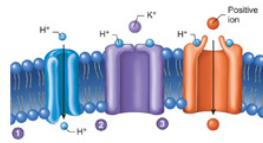
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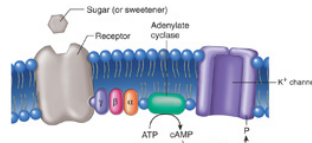
(a) **Salt:** Sodium ions diffuse through Na^+ channels, resulting in depolarization.



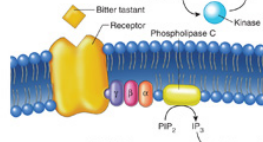
(b) **Sour foods:** Hydrogen ions (H^+) from acids can cause depolarization by one of three mechanisms: (1) They can enter the cell directly through H^+ channels, (2) they can bind to gated K^+ channels, closing the gate, and preventing K^+ from entering the cell, or (3) they can open ligand-gated channels for other positive ions.



(c) **Sweet:** Sugars, such as glucose, or artificial sweeteners bind to receptors and cause the cell to depolarize by means of a G protein mechanism. The α subunit of the G protein activates adenylyate cyclase, which produces cAMP. cAMP activates a kinase that phosphorylates K^+ channels. The K^+ channels close, resulting in depolarization.



(d) **Bitter:** Bitter tastants, such as quinine, bind to receptors and cause depolarization of the cell through a G protein mechanism. The α subunit of the G protein activates phospholipase C, which converts phosphoinositol (PIP_2) to inositol triphosphate (IP_3). IP_3 causes Ca^{2+} release from intracellular stores and depolarization of the cell.



(e) **Glutamate (umami):** Amino acids, such as glutamate, bind to receptors and cause depolarization through a G protein mechanism. The α subunit of the G protein activates adenylyate cyclase, which catalyzes the conversion of ATP to cAMP. cAMP opens Ca^{2+} channels. The influx of Ca^{2+} causes depolarization of the cell.

