Sensing sweetness on a molecular level

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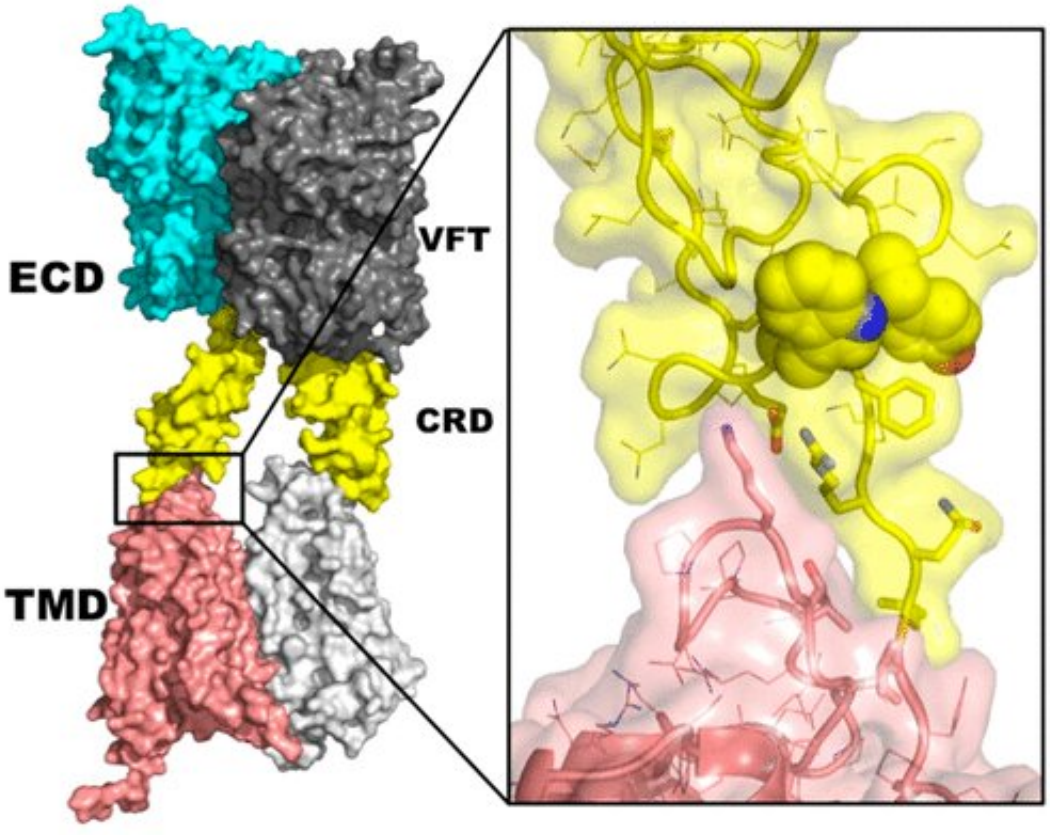

Credit: American Chemical Society

Whether it's chocolate cake or pasta sauce, the sensation of sweetness plays a major role in the human diet and the perception of other flavors. While a lot is known about the individual proteins that signal "sweet," not much is known about how the proteins work together as a receptor to accomplish this feat. Now, in *ACS Chemical Neuroscience*, researchers

report a molecular look at the receptor, which could someday lead to better-tasting food.

Taste receptors are members of a family of G-protein-coupled receptors that communicates information into the body's cells. In particular, the T1R2 and T1R3 proteins form a complex known as the sweet receptor that is responsible for the perception of molecules, such as natural sugars, artificial sweeteners, and some proteins and amino acids. Although information has recently been obtained on the structure and function of the receptor, the exact layout of the proteins in the complex and its activation process aren't entirely clear. So, Ruhong Zhou and colleagues set out to develop and analyze theoretical structures of the receptor.

The researchers used existing data about the T1R2 and T1R3 proteins to generate detailed computer models of each structure. Then they created and analyzed models of the proteins together in the full complex, and conducted in-depth studies on two specific segments: one part that is inside the cell membrane and one that is outside of the cell. From there, the group conducted simulations and learned how the receptor's architecture could change when chemicals, such as sodium and cholesterol, bind to it. In addition, likely configurations of T1R2's and T1R3's structures were revealed with respect to one another when in a complex. These models could serve as a basis for further experimentation on how the sweet receptor impacts nutrition, drug development and human health in general, the researchers say.

More information: Jose Manuel Perez-Aguilar et al. Modeling and Structural Characterization of the Sweet Taste Receptor Heterodimer, *ACS Chemical Neuroscience* (2019). DOI: 10.1021/acschemneuro.9b00438

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