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Sweet success

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Receptors on the surface of the tongue's specialized taste bud cells allow us to distinguish the five classes of tastes: sweet, sour, bitter, salty and unami. Receptors responding to bitter tastes are members of the G-protein-coupled receptor (GPCR) family, but mammalian sweet receptors have not been found. Two papers, published in the May issues of Nature Genetics and Nature Neuroscience, report the cloning of a candidate taste receptor gene, *T1r3*, which is linked to the Saclocus that determines mouse sensitivity to sweet tastants. Both groups scoured the human genomic sequence around chromosome 1p36, syntenic to the *Sac* locus on the distal end of mouse chromosome 4, in search of GPCR genes. They identified one gene that encodes a receptor with seven transmembrane helices and a large extracellular domain, and is similar to T1R1 and T1R2, two 'orphan' GPCRs (with no known ligands) that are expressed on taste cells. T1R3 is specifically expressed on a subset of taste cells in mouse taste buds. Montmayeur *et al*. characterized six amino acid changes that differed between mice which can taste saccharin and non-tasters, and found a perfect correlation between T1r3 alleles and Sac phenotypes in recombinant inbred strains (*Nature Neuroscience* 2001, **4:**492-498). Max *et al*. suggest that the non-taster polymorphism may affect protein glycosylation and interfere with receptor dimerization (*Nature Genetics* 2001, **28:**58-63). Montmayeur *et al*. found that T1R3 expression overlapped with that of the related receptor T1R2, and proposed that the two may form heterodimers. Max *et al*. note that it is fitting that a glycosylation event should determine sensitivity to sweetness and predict that these results will help identify novel sweeteners.

References

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