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Receptor guanylyl cyclases in mammalian olfaction: from genes to function

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The contributions of guanylyl cyclases to sensory signaling in the olfactory system have been unclear. Recently, studies of a specialized subpopulation of olfactory sensory neurons (OSNs) located in the main olfactory epithelium have provided important insights into the neuronal function of one receptor guanylyl cyclase, GC-D. Gene-targeted mice expressing reporters such as β-galactosidase and green fluorescent protein in OSNs that normally express GC-D have allowed investigators to identify these neurons *in situ*, facilitating anatomical and physiological studies of this sparse neuronal population. The specific perturbation of GC-D function *in vivo* has helped to resolve the role of this guanylyl cyclase in the transduction of olfactory stimuli. Similar approaches could be useful for the study of the orphan receptor GC-G, which is expressed in another distinct subpopulation of sensory neurons located in the Grueneberg ganglion. This lecture will discuss the key findings that have reinvigorated the study of guanylyl cyclase function in the olfactory system.

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