Odor coding in mammals is more complex than previously thought

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A new study in the *Journal of General Physiology* (JGP) shows that the contribution of odorant receptors (ORs) to olfactory response in mammals is much more complex than previously thought, with important consequences for odorant encoding and information transfer about odorants to the brain. The study appears online on October 25.

ORs, which provide a system for mammals to discriminate between many different odors, form a large, diverse group of G protein–coupled receptors corresponding to around 1,000 functionally distinct receptors in rodents and 350 in humans. Besides providing odorant specificity to olfactory receptor neurons (ORNs) and contributing to ORN axon targeting, little is understood about the OR contribution to olfactory response.

Johannes Reisert, from the Monell Chemical Senses Center in Philadelphia, now demonstrates that different odorant receptors have varying degrees of basal activity, which drives receptor current fluctuations and basal action potential firing. This basal activity can be suppressed by odorants functioning as inverse agonists. Furthermore, odorant-stimulated olfactory receptor neurons expressing different odorant receptors can have strikingly different response patterns in the later phases of prolonged stimulation.

Thus, basal activity differences, inhibitory antagonism, and late-phase response patterns may contribute heretofore unsuspected information used by the olfactory system in categorizing odorants.

More information: Reisert, J. 2010. *J. Gen. Physiol.* doi:10.1085/jgp.201010528