Abstract for October 30, 2007 Odor Forum Presentation

"Chemical & Psychological Dimensions of the Sense of Smell."

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A variety of notions abound regarding the sense of smell. The following conclusions have a basis in experimental fact:

1. In humans, the sense of smell encompasses at least two separate responses: pungency (which passes via the trigeminal nerve) and odor (which passes via the olfactory bulb of the brain) [1];

2. Sensitivity to odors is very keen and has a remarkable dynamic range, but olfactory response also exhibits adaptation, which (at least in part) results from signal processing in the brain. [2]

3. Olfactory reception involves the binding of volatile molecules to protein binding sites on the surface of receptor neurons, some of which become attached via covalent bonding. [3]

4. Humans (as well as other mammals) can, in some cases, differentiate molecules that are nonsuperimposable mirror images of one another. [4]

5. Human responses and evaluations of odor quality are highly suggestible and can often depend on emotional state. [5]

References

[1] M.H. Abraham, R. Sánchez-Moreno, J.E. Cometto-Muñiz, W.S. Cain, Chemical Senses 2007, 32, 711-715.
[2] H. Eichenbaum, T.H. Morton, H. Potter, S. Corkin, Brain 1983, 106, 459-472.
[3] T.H. Morton in Of Molecules and Mind (N. Bhushan and S. Rosenfeld, eds), Oxford University Press, Oxford, 2000, pp 251-272, and references therein.
[4] D. Joshi, M. Völkl, G.M. Shepherd, M. Laska, Chemical Senses 2006, 31, 655-664.
[5] O. Pollatos, R. Kopietz, J. Linn, J. Albrecht, V. Sakar, A. Anzinger, R. Schandry, M. Wiesmann Chemical Senses 2007, 32, 583-589.