

SCIENCE & INDUSTRY

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Main Attraction

The search for human pheromones continues.

By Steve Herman

*For every complex question,
there is a simple answer, and it's wrong.
—H.L. Mencken*

Everyone knows the story of the two fruit flies. Separated by 700 miles, the female releases a single molecule of pheromone. The male fruit fly instantly goes crazy with desire and flies directly to the female with only one motivation. Upon meeting, they mate with as much passion as two fruit flies can muster. If only we could discover human pheromones...

Humans seem to be fundamentally different from fruit flies where mating habits are involved, but the quest for pheromones has never been more intense¹. Pheromones work through a different receptor mechanism than odors: Both are part of a more generalized system called chemoreception. Chemoreception embraces all the systems used by an organism to sense chemicals in the environment.

Chemoreception in humans consists of the olfactory system, the vomeronasal organ (VNO or Jacobson's Organ), and the trigeminal nerve. The first two are shown in Figure 1. The trigeminal nerve is a network spreading over the front of the skull, the tongue, and into the teeth. The trigeminal nerve is a hazardous chemical warning system, alerting

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us to the presence of ammonium hydroxide, making tears when we cut onions, or reporting on the progress the dentist is making while drilling our teeth.

Human response to airborne chemicals is complex. Technically out of bounds is aromatherapy, which relies on massage or ingestion for action, and allegedly places the active ingredients in the bloodstream. Aromascience deals with temporary effects on physical, emotional, or intellectual performance caused by aroma chemicals triggering the olfactory system. It can be difficult to clearly separate the realm of aromascience from that of pheromones, and similarly difficult to clearly define the functional boundary between the olfactory system and the VNO.

Pheromones are a subcategory of semiochemicals. Semiochemistry is the study of chemical signaling between organisms. Pheromones evoke a response in individuals of the same species. Some pheromones attract mates, but aggregation pheromones summon predators to a palatable meal. When under attack, victims can emit alarm pheromones to warn others. A kairomone is a substance emitted by one species to evoke a beneficial response in another species. The chess strategy of chemical signaling leads to a complex interaction when a caterpillar attacks a cotton plant: The cotton plant releases a volatile compound to attract a wasp, a natural enemy of the caterpillar.

The pheromones currently used in most perfumes making sexual-attractant claims are androstenone (Figure 2) and androstenal. Critics refer to these as "pig pheromones." Male pigs do indeed dig for truffles seeking a female, since the female pig and truffle release the same chemical. These pheromones are present in human perspiration, but commercial products incorporating

them use synthetic versions. The individual ability to smell these materials varies, but it is certainly not the odor but the unconscious response to the chemicals that is critical.

Copulins are human pheromones found in vaginal secretions. Copulins were first isolated in female Rhesus monkeys, and are composed of a mixture of C2-C5 aliphatic acids. Recent work by Astrid Jutte, of the Ludwig Boltzmann Institute for Urban Ethology in Vienna, indicates the copulin blend changes during the menstrual cycle and can send a specific signal to males during ovulation². The less attractive the woman, the more she gains from the signal, thus increasing her chances of becoming fertilized. Copulins are an ingredient of DateMate Fm³, intended to help females attract males.

Ruysch (a Dutch military doctor) discovered the VNO in 1703. The organ was named for Ludwig Levin Jacobson. Jacobson's Organ was noted in an 1811 publication about a snake with unusual pits in its palate, not for any observation in humans. The recognition of the human VNO took a giant step backward when a comment appeared in a standard anatomical textbook⁴, which stated concerning Jacobson's organ and the related nerve: "They are not present in adult man. In human development, these structures are merely ontogenetic signs of the persistence of phylogenetic structures and are without function." Counterbalancing this statement, there has been a steady accumulation of evidence indicating the presence of the VNO in most adult humans.

Volmeropherin is the term used by Berliner for chemicals that trigger the VNO. Despite several patents and publications, it is not clear if a functioning mechanism exists

FIGURE 1 Chemoreception Anatomy

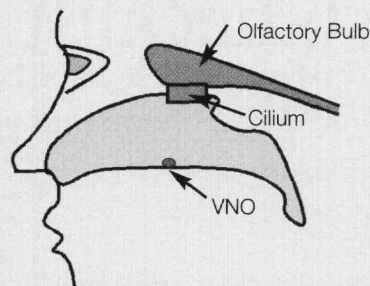
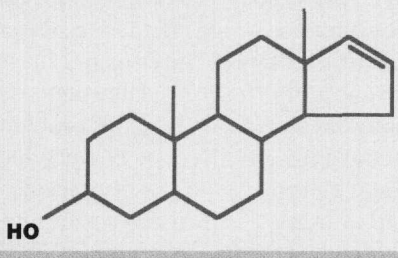


FIGURE 2 Androstenone (5 α -androst-16-en-3 α -ol)



for the human VNO. There has been no discovery of a clearly defined nerve that can transmit a signal from the VNO to the brain. There are many published papers on the potential activity of stimuli on the VNO, but none in peer-reviewed journals.

Back to the pig, whose response to pheromones is unquestioned: K.M. Dorries⁵ blocked the working VNO and still obtained a pheromonal response. Clearly, the pig olfactory system can perform the same signalling task as the VNO. The fruit flies, whose passion is excited by semiochemicals, have no VNO.

Despite all the research and published data, no conclusions are possible on pheromones or Jacobson's Organ. Pheromones are clearly not the determining factor in human mating, but humans certainly exhibit influences from semiochemicals. Anyone interested in better understanding the power of scents can do no better than reading Patrick Suskind's "Perfume, The Story of a Murderer."⁶ It is fictional—the tale of Jean-Baptiste Grenouille, the world's greatest perfumer. Grenouille creates scents that give him power over his fellow man, made from an ingredient...well, it's in the book. ■

References

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