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For Gay Men, an Attraction to a Different Kind of Scent

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Using a brain imaging technique, Swedish researchers have shown that homosexual and heterosexual men respond differently to two odors that may be involved in sexual arousal, and that the gay men respond in the same way as women.

The new research may open the way to studying human pheromones, as well as the biological basis of sexual preference. Pheromones, chemicals emitted by one individual to evoke some behavior in another of the same species, are known to govern sexual activity in animals, but experts differ as to what role, if any, they play in making humans sexually attractive to one another.

The new research, which supports the existence of human pheromones, [is reported in today's issue of The Proceedings of the National Academy of Sciences](#) by Dr. Ivanka Savic and colleagues at the Karolinska Institute in Stockholm.

The two chemicals in the study were a testosterone derivative produced in men's sweat and an estrogen-like compound in women's urine, both of which have long been suspected of being pheromones.

Most odors cause specific smell-related regions of the human brain to light up when visualized by a form of brain imaging that tracks blood flow in the brain and therefore, by inference, sites where neurons are active. Several years ago, Dr. Savic and colleagues showed that the two chemicals activated the brain in a quite different way from ordinary

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scents.

The estrogen-like compound, though it activated the usual smell-related regions in women, lighted up the hypothalamus in men. This is a region in the central base of the brain that governs sexual behavior and, through its control of the pituitary gland lying just beneath it, the hormonal state of the body.

The male sweat chemical, on the other hand, did just the opposite; it activated mostly the hypothalamus in women and the smell-related regions in men. The two chemicals seemed to be leading a double life, playing the role of odor with one sex and of pheromone with another.

The Swedish researchers have now repeated the experiment but with the addition of gay men as a third group. The gay men responded to the two chemicals in the same way as did women, Dr. Savic reports, as if the hypothalamus's response is determined not by biological sex but by the owner's sexual orientation.

Dr. Savic said that she had also studied gay women, but that the data were "somewhat complicated" and not yet ready for publication.

The finding is similar to a report in 1991 by Dr. Simon LeVay that a small region of the hypothalamus is twice as large in straight men as in women or gay men. The brain scanning technique used by the Swedish researchers lacks the resolution to see the region studied by Dr. LeVay, which is a mere millimeter or so across. But both findings suggest that the hypothalamus is organized in a way related to sexual orientation.

The new finding, if confirmed, would break ground in two important directions, those of human pheromones and human sexuality.

Mice are known to influence each other's sexual behavior through emission of chemicals that act like hormones on the recipient's brain and so are known as pheromones. Hopes by the fragrance industry, among others, of finding human pheromones were dashed several years ago when it emerged that a tiny structure in the nose through which mice detect many pheromones, the vomeronasal organ, is largely inactive in humans, having lost its nervous connection with the brain.

Researchers interpreted that to mean that humans, as they evolved to rely on sight more than smell, had no need of the primitive cues that pass for sexual attractiveness in mice. But

a role for human pheromones could not be ruled out, especially in light of findings that women living or working together tend to synchronize their menstrual cycles.

Some researchers see Dr. Savic's work as strong evidence in favor of human pheromones. "The question of whether human pheromones exist has been answered. They do," wrote the authors of a commentary in *Neuron* about Dr. Savic's report of 2001.

Dr. Catherine Dulac, a Harvard University biologist who studies pheromones in mice, said that if a chemical modified the function of the hypothalamus, that might be enough to regard it as a pheromone. She said the Swedish study was extremely interesting, even though "humans are a terrible experimental subject." She noted, however, that the researchers used a far higher dose of the armpit chemical than anyone would be exposed to in normal life.

If human pheromones do exist, Dr. Savic's approach may allow insights into how the brain is organized not just for sexual orientation but also for sexuality in general.

"The big question is not where homosexuality comes from, but where does sexuality come from," said Dr. Dean Hamer, a geneticist at the National Institutes of Health.

The different pattern of activity that Dr. Savic sees in the brains of gay men could be either a cause of their sexual orientation or an effect of it. If sexual orientation has a genetic cause, or is influenced by hormones in the womb or at puberty, then the neurons in the hypothalamus could wire themselves up in a way that permanently shapes which sex a person is attracted to.

Alternatively, Dr. Savic's finding could be just a consequence of straight and gay men's using their brain in different ways.

"We cannot tell if the different pattern is cause or effect," Dr. Savic said. "The study does not give any answer to these crucial questions."

But the technique might provide an answer, Dr. Hamer noted, if it were applied to people of different ages to see when in life the different pattern of response developed.

Dr. LeVay said he believed from animal experiments that the size differences in the hypothalamic region he had studied arose before birth, perhaps in response to differences in the circulating level of sex hormones. Both his finding and Dr. Savic's suggest that the hypothalamus is specifically

organized in relation to sexual orientation, he said.

Some researchers believe there is likely to be a genetic component of homosexuality because of its concordance among twins. The occurrence of male homosexuality in both members of a twin pair is 22 percent in nonidentical twins but rises to 52 percent in identical twins.

Gay men have fewer children, meaning that in Darwinian terms, any genetic variant that promotes homosexuality should be quickly eliminated from the population. Dr. Hamer believes that such genes may nevertheless persist because, although in men they reduce the number of descendants, in women they act to increase fertility.

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