Do Human Pheromones Exist?

**Despite the prevalence of pheromone products on the market, substantial evidence that they can induce sexual attraction is lacking.**

By Diana Kwon | January 23, 2018

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earch for “pheromones products” on the internet, and dozens of sprays and perfume additives will appear—many claiming to be able to increase your attractiveness to the opposite sex. Some companies, such as the Athena Institute, which, according to its founder, [Winnifred Cutler](https://www.athenainstitute.com/index.html), published its 108th consecutive ad in *The* *Atlantic* this month, assert that scientific studies back up their claims.

While there have been several experiments examining the effects of compounds extracted from people’s armpits, much of the data on sex-related behaviors, *The Scientist* has found, go back more than a decade and were met then—and still now—with skepticism from pheromone researchers. “I am not compelled by any studies that are out there that say there is an active steroid component from the underarm that causes [sexual attraction],” says [George Preti](https://www.monell.org/faculty/people/preti), an organic chemist at the Monell Chemical Senses Center in Philadelphia who conducted some of the early human pheromone trials.

The problem with [pheromone] companies is not specific to them. It’s a much more general question about claims made without good evidence.

—Tristram Wyatt, Oxford University

Within the scientific community, pheromones are broadly defined as chemical signals released by an animal that induce specific effects on other members of the same species. Although these substances are typically associated with sexual attraction, researchers have found they can have a broader range of influence, such as prompting aggression or modifying parental behaviors.

While pheromones are well-defined among other members of the animal kingdom, the presence of such molecules in humans remains controversial. “I still have an open mind about whether human pheromones exist,” says [Ron Yu](https://www.stowers.org/faculty/yu-lab), an investigator at the Stowers Institute for Medical Research who studies rodent pheromones. “But I just don’t find any of the published studies convincing enough.”

Cutler disagrees. There is robust scientific evidence, she argues, for the Athena Institute’s [pheromone cosmetic fragrance additives](https://www.athenainstitute.com/cart/products.htm#/category/uid-pheromones/pheromones), which are sold to both men and women and cost approximately $90 per two- to four-ounce vial. “We at Athena, as well as independent researchers, have tested the efficacy of Athena’s pheromones as sexual attractants using double-blind, placebo-controlled protocols,” she tells *The Scientist*.

The human pheromone experiments

In 1986, Cutler and her colleagues published a [pair](https://www.ncbi.nlm.nih.gov/pubmed/3793027) [of studies](https://www.ncbi.nlm.nih.gov/pubmed/3793028) in *Hormones and Behavior* that reported that both male and female armpit secretions could shift women’s menstrual cycles. These findings were widely covered by the press—[*The Washington Post*](https://www.washingtonpost.com/archive/politics/1986/11/18/pheromones-discovered-in-humans/7525a24c-b822-425c-9a4c-ecfad96d830a/?utm_term=.3c1edbc5406e)*,* for example, ran a story titled, “Pheromones Discovered in Humans,” which stated that the team was the first to establish the existence of pheromones in people. The reporter did note, however, that “[t]he human pheromones are not sex attractants, nor do they act almost immediately as animal pheromones do. Instead, the human pheromones act over a period of weeks or months to alter the timing of women’s menstrual cycles.”

Around the same time, Cutler established the Athena Institute and, a few years later, she created two trademarked pheromone products, Athena Pheromone 10:13 for women and Athena Pheromone 10X for men. These formulations, which Cutler says are synthesized copies of chemical substances isolated from armpit extracts, were tested in three published, double-blind, placebo-controlled investigations: the effect of the latter was [tested](https://www.ncbi.nlm.nih.gov/pubmed/9494686) in 38 men by Cutler and her colleagues, and the former was examined in studies by two teams of independent researchers. One study included 36 [female university students](https://www.ncbi.nlm.nih.gov/pubmed/11897264) and the other 44 [postmenopausal women](https://www.ncbi.nlm.nih.gov/pubmed/15765277). All three papers reported that individuals who received the pheromone formulation reported increased frequencies of sexual behaviors, including kissing, formal dates, and sexual intercourse.

Despite what appeared to be promising results, Preti was skeptical. “I’m not excited by this paper and I’m wary of this mystery chemical,” he told [*New Scientist*](https://www.newscientist.com/article/dn2068-pheromone-triples-womens-sexual-success/) in a 2002 story about the study on female university students. Preti, who coauthored both 1986 papers about the effects of armpit extracts on menstrual cycles with Cutler, still expresses that doubt today. Without knowing what the compounds are, he tells *The Scientist*, scientists cannot repeat these experiments to validate their effects*.*

When asked about her pheromone formulas, Cutler says that her products were carefully selected from human underarm extracts, “based on my analysis of a world of literature that I do not let my competitors know about.”

Other issues associated with these studies, according to Yu, are the relatively small sample sizes and their reliance on self-reported behaviors. As a result, he says, “I don't think [these studies] are powerful enough to draw a solid solution.”

The hunt for human pheromones

In the literature, there are four compounds that are commonly cited as potential human sexual attractant pheromones, androstenone, androstenol, androstadienone, and estratetraenol.

Despite their prevalence in scientific studies and consumer products, [Tristram Wyatt](https://www.zoo.ox.ac.uk/people/dr-tristram-wyatt), a zoologist at the University of Oxford, argued in a 2015 [*Proceedings of the Royal Society B*](http://rspb.royalsocietypublishing.org/content/282/1804/20142994.long) paper that there was no scientific basis for claiming these molecules were pheromones at all. Androstenone and androstenol, he says, were proposed simply as a matter of coincidence, when researchers discovered molecules in the human armpit that were known to act as pheromones among pigs. Subsequent studies were not able to provide sufficient proof that these compounds influence human behavior.

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Androstadienone and estratetraenol have an unusual origin story. They were first proposed by the pheromone company [EROX](http://erox.com/) in the early 1990s. “No evidence of how they found these molecules and chose them out of all the potential hundreds was ever published,” Wyatt tells *The Scientist*. Still, many studies have utilized these molecules. As recently as 2014, a group of researchers published a study in [*Current Biology*](http://www.cell.com/current-biology/fulltext/S0960-9822%2814%2900327-3), reporting that these molecules could convey masculinity or femininity to members of the opposite sex. Last year, another team contradicted these results in a study published in [*Royal Society Open Science*](http://rsos.royalsocietypublishing.org/content/4/3/160831).

“The problem with [pheromone] companies is not specific to them,” Wyatt says. “It’s a much more general question about claims made without good evidence.”

There is, however, more convincing evidence of human pheromones that are not involved in sexual attraction, according to Preti—for example, compounds that modulate menstrual cycles or [hormone release](https://www.ncbi.nlm.nih.gov/pubmed/12606409).

Scientists have also [observed](http://journals.plos.org/plosone/article?id=10.1371/journal.pone.0007579) that a secretion from areolar glands on a lactating mother’s nipples will induce a suckling response in an infant, even if the child is not her own. “If it should turn out that the preliminary observations of the pheromone in babies is correct, and the molecules could be identified, that would give greater confidence for researchers to start serious study of possible human pheromones in a sexual context,” Wyatt tells *The Scientist*. “But it’s perfectly possible that pheromones are not involved in human sexual behavior—we are complex animals, and other cues and signals may have evolved to take their place.”

As for pheromone products, the main active ingredient in them is likely “hope,” Wyatt says. “The placebo effect is strong. If you have spent $50 on something to add to your perfume, you might go out to the bar with greater confidence, and that’s how an effect by individual consumers could be realized—but it’s not because of anything in the products.”

See “[A Pheromone by Any Other Name](https://www.the-scientist.com/?articles.view/articleNo/37631/title/A-Pheromone-by-Any-Other-Name/)”

*Update (January 24): The 2014 study on androstadienone and estratetraenol was published in* Current Biology*, not* Cell*. The Scientist regrets the error.*