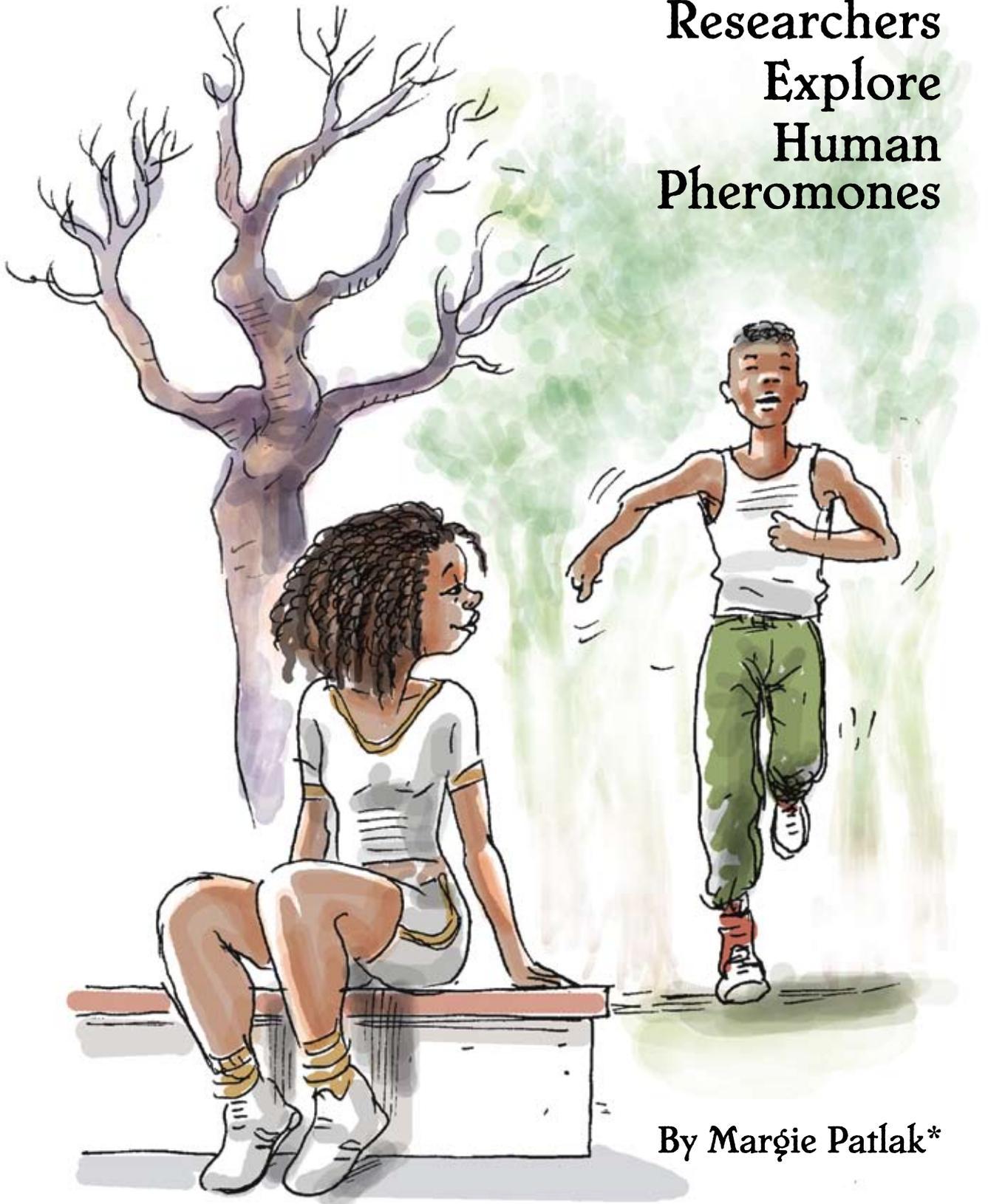


# The Scent of Another

Researchers  
Explore  
Human  
Pheromones



By Marjé Patlak\*

It's well known that pheromones have marked endocrine effects in many animals, prompting both sex and reproduction. But until recently, most experts didn't believe that humans could respond hormonally to a scent because they lack a functioning vomeronasal organ, used by other mammals to sniff out pheromones. That skepticism about human pheromones is now changing, thanks to the recent discovery of another pheromone detection system in the nose and a number of well-controlled studies suggesting that sexually charged scents released by people can subconsciously affect others. Human pheromones may not be something to sniff at after all.

"The field has exploded in the last 2 or 3 years, with people starting to investigate human pheromones in a methodical way using more advanced scientific tools," says Johan N. Lundström, Ph.D., of Monell Chemical Senses Center in Philadelphia, Penn. "Almost everyone agrees now, there is something hidden within our body odors that, when it's picked up by someone else, evokes some reaction."

## The Nose Knows

The new shift in thinking about pheromones began a few years ago when Nobel Laureate Linda B. Buck, Ph.D., of the Fred Hutchinson Cancer Research Center in Seattle, Wash., reported the discovery of a new group of odor receptors in the mouse. Although these receptors are embedded in the lining of the nose and not within the vomeronasal organ, they can still detect pheromones, she showed. And they are functional in the human nose.

Other researchers then found a neuronal pathway in mice that goes from the nose to luteinizing hormone-releasing hormone (LHRH)-secreting neurons in the brain. This pathway also did not pass through the vomeronasal organ. When researchers shut down odor detection in parts of the nose other than the vomeronasal organ, male mice stopped mating.

All these findings suggest that humans might have the anatomical apparatus required to respond hormonally to the scent of others. Focusing on humans, scientists George Petri, Ph.D., and his colleagues at the Monell Center found that, compared with a control scent, compounds emitted and collected from men's armpits affected LHRH blood levels and improved the mood of women who sniffed them. More recently, Claire Wyart, Ph.D., at the University of California in Berkeley, and her colleagues, found that smelling androstadienone, a derivative of testosterone found in high concentration in male armpit sweat, fostered greater sexual arousal and boosted saliva cortisol levels in women compared with smelling a control scent.<sup>1</sup>

## Making Sexual Scents

There is even evidence that some of these scent effects vary according to sexual orientation. Brain imaging studies by Ivanka Savic, M.D., Ph.D., and her colleagues at the Karolinska Institute in Stockholm, Sweden, showed that women and homosexual men who sniff androstadienone experience significantly boosted activity in the anterior hypothalamus.<sup>2</sup> This brain region determines mate choice and sexual

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behavior, animal studies have found. In contrast, the same region in heterosexual men stayed dark after they smelled androstadienone, although it lit up when the men smelled estratetraenol, an estrogen-like counterpart to androstadienone found in high concentrations in women's urine.

Some reactions came to such a low dose of the tested odor that participants could not consciously smell it. Indeed, subconscious processing of pheromones may be the norm, suggests Dr. Lundström. He had women smell the body odors embedded in armpit pads of shirts worn by their sisters or their close female friends, and then asked them to distinguish the two.<sup>3</sup> Although most expressed frustration at this seemingly impossible task and claimed they were only guessing, they "guessed" correctly nearly 8 out of 9 tries. "It's really amazing," he says. "People are better at picking out kin odors than at picking out a strong odor, like the scent of an apple, among other odors."

Brain scans of the women as they smelled their sisters' armpit pads revealed an activity pattern different from that seen when they were smelling pads from their friends. And neither sniffing their sisters' pads nor those of long-time friends prompted the same brain activity as sniffing an ordinary scent, such as a mixture of spices they believed was a natural body odor.

## Effective Armpits

These findings suggest that humans, like other animals, have a kin-detection system that operates outside conscious awareness by processing signals hidden in the unique bouquet of odors that individuals emit, according to Dr. Lundström. The same genetics that determines our distinct immunological fingerprint (human leukocyte antigen or HLA) also determines our unique "odorprint." In this way, perhaps, subliminal smells can guide sexual preferences and presumably prevent inbreeding—what Dr. Lundström calls the "armpit effect."

This notion sounds far-fetched, but some experimental evidence supports it. For example, one study found that women prefer the smell of t-shirts that have been worn by men whose HLA genes differ from their own. Another study found that as the number of HLA alleles shared by couples increased, women's sexual responsiveness to their partners decreased and their infidelities increased. A recent review,<sup>4</sup> however, showed that there are numerous conflicting findings as to whether people are more likely to choose mates with odorprints/HLA types that are dissimilar to their own. The authors noted that the choice of a long-term mate is complex and includes factors such as cultural and ethnic restrictions on mate choice, and not just pheromone-driven urges.

## Led Around by the Nose?

This begs the question—how big an effect can pheromones really have in people? Are we really slaves to the subliminal odors that surround us, or do higher brain commands out-shout the chatter of these chemical signals? “I don’t believe these molecules are going to trigger behavior in humans,” says Dr. Wyart, the researcher who showed that an odor molecule can affect cortisol production and mood. “But I believe there is something there that isn’t a very strong effect, but is interesting to understand.”

Dr. Lundström thinks that although human odors used for kin detection might have a significant group effect, the impact at the individual level is likely to be minor. “It’s true that body odor does aid us in picking a partner, but my guess is that its influence on an individual’s choice is only 5%–10%.” And he advises that we continue to take showers and use deodorants, because they won’t affect the production or detection of our chemical odor signals, and probably will go farther toward making us more attractive to others than our own pheromones.

## Pheromone-Based Nasal Sprays

Although companies may not ever be able to put human pheromones to work in aftershaves or perfumes, research on

these chemical signals might aid pharmaceutical firms trying to make nasal sprays of their drugs. Dr. Lundström points out that the biggest application of human pheromones might be using them, or similar chemicals, to shepherd anti-depressants and other psychopharmaceuticals into the brain. “We know that the olfactory nerve can transport compounds directly into the brain, so this provides a golden opportunity for surpassing the blood–brain barrier and using lower doses that don’t have side effects,” he says.

Now wouldn’t it be ironic if a pheromone-based nasal spray for antidepressants relieves people of the loss of libido they often experience on these medications... ■

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