**Of Mice And Men**

The empirical proof of odor's effect on human sexual attraction came out of left field. Medical geneticists studying inheritance rules for the immune system, not smell physiologists, made a series of crucial discoveries that nobody believed were relevant to human mate preferences—at first.

Research on tissue rejection in organ transplant surgery patients led to the discovery that the body recognizes an alien presence (whether a virus or a surgically implanted kidney) because the body's own cells are coated with proteins that our immune system recognizes as "self." But the immune system gets a lot more subtle about recognizing "nonself" intruders. It can recognize specific types of disease organisms, attach protein identifiers to them, and muster antibodies designed specifically for destroying that particular disease. And it can "remember" that particular invader years later, sending out specific antibodies to it. A segment of our DNA called the major histocompatibility complex (MHC) codes for some of these disease-detecting structures, which function as the immune system's eyes. When a disease is recognized, the immune system's teeth—the killer T cells—are alerted, and they swarm the intruders, smothering them with destructive enzymes.

Unlike many [genes](https://www.psychologytoday.com/basics/genetics), which have one or two alternative versions (like the genes that code for attached or unattached ear lobes), MHC genes have dozens of alternatives. And unlike earlobe genes, in which the version inherited from one [parent](https://www.psychologytoday.com/basics/parenting) dominates so that the version inherited from the other parent is not expressed, MHC genes are "co-dominant." This means that if a lab mouse inherits a version of an MHC gene for resistance to Disease A from its mother and a version lending resistance to Disease B from its father, that mouse will be able to resist both diseases.

When a female mouse is offered two suitors in mate choice trials, she inevitably chooses to mate with the one whose MHC genes least overlap with her own. It turns out that female mice evaluate males' MHC profile by sniffing their urine. The immune system creates scented proteins that are unique to every version of each MHC gene. These immune by-products are excreted from the body with other used-up chemicals, allowing a discerning female to sniff out exactly how closely related to her that other mouse is. By choosing MHC-dissimilar mates, a female mouse makes sure that she doesn't inbreed. She also secures a survival advantage for her offspring by assuring that they will have a wider range of disease resistance than they would had she mated with her brother.

It's not that she seeks out diverse MHC genes for her young on purpose, of course. Ancestral females who preferred the smell of closely related males were simply outrun through evolutionary time by females who preferred the scent of unrelated sires.

**Can You Smell That Smell?**

Since humans show little interest in one another's urine, few researchers thought that the story of MHC in rodent attraction could shed light on human interactions. But then someone made an eyebrow-raising discovery: Human volunteers can discriminate between mice that differ genetically only in their MHC. If human noses could detect small differences in the immune systems of mice (mice!) by giving the critters a sniff, excited researchers realized, we may well be able to detect the aromatic by-products of the immune system in human body odor as well!

A team led by Claus Wedekind at the University of Bern in Switzerland decided to see whether MHC differences in men's apocrine gland secretions affected women's ratings on male smells. The team recruited just under 100 college students. Males and females were sought from different schools, to reduce the chances that they knew each other. The men were given untreated cotton T-shirts to wear as they slept alone for two consecutive nights. They were told not to eat spicy foods; not to use deodorants, cologne, or perfumed soaps; and to avoid [smoking](https://www.psychologytoday.com/basics/smoking), drinking, and [sex](https://www.psychologytoday.com/basics/sex) during the two-day experiment. During the day, their sweaty shirts were kept in sealed plastic containers.

And then came the big smell test. For two weeks prior, women had used a nasal spray to protect the delicate mucous membranes lining the nose. Around the time they were ovulating (when their sense of smell is enhanced), the women were put alone in a room and presented with boxes containing the male volunteers' shirts. First they sniffed a new, unworn shirt to control for the scent of the shirts themselves. Then the women were asked to rate each man's shirt for "sexiness," "pleasantness," and "intensity of smell."

It was found, by Wedekind and his team, that how women rate a man's body odor pleasantness and sexiness depends upon how much of their MHC profile is shared. Overall, women prefer those scents exuded by men whose MHC profiles varied the most from their own. Hence, any given man's odor could be pleasingly alluring to one woman, yet an offensive turnoff to another.

Raters said that the smells they preferred reminded them of current or ex-lovers about twice as often as did the smells of men who have MHC profiles similar to their own, suggesting that smell had played a role in past decisions about who to date. MHC-similar men's smells were more often described as being like a brother's or father's body odor... as would be expected if the components of smell being rated are MHC determined.

Somewhat more surprising is that women's evaluations of body odor intensities did not differ between MHC-similar and MHC-dissimilar men. Body scent for MHC-dissimilar men was rated as less sexy and less pleasant the stronger it was, but intensity did not affect the women's already low ratings for MHC-similar men's smells.

That strong odor turned raters off even with MHC-dissimilar men may be due to the fact odor is a useful indicator of disease. From diabetes to viral infection to schizophrenia, unusually sweet or strong body odors are a warning cue that ancestral females in search of good genes for their offspring may have been designed to heed. (In the case of schizophrenia, the issue is confounded—while some [schizophrenics](https://www.psychologytoday.com/conditions/schizophrenia) do actually have an unusually sweet smell, many suffer from delusions of foul smells emanating from their bodies.)

Nobody yet knows what roles MHC may play in male evaluations of female attractiveness. Females' superior sense of smell, however, may well be due to their need to more carefully evaluate a potential mates merits—a poor mate choice for male ancestors may have meant as little as a few minutes wasted, whereas a human female's mistake could result in a nine-month-long "morning after" and a child unlikely to survive.

Perfumers who really want to provide that sexy allure to their male customers will apparently need to get a genetic fingerprint of the special someone before they can tailor a scent that she will find attractive. But before men contemplate fooling women in this way, they should consider the possible consequences.

<<https://www.psychologytoday.com/articles/200910/the-smell-love>>