



THE SCIENCE OF SCENT IS HELPING US UNDERSTAND EACH OTHER.  
IT MAY SOON EVEN SAVE LIVES

# UNDER OUR NOSES

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Ko-Ichi Shiozawa wafts extracts of various plant oils and resins beneath my nose. “This is balsam fir,” he says. “It’s clean, fresh and green. It gives the impression of extended space.” As a master perfumer for Aveda Corporation, making scents of smells is Shiozawa’s job. In the world of perfume he’s known as a nose. Some might take offense to having their professional identity labeled a body part, but in the trade, to be called *un nez*—or better yet, *un grand nez*, “a great nose”—is the highest compliment.

In his lab, Shiozawa concocts perfumes the way a composer creates music. In fact, the building blocks of his compositions, hundreds of plant-derived essential oils, are also known as notes. He’s particularly proud of a little ditty he likes to call “rosemary mint.”

“I was visiting the island of Corsica, *L’île de Beauté*,” says Shiozawa. “It was full of flowers, herb plants and wild roses. There was a blue sky, a breeze. It was so beautiful, I thought I should sum up my impression in the form of an aroma.” Rosemary mint went on to become one of the company’s signature scents.



# HUMANS ARE EXQUISITELY TUNED TO DETECT ABOUT 10,000 DIFFERENT ODORS

Perfumers have worked this kind of magic since ancient times. The Egyptians believed that pleasant odors came from the sweat and tears of the gods, and would crush and blend seeds, roots and flower petals in search of new fragrances. Scent has the power to stimulate appetite, emotion, sexual attraction and evoke memories like that of Shiozawa's day in Corsica. Humans are exquisitely tuned to detect about 10,000 different odors, which is why we can distinguish roses from burning rubber, lavender from wet dog. Still, scientists are just beginning to unravel the mysteries of scent.

When we think of the sense of smell, we think of the nose. But the nose is just the hardware; a vacuum to suck up odor molecules. The real work of smelling takes place deep within the nasal cavity in a small patch of cells containing around five million neurons called the olfactory epithelium. By delving into our smelling software, Nobel Prize-winning neuroscientists Richard Axel and Linda Buck discovered the genes behind a huge variety of special "receptor" proteins that recognize odorant molecules and allow olfactory neurons to send signals to appropriate parts of the brain.

Humans have 350 functional olfactory receptor genes while mice possess about 1,000. So you'd expect our sense of smell to be lacking compared to other species. Not so, according to Gordon M. Shepherd, a neurobiologist at Yale University's School of Medicine. He cites several studies where humans detect complex odors as well or better than other mammals, including dogs and rats. Not only do our brains process a richer repertoire of smells, but we also have the unique ability to communicate about scent through language. Picture a wine taster taking a whiff of a new Bordeaux, then expounding on its qualities before he's even taken a sip.


Our ability to distinguish one odor from the next was further tested by researchers at the University of Düsseldorf. They wanted to see if humans can recognize the scent of fear. So they put absorbent

cotton pads under the armpits of nervous student volunteers before a university exam. They also collected sweat from the same group as they worked out on exercise bikes. Another group of volunteers then had the delightful job of sniffing the cotton pads as their brains were monitored by an MRI scanner.

While these volunteers could not consciously identify the difference between the anxiety sweat and exercise sweat, their brains told a different story. Panic sweat lit up the regions of the brain that handle emotions, social signals and empathy, demonstrating that we subconsciously detect and react to chemicals released from other people's skin during times of fear or anxiety.

Other researchers are investigating animals' sense of smell with the goal of saving human lives. Yale University molecular biologist John Carlson studies insect olfaction and has one deadly bug in his sights: the *Anopheles* mosquito. This pest indirectly kills more than one million people each year by spreading the parasite that causes malaria in about eight percent of the world's population.

"Many insects find the humans they bite and the plants they destroy through their sense of smell," Carlson says. "The female mosquito, for example, can detect human sweat from 50 meters [about 55 yards] away." Carlson and an international team of scientists hope to turn that sensitivity against the mosquito. "We discovered a large family of receptors that insects use to recognize odors. By understanding how these receptors work, we may be able to come up with new ways of blocking them or activating them, which could be useful in designing new insect repellents or traps."

Despite recent advances like these, we're still far from understanding everything the nose knows. Science still can't fully explain why some odors entice while others repulse. And it can't explain why a scent can so suddenly and powerfully elicit a vivid memory. For Shiozawa and other noses, it doesn't matter how it happens, just that it does. 

## LOVE POTION NO. 9? ■

The role our sense of smell plays in our attraction to one another is one of the most intriguing questions in scent research. The term *pheromone* was coined in 1959 when scientists discovered that female moths looking to mate emit a "come hither" chemical that attracts males. Since then, a variety of animals have been found to use chemical communication for everything from signaling danger to helping each other locate nectar.

While pheromone-based behavior runs wild in the animal kingdom, and the research points toward pheromone communication among humans, the jury is still out. That hasn't stopped some entrepreneurs from attempting to manufacture "appeal in a bottle" by adding synthesized hormones to perfumes and toiletries. Science aside, if a splash of pheromone cologne gives you more confidence, maybe the magic has already happened.

