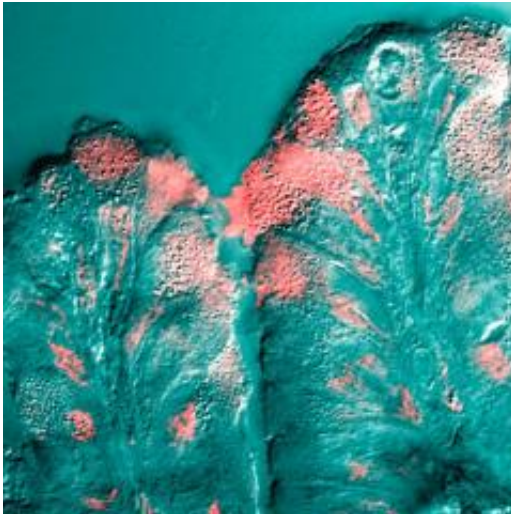


# Mucus in the nose changes perception of smells

December 3 2010, by Lin Edwards

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Mucous cells. Credit: The Path to Digestion Is Paved with Repair. Underwood J, PLoS Biology Vol. 4/9/2006, e307.

(PhysOrg.com) -- A new study in Japan has shown for the first time that enzymes in nasal mucus change the way we perceive smells.

Ayumi Nagashima and Kazushige Touhara of the Applied Biological Chemistry department at the University of Tokyo decided to study the much-neglected nose mucus by extracting tiny amounts of it from mice, adding odorants (smell molecules), and then testing the chemical composition of the mixture.

The scientists found that odorants with chemical groupings such as aldehydes and esters were converted by enzymes in the mucus to acids and alcohols. So, for example, when benzaldehyde (almond smell) was added to the mucus, within five minutes around 80 percent had been converted to the odorless benzoic acid and the subtle scent of benzyl alcohol, which is found in some teas. [Aldehydes](#) and esters are common ingredients of many scents derived from flowers and other plant parts, and are also found in many commercial perfumes.

When the mucus was boiled to inactivate the enzymes the conversions did not occur, and the mice behaved differently when exposed to unconverted odorants. The researchers confirmed this by training mice to earn sugar rewards when they identified the target smell. When the [odorant](#) was treated with an [enzyme](#) inhibitor, the mice could no longer identify the smell to gain the treat. Parts of the brain called glomeruli, which decode signals from the nasal smell receptors, also reacted differently to the converted and unconverted odorants.

The research highlights that nasal mucus plays an important role in the sense of [smell](#) that was previously unknown. It was already understood that mucus was more than just a lubricant and that it was full of proteins and enzymes and may play a role in transporting odorants to the receptors in the nose, but the finding that enzymes in the mucus can change an odorant before it even reaches the receptors is new.

Nasal mucus is produced by the mucous membranes in the nose. It has antiseptic qualities and is important because it protects the cells in the respiratory tract by trapping dust and other foreign particles such as bacteria, fungi and viruses. Around one liter of [mucus](#) is produced each day in the average adult human body.

The paper was published in *The Journal of Neuroscience* on December 1.

**More information:** Enzymatic Conversion of Odorants in Nasal Mucus Affects Olfactory Glomerular Activation Patterns and Odor Perception, Ayumi Nagashima and Kazushige Touhara, *The Journal of Neuroscience*, December 1, 2010, 30(48):16391-16398; [doi:10.1523/JNEUROSCI.2527-10.2010](https://doi.org/10.1523/JNEUROSCI.2527-10.2010)

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