

OLFACTORY HABITUATION

I enter a severely overcrowded tramway... Immediately a myriad of smells assault me: the smell of perfume, those of sweat, food, damp clothes... Several minutes later, I feel that the smells have disappeared. However, the odorous molecules are still there, at approximately the same concentration. What is happening?



In fact, our sense of smell, driven by our brain, possesses a highly developed filter of information: habituation. Unconscious neuronal mechanisms are constantly adjusting the quantity and quality of the information that reaches our awareness. Thus, although our nose is continuously stimulated by olfactory information, the intensity perceived diminishes progressively until it disappears.

But do we become used to all odors in the same fashion? To answer this question, researchers of the CSGA in collaboration with the group of Thomas Hummel (Smell & Taste Clinic, Germany) chose 32 odorous molecules. For each molecule, the researchers asked 55 volunteers to evaluate the olfactory intensity during the continual diffusion of the molecule at a constant concentration. To that end, the volunteers used an original system of a piston onto which they pushed more or less strongly in function of the intensity perceived. The analysis of the curves obtained allowed the identification of molecules with a strong and rapid habituation, molecules that demonstrate a slow and weak habituation (quasi non-existent) and molecules that show an intermediary habituation.

The researchers were next interested by the molecular characteristics of odorants liable to influence habituation. Amongst the parameters studied, small, highly volatile molecules that activate the trigeminal system show the weakest habituation (the trigeminal system, which functions in parallel to the olfactory system, allows us to detect potentially toxic components).

Following on from these first results, work is being pursued to better understand the origin of the mechanism of habituation: is it a peripheral mechanism (at the level of our sense organs) or a central one (at the level of the brain)?

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To know more

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Key words

Habituation, olfaction, odour, smell, odorant, odorous molecule, intensity, perception, activity-structure, sense organ