

Research sheds light on links between memory and smell

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French novelist Marcel Proust's memories started to flow when he tasted a madeleine cake dipped in linden tea, as he had been given as a child.

(Medical Xpress)—Scents and smells can form the basis of some of the most significant memories that humans form in their lives.

A University of Queensland-led international team has boosted understanding of the smell-memory connection, by showing that olfactory memory in honeybees regulates receptors in their antennae.

Bees' antennae function like a human nose, say Queensland Brain Institute scientists Dr Judith Reinhard and Associate Professor Charles Claudianos.

"French novelist Marcel Proust in his novel *Remembrance of Things Past* (also known as *In Search of Lost Time*) described how his childhood memories started to flow when he tasted a madeleine cake dipped in linden tea, as he had been given as a child," Dr Reinhard said.

"Our team found that odour memories trigger recall of associated events, and that long-term odour [memory formation](#) in the brain regulates the [sense](#)

[of smell](#) in the 'nose' via regulating the receptor molecules.

"Preferences for different foods and beverages are linked to our sense of smell, and our research shows that long-term scent memories modify how odours are perceived.

"In a nutshell: our smell experiences shape our preferences."

"The study demonstrates for the first time that the ability to smell different things is experience-dependent and modulated by scent conditioning."

Dr Claudianos said the findings may help explain the wide variability of smell perception in humans and the neurological mechanism underlying the common phenomenon of "acquired taste", where repeated sensory experience with a flavour or aroma leads to perceptual changes.

"This knowledge will provide an enormous insight for understanding food and aroma perception," he said.

"The discovery may also provide a means to detect early problems with memory formation and [memory](#) retrieval in the brain."

Individuals with neurodevelopmental disorders such as autism and schizophrenia, or neurodegenerative disorders such as Alzheimer's and Parkinson's disease often have an altered sense of [smell](#) perception.

More information: Claudianos, C., Lim, J., Young, M., Yan, S., Cristino, A. S., Newcomb, R. D., Gunasekaran, N. and Reinhard, J. (2014), "Odor memories regulate olfactory receptor expression in the sensory periphery." *European Journal of Neuroscience*. doi: 10.1111/ejn.12539

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