Smelling Trouble Is Key to the Human Survival Mechanism

When the central nervous system deems an odor to be dangerous, the brain unconsciously prompts the body to flee.

November 4, 2021 By Jeanette L. Pinnace

If a basket of rotting fish stood next to a table overflowing with fragrant flowers, which would you smell first? The answer is rooted in science that shows that the human brain immediately zeroes in on unpleasant smells because such odors might threaten survival, suggest study findings published in the journal PNAS (Proceedings of the National Academy of Sciences), reports a press release from the Karolinska Institutet.

The olfactory system controls our sense of smell and allows the brain to identify perhaps a trillion different odors, new research proposes. Many of these smells signal dangers, such as spoiled food, that threaten human health and must be avoided.

For the study, researchers at Karolinska Institute conducted three trials to evaluate six different positive and negative smells. After exposing participants to the smells, they measured the electrical activity of the nerve cells in the olfactory bulb. Located on the underside of the front of the brain, this organ processes odors and sends messages to other areas of the brain that manage movement and evasive behavior.

Researchers noted that the bulb reacted precisely and quickly to objectionable odors and flagged the brain's motor cortex directly within about 300 milliseconds.

"The human avoidance response to unpleasant smells associated with danger has long been seen as a conscious cognitive process, but our study shows for the first time that it's unconscious and extremely rapid," said Behzad Iravani, PhD, a postdoctoral researcher in the perception lab at the department of clinical neuroscience at the institute and first author of the investigation.

"The signal causes the person to unconsciously lean back and away from the source of the smell," explained Johan Lundström, PhD, an associate professor at the institute's department of clinical neuroscience and the last study author.

"The results suggest that our sense of smell is important to our ability to detect dangers in our vicinity, and much of this ability is more unconscious than our response to danger mediated by our

senses of vision and hearing," he added.

To learn more about the use of smell tests in research, read "Could Smell and Eye Tests Hold the Key to Alzheimer's Disease Prevention?"
