MONELL CHEMICAL SENSES CENTER
ADVANCING DISCOVERY IN TASTE AND SMELL

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Nasal Congestion: More than Physical Obstruction

Are you sure your nose is plugged?

PHILADELPHIA (October 13, 2011) – Nose feel congested and stuffed up? Scientists from the Monell Center report that the annoying feeling of nasal obstruction is related to the temperature and humidity of inhaled air. The findings suggest that sensory feedback from nasal airflow contributes to the sensation of congestion. This knowledge may help researchers design and test more effective treatments for this familiar symptom of nasal sinus disease.

Nasal sinus disease, usually caused by infection or allergy, is one of the most common medical conditions in the United States, afflicting approximately 33 million people and accounting for over $5.8 billion in healthcare costs annually. Nasal congestion and the associated feeling of obstruction is the symptom that typically causes individuals to seek medical assistance.

However, symptoms of nasal congestion have been difficult to treat effectively because, as many physicians have found, patient reports of congestion often have little relationship to the actual physical obstruction of nasal airflow.

“By establishing that feelings of nasal congestion can be sensory-related, we open doors for more targeted treatment,” said study lead author Kai Zhao, Ph.D., a bioengineer at Monell. “For example, effective treatments may need to include a focus on restoring optimal humidity and temperature in the patient’s nasal airflow.”

In the study, published online in the free-access journal PLoS One, 44 healthy volunteers rated symptoms of nasal congestion after breathing air from three boxes: one containing room air at normal humidity, another containing dry air at room temperature, and the third containing cold air.

The volunteers reported reduced nasal congestion after breathing from both the cold air box and the dry air box as compared with the room air box, with the cold air box decreasing reports of congestion most effectively.

Calculations revealed that humidity also was an important factor, with lower humidity associated with decreased feelings of congestion.

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The authors speculate that temperature and humidity interact as air moves through the nasal cavity to influence nasal cooling. It is this cooling that is then detected by 'cool sensors' inside the nose to influence the feeling of air flow as being either easy or obstructed.

"Someone in the desert, all other things being equal, should feel less congested than someone in the jungle. In the low humidity of the desert, there is more evaporative cooling inside of the nose, such that the temperature of the nasal passages is lower. This leads to a feeling of greater air flow – and less sensation of obstruction." said co-author Bruce Bryant, Ph.D., a sensory scientist at Monell.

Future studies will examine patients reporting nasal obstruction to see if the sensory findings reported here can explain their symptoms, and also explore how sensory factors interact with other predictors of nasal obstruction.

Also contributing to the study were Kara Blacker, Yuehao Luo, and Jianbo Jiang, all of Monell. The research was funded by the National Institute on Deafness and Other Communication Disorders.

The Monell Chemical Senses Center is an independent nonprofit basic research institute based in Philadelphia, Pennsylvania. Monell advances scientific understanding of the mechanisms and functions of taste and smell to benefit human health and well-being. Using an interdisciplinary approach, scientists collaborate in the programmatic areas of sensation and perception; neuroscience and molecular biology; environmental and occupational health; nutrition and appetite; health and well-being; development, aging and regeneration; and chemical ecology and communication. For more information about Monell, visit www.monell.org.

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