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## **Genetic Differences in Sense of Smell Identified Through Asparagus Urine Odor**

PHILADELPHIA (September 28, 2010) – Scientists at the Monell Center have used a well-known example of individual differences to identify a genetic contribution to the sense of smell.

Most people detect a distinct sulfurous odor in their urine shortly after eating asparagus. However, there are some who seemingly do not notice the unpleasant odor.

Up until now, it has been unclear whether this is because these individuals do not produce the odor or because they cannot smell it.

Addressing this mystery from several angles, scientists from the Monell Center first used sophisticated sensory testing techniques to show that both explanations apply: approximately eight percent of the subjects tested did not produce the odorous substance, while six percent were unable to smell the odor. One person both did not produce the odor and was unable to smell it.

Next, DNA samples collected from each subject revealed that the inability to smell asparagus odor was linked to genetic variation within a family of olfactory receptors.

“This is one of only a few examples to date showing genetic differences among humans in their sense of smell,” said study co-author Danielle Reed, Ph.D., a Monell behavioral geneticist. “Specifically, we have learned that changes in an olfactory receptor gene can have a large effect on a person’s ability to smell certain sulfurous compounds. Other such compounds include mercaptan, the chemical used to add odor to natural gas so that people are able to detect it.”

In the study, published online in the journal *Chemical Senses*, a total of 38 subjects each came to the laboratory on two separate occasions. One time they donated urine before and after eating roasted asparagus and the other time before and after eating bread.

The subjects next returned to the laboratory for sensory testing to determine their abilities both to produce and identify asparagus odor. Additional tests evaluated each subject’s ability to smell the odor of rose to make sure that they had a normal sense of smell.

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Results of the study also provide an example of ways in which normal people differ in their metabolism.

“Although seemingly just a curiosity, the individual differences in metabolism could be important in other realms,” said study lead author Marcia Levin Pelchat, Ph.D., a sensory psychologist at Monell. “Additional studies are needed to determine whether the inability to produce the odor is associated with other metabolic traits or disorders.”

Cathy Bykowski and Fujiko Duke also contributed to the research, which was supported by Monell Center institutional funds.

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](http://www.monell.org).

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