

Study shows pregnant mother's diet impacts infant's sense of smell

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A major new study shows that a pregnant mother's diet not only sensitizes the fetus to those smells and flavors, but physically changes the brain directly impacting what the infant eats and drinks in the future.

"This highlights the importance of eating a [healthy diet](#) and refraining from [drinking alcohol](#) during pregnancy and nursing," said Josephine Todrank, PhD, who conducted the two-year study while a visiting scientist at the University of Colorado School of Medicine. "If the mother drinks alcohol, her child may be more attracted to alcohol because the developing fetus "expects" that whatever comes from the mother must be safe. If she eats [healthy food](#), the child will prefer healthy food."

Researchers studying mice found that the pups' [sense of smell](#) is changed by what their mothers eat, teaching them to like the flavors in her diet. At the same time, they found significant changes in the structure of the brain's olfactory glomeruli, which processes smells, because odors in the [amniotic fluid](#) affect how this system develops.

"This is the first study to address the changes in the brain that occur upon steady exposure to flavors in utero and early in postnatal life when the newborn is receiving milk from the mother," said Diego Restrepo, PhD, co-director of the Center for NeuroScience at the University of Colorado School of Medicine and sponsor of the study. "During these periods the pup is exposed to flavors found in the food the mom is eating."

The research, he said, could have important public health implications.

"Many diseases plaguing society involve excess consumption or avoidance of certain kinds of foods," said Restrepo, a professor of cell and developmental biology. "Understanding the factors that determine choice and ingestion, particularly the early factors, is important in designing strategies to enhance the health of the infant, child, and adult."

In her study, Todrank, now a research fellow with collaborator Giora Heth, PhD, at the Institute of Evolution at the University of Haifa, Israel, fed one group of pregnant and nursing mice a bland diet and another a flavored diet. At weaning age, the pups from mothers on the flavored diet had significantly larger glomeruli than those on the bland diet. They also preferred the same flavor their mother ate, while the other pups had no preference.

"Exposure to odor or flavor in the womb elicits the preference but also shapes the brain development," said Todrank, whose work was funded by a grant from the National Institutes of Health and was published Dec. 1, 2010 in the *Proceedings of the Royal Society B*, a major biological research journal.

"From the fetus' point of view, whatever is in the womb is considered "good". If your mother ate it and survived to give birth to you then it was probably safe," she said. "This is a good strategy for a mouse that is foraging for food. It treats those same foods as safe."

Due to the similarities in mammalian development, she said, there is no reason to think that experiments would produce different results in humans.

"What an expectant mother chooses to eat and drink has long-term effects – for better or worse – on her child's sensory anatomy as well his

or her odor memory and food preferences in the future," Todrank said. "It is not yet clear how long these changes and preferences last, but we are currently investigating that question."

Provided by University of Colorado Denver

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