

In utero exposure to diesel exhaust a possible risk factor for obesity

July 19 2012

Pregnant mice exposed to high levels of air pollution gave birth to offspring with a significantly higher rate of obesity and insulin resistance in adulthood than those that were not exposed to air pollution. This effect seemed especially prevalent in male mice, which were heavier regardless of diet. These findings, published online in the *FASEB Journal*, suggests a link between diesel exhaust exposure in utero and bulging waistlines in adulthood.

"It is becoming clearer that our environment profoundly affects our health in ways that are little understood," said Jessica L. Bolton, Ph.D., a researcher involved in the work from the Department of Psychology and Neuroscience at Duke University in Durham, NC. "We believe these data have important implications for [health disparities](#) as a consequence of socioeconomic conditions, in which low income neighborhoods tend to be disproportionately exposed to high levels of pollution, which we hope will inform policy and regulation decisions."

To make this discovery, Bolton and colleagues used two groups of pregnant [female mice](#), one of which was exposed to diesel exhaust during the latter half of pregnancy. The second group was exposed to filtered air for the same time period. The mice lived in specialized chambers for four hours each day breathing polluted air and then were returned to normal housing after these exposures. Prior to birth, some of the fetal brains of the mice from both groups were analyzed to measure [immune proteins](#) and to get a "snap shot" of the [fetal brain](#) immune response to the in utero condition. Once the offspring were adults, they

were placed on either a low-fat diet (10% saturated fat) or a high-fat diet (45% saturated fat). All other nutritional aspects of the diets were identical. Scientists measured food intake, body weight and activity levels before putting the mice on their diets, and then weekly throughout the experiment. At the end of six weeks, metabolic hormones were assessed. They found that males from diesel-exposed moms were heavier than the males from clean air-exposed moms regardless of their diet as adults. In contrast, females from diesel-exposed moms were heavier than control females only if they were fed a high-fat diet as adults, and they never developed signs of [insulin resistance](#).

"If you're pregnant and have a long drive into work, you might think twice about opening the car windows," said Gerald Weissmann, M.D., Editor-in-Chief of the [FASEB Journal](#). "It's already been established that risk factors for obesity (junk food, high fat-high cholesterol diets, etc.) begin as early as the womb. This important study shows that the air a mother breathes is also one of those risk factors."

More information: Jessica L. Bolton, Susan H. Smith, Nicole C. Huff, M. Ian Gilmour, W. Michael Foster, Richard L. Auten, and Staci D. Bilbo. Prenatal air pollution exposure induces neuroinflammation and predisposes offspring to weight gain in adulthood in a sex-specific manner. *FASEB J*, [doi:10.1096/fj.12-210989](https://doi.org/10.1096/fj.12-210989)

Provided by Federation of American Societies for Experimental Biology

Citation: In utero exposure to diesel exhaust a possible risk factor for obesity (2012, July 19) retrieved 25 April 2024 from <https://medicalxpress.com/news/2012-07-utero-exposure-diesel-exhaust-factor.html>

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