

## Expectant moms who smoke could cause abdominal obesity in teens

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(PhysOrg.com) -- Smoking during pregnancy is a known risk factor for a variety of health problems for babies, including low birth weight, respiratory issues and even sudden infant death syndrome (SIDS). A new study, published in the journal *Obesity*, suggests exposure to cigarette smoke in utero may also contribute to abdominal obesity in late adolescence.

“We believe that maternal cigarette smoking during pregnancy plays an important role in the fetal programming of obesity,” says Dr. Zdenka Pausova, a Scientist in the Physiology & Experimental Medicine program at The Hospital for Sick Children (SickKids). “Although we do not know the exact mechanisms, we know that nicotine in cigarette smoke, for example, sets into the baby's body and stays there in higher

quantities and for longer than in the mother's. Animal studies suggest that nicotine given prenatally could influence certain parts of the brain, including those that control how much and what we eat and how well we burn calories. This study provides one more reason for expectant mothers to avoid smoking.”

The research was conducted by a team of scientists from the University of Nottingham, the University of Toronto, McGill University, the Université de Montréal and the Université du Québec à Chicoutimi. Co-principal investigators of the study are Pausova, former principal research fellow at the University of Nottingham, and Dr. Tomas Paus, who is now Senior Scientist at Baycrest.

The researchers targeted adolescence because this is a period when adult distribution of [body fat](#) is established. They investigated whether exposure to cigarette smoke in the womb would stimulate the accumulation of abdominal fat during late puberty, when boys and girls typically experience rapid weight gain.

The scientists studied more than 500 teens between the ages of 12 and 18, of which half were exposed to maternal cigarette smoke. Those who were exposed weighed about 300 grams less at birth than their peers, were breastfed for a shorter period of time and were exposed more frequently to secondhand smoke in utero.

Magnetic resonance imaging (MRI) was used to measure two types of fat: subcutaneous (found directly under the skin) and intra-abdominal (surrounding internal organs). The teens were interviewed by a certified nutritionist to track their daily energy and nutrient intake and were asked to complete questionnaires about their physical activity.

The scientists measured adiposity (the accumulation of fat) based on the MRI scans. They found that in early puberty, there was no difference in

body weight, total body fat, subcutaneous or intra-abdominal fat between those teens who were exposed to smoke in the womb and those who were not. In late puberty, however, the exposed teens showed significantly higher quantities of subcutaneous fat (26 per cent higher than their non-exposed peers) and intra-abdominal fat (33 per cent higher).

“We found that in late puberty, there was quite a profound difference in adiposity,” says Dr. Pausova. “This is important as cardiovascular and metabolic disorders related to obesity - usually considered to be diseases of adulthood - are now beginning in adolescence.”

Previous studies have shown a relationship between in-utero exposure to cigarette smoke and total body fat. Research has also shown that this exposure could be linked to [obesity](#) in childhood and in the later teenage years. This is the first study to report that this exposure is also associated with higher intra-abdominal fat in late puberty.

Cigarette smoke contains nearly 4,000 chemicals, of which many have been proven to be harmful to the fetus. Exposure to [cigarette smoke](#) is considered to be the most common environmental threat to the fetus in industrialized countries.

Provided by University of Montreal

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