Prenatal Nicotine Exposure May Lead to ADHD in Future Generations

By Ruth Umoh
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Building on recent discoveries about how factors like stress, fear, or hormonal imbalance in an individual can be passed along to the next generation, professors Pradeep G. Bhide and Jinmin Zhu were curious about a proven link between prenatal nicotine exposure and hyperactivity in mice.

The professors have found evidence which suggests that a child's ADHD may be an environmentally induced condition, inherited from the maternal grandmother that smoked during pregnancy, regardless of whether the mother smokes.

The professors tested whether hyperactivity induced by prenatal nicotine exposure is transmitted from generation and found that there is a transgenerational link via the maternal line of descent.

Their work at the Center for Brain Repair at the Florida State University College of Medicine has included extensive research around ADHD, a neurobehavioral disorder affecting about 10 percent of children and 5 percent of adults in the United States. Researchers have struggled to produce a definitive scientific explanation for the large increase in ADHD diagnoses in the last few decades.
"What our research and other people's research are showing is that some of the changes in your genome - whether induced by drugs or by experience - may be permanent and you will transmit that to your offspring," said Bhide.

Although unproven, a possible contributing factor is that the current spike in ADHD cases correlates to an increase in the amount of women who smoked during pregnancy, as cigarettes became popular after World War II.

Their findings, published in the current issue of *The Journal of Neuroscience*, have created new questions. For example, how are these genes transmitted across future generations? If the individual is treated successfully would that stop the transmission to future generations?

Bhide cautions, however, that although the work is conclusive, it is based on a study of mice which have served as a proxy for human phenotypes. "It's not that every child born to a mother who smokes has ADHD, and it also isn't true that every person with ADHD will transmit the genetic material responsible," he said.