

## Quitting smoking may be harder if mom smoked during pregnancy

January 24 2007

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Quitting smoking may be more difficult for individuals whose mothers smoked during pregnancy, according to animal research conducted by Duke University Medical Center researchers.

Prenatal exposure to nicotine is known to alter areas of the brain critical to learning, memory and reward. Scientists at the Duke Center for Nicotine and Smoking Cessation Research have discovered that these alterations may program the brain for relapse to nicotine addiction. Rodents exposed to nicotine before birth self administer more of the drug after periods of abstinence than those that had not been exposed.

The study suggests that pregnant women should quit smoking to avoid exposing their unborn children to nicotine, and that they should do so without the use of nicotine products such as patches or gums that also present a risk to the baby, the researchers said.

"Smoking during pregnancy can harm the baby in ways that extend far beyond preterm delivery or low birth weight," said lead study investigator Edward Levin, Ph.D., a professor of biological psychiatry. "It causes changes in the brain development of the baby that can last a lifetime."

Results of the study appear this week in the online issue of the journal *Pharmacology, Biochemistry and Behavior*. The work was supported by the National Institute on Drug Abuse and Philip Morris U.S..

Levin's team exposed pregnant rats to nicotine. Once the offspring grew to adolescence, they were allowed to self administer nicotine as often as they wanted. To self administer the drug, the rats pressed a lever that caused a dose of nicotine to be delivered intravenously. Each push of the lever was roughly equivalent to a hit from a cigarette.

The researchers studied two groups of rats: those that had been exposed to nicotine prenatally and those that had not. Initially, both groups of rats consumed nicotine at the same rates—about ten hits per session. After four weeks, the researchers forced the rats to go "cold turkey" for a week, during which they had no access to nicotine.

Once the scientists restored access to nicotine again, they witnessed a dramatic difference in the rates at which the two groups resumed the habit. The rats that had been exposed prenatally took nearly double the nicotine hits compared with those that had not.

While the rates of smoking in the United States are declining, approximately a quarter of Americans have mothers who smoked during pregnancy, Levin said. Previous studies have shown these individuals have a higher chance of sudden infant death syndrome, attention deficit-hyperactivity disorder, obesity and even of becoming a lifelong smoker themselves, Levin said.

"It is easy to quit smoking—anyone can do it, for a brief time," Levin said. "But not taking it up again—that is the part that has proven so difficult for most people, especially those who have been exposed to nicotine before birth."

Levin and his colleagues say that different smoking cessation approaches should be taken in individuals who have been exposed to nicotine prenatally. Whether or not a person has been exposed to nicotine while in the womb becomes another part of their medical profile that helps

doctors tailor treatment to the specific needs of the patient, Levin said. Some other factors shown to influence a person's ability to quit include gender, age, state of mental health and genetics, he added.

Citation: Quitting smoking may be harder if mom smoked during pregnancy (2007, January 24) retrieved 29 April 2024 from

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