New animal research shows effects of prenatal drug exposure and early life infections on the brain

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New findings released today help identify the long-term impact of the prenatal environment and early parental care on the brain. Using animals as models, researchers help explain why early inflammation and a mother's exposure to drugs such as nicotine and high doses of pain killers have lasting consequences for children — and even future generations.

Maternal drug use has been associated with increased risk for learning disabilities, behavioral problems, and mental disorders for children. The new results provide greater insight into the neurobiological factors involved in these lifelong issues, and were reported at Neuroscience 2010, the annual meeting of the Society for Neuroscience and the world's largest source of emerging news on brain science and health.

Today's new findings show that:

- Abuse of prescription pain relievers, such as morphine, during adolescence alters the brains of future offspring. The animal study suggests that a mother's history of drug use may have a significant impact on her children and grandchildren, even if she was not using drugs at the time of becoming pregnant (Elizabeth Byrnes, PhD, abstract 271.5, see attached summary).

- Prolonged prenatal exposure to nicotine decreases the number of newborn cells in the hippocampus, a brain area important in learning and memory. These results may lead to new approaches to treating learning disabilities and other behavioral deficits associated with exposure (Robin Lester, PhD, abstract 852.18, see attached summary).

- Smoking during pregnancy may interfere with brain development. New animal research shows maternal smoking affects genes important in the formation and action of a fatty brain substance called myelin that insulates brain cell connections (Ming Li, PhD, abstract 269.2, see attached summary).

- An episode of brain inflammation early in life may lead to long-lasting changes that increase the risk of developing drug addiction during adulthood (Lir-Wan Fan, PhD, abstract 879.10, see attached summary).

"Brain circuits, formed by genetic programs during embryonic development, are modified through interactions with the internal and external environment," said press conference moderator Yasmin Hurd, PhD, of the Mount Sinai School of Medicine, an expert in how drugs affect the brain, particularly prenatal and postnatal development. "These findings tell us new information about how the brain develops, and also highlight the social imperative of educating mothers on the importance of avoiding harmful substances."

More information: PDF: www.sfn.org/am2010/press/OmniP … s/data/press/002.pdf

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