# Cicardian system suffers and protects from prenatal cocaine exposure

July 11 2007

Researchers from Boston University School of Medicine (BUSM) have shown that prenatal cocaine exposure in zebrafish (which share the majority of the same genes with humans) can alter neuronal development and acutely dysregulate the expression of circadian genes and those affecting melatonin signaling, growth and neurotransmission.

The circadian factors, including the principal circadian hormone melatonin, can attenuate the prenatal effects of cocaine. These findings appear in the July 11th issue of the journal PLoS ONE.

Tens of thousands of babies that have been exposed to cocaine in utero are born in the United States each year.

Multiple human studies suggest there are significant changes in brain development and subsequent brain function of children of drug-addicted parents. However, the extent of the damage and whether it is in part due to confounding environmental, genetic or physiological factors remains controversial.

Using a specifically developed zebrafish, the researchers, Drs. Eva Shang and Irina Zhdanova, found that prenatal exposure to cocaine, in concentrations comparable to those experienced by human embryos, altered the neuronal development in zebrafish and acutely changed embryonic expression of genes regulating growth, neurotransmission and circadian system.

“Moreover, we found that the effects of the cocaine exposure were dependent on time of exposure, being more robust in the day, and were blocked or attenuated by the principal circadian hormone, melatonin, produced exclusively at night,” said lead author Irina Zhdanova, MD, PhD, an associate professor in the department of anatomy and neurobiology at BUSM. “Thus the circadian system might be at the core of the developmental effects of cocaine and their inter-individual variability,” she added.

According to Zhdanova, circadian factors, including melatonin, could provide new therapeutic strategies to counteract the developmental effects of prenatal cocaine exposure.

Source: Boston University

Citation: Cicardian system suffers and protects from prenatal cocaine exposure (2007, July 11) retrieved 24 April 2024 from https://phys.org/news/2007-07-cicardian-prenatal-cocaine-exposure.html

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.