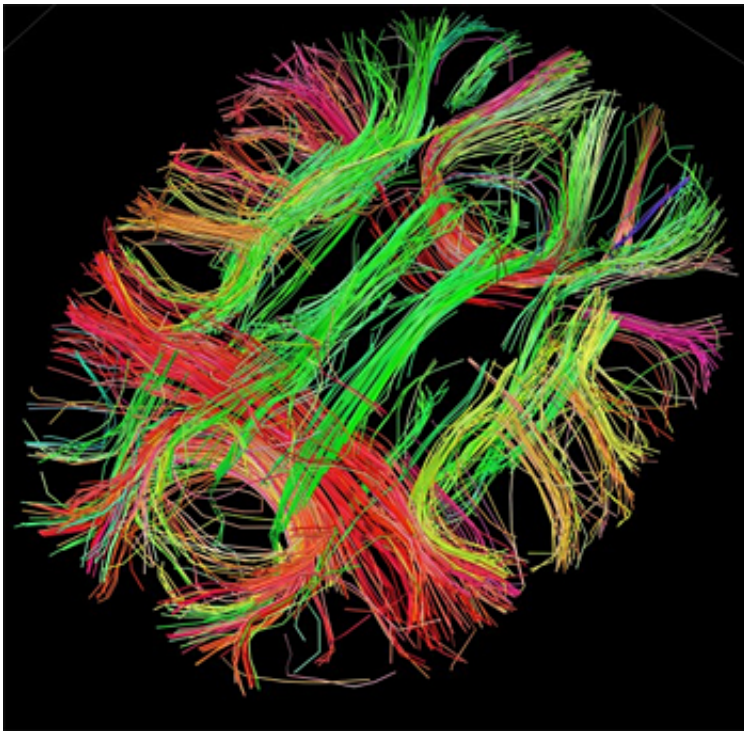


# Functional brain organization of newborns altered by prenatal cocaine exposure

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White matter fiber architecture of the brain. Credit: Human Connectome Project.

A new study by UNC researchers, based on MRI brain scans of 152 infants, found disruptions in functional connectivity within part of the amygdala-prefrontal network - a pathway thought to play an important role in arousal regulation.

"To our knowledge, this study is the first to show that maternal drug use during pregnancy alters the brain's functional organization in newborns," said Wei Gao, PhD, assistant professor of radiology in the University of North Carolina School of Medicine and one of the two corresponding authors of the study, published in the April 8, 2015 issue of the *Journal of Neuroscience*.

"This study may inform new strategies aimed at early risk identification and intervention," said Karen M. Grewen, PhD, the study's other corresponding author and associate professor of psychiatry, neurobiology and psychology.

In the study, 152 infants were given resting-state [functional magnetic resonance imaging](#) (rsfMRI) scans. Of these, 45 had prenatal exposure to cocaine, 43 had [prenatal exposure](#) to drugs other than cocaine, and 64 had no known prenatal drug exposure.

Alterations in the brain's functional organization were found in both groups that had prenatal drug exposure. The group with [prenatal cocaine exposure](#) had additional alterations that the other drug control group did not have. A reduced anti-correlation between the amygdala and part of the [prefrontal cortex](#) was found to be specifically associated with prenatal cocaine exposure, which may indicate a potential failure, or risk for failure, in the suppression of amygdala responses from the higher-order prefrontal cortex. The disruption of this functional circuit may potentially underlie the arousal dysregulation trait frequently observed for infants with prenatal cocaine exposure.

Overall, this study revealed that rsfMRI in infants may play a pivotal role in the search for objective biomarkers for the identification of risks and guidance of early intervention to improve later behavioral outcomes.

Provided by University of North Carolina Health Care

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