

Baby cries show evidence of cocaine exposure during pregnancy

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Credit: Photo by Chris Meyer, Indiana University

A new study conducted by University of North Carolina School of Medicine researchers provides the first known evidence of how a similar acoustic characteristic in the cry sounds of human infants and rat pups may be used to detect the harmful effects of prenatal cocaine exposure on nervous system development.

"These findings are important because studies of prenatal drug exposure in humans are always limited by not knowing if infant nervous system damage was due to the effects of a specific drug, such as cocaine, or the effects of other associated factors, such as maternal depression, poor prenatal care and other drug use, that are often linked with maternal drug use during pregnancy," said Philip Sanford Zeskind, PhD, lead author of

the study published October 22 in the journal *PLOS ONE*.

"The discovery of the similar spectral characteristic in rat pup vocalizations will allow for translational analyses that can be used to detect the isolated effects of cocaine or similar drugs on brain limbic mechanisms common to humans, rodents and other mammals," said Zeskind, a researcher at Levine Children's Hospital at Carolinas Medical Center in Charlotte, North Carolina and a research professor of psychology and pediatrics at UNC.

The study was conducted as part of the Cocaine Affects Mother-Infant Dyads (CAMID) research initiative. The CAMID project's principal investigator, Josephine M. Johns, PhD, professor of psychiatry and psychology at UNC, is a senior author of the *PLOS ONE* paper. The CAMID research group focuses on how drug abuse affects the mother infant dyad on multiple levels. The work is funded in part by the National Institute on Drug Abuse and the National Institute of Mental Health.

Previous work by Zeskind and others has shown how a high-pitched spectral characteristic of the infant's cry sound called "hyperphonation" may show that a newborn infant has suffered [nervous system](#) damage due to prenatal drug exposures – even when the baby otherwise appears to be perfectly healthy by traditional pediatric examinations.

In addition to finding increased amounts of hyperphonation in the cries of human infants whose mothers used [cocaine](#) during pregnancy, the UNC researchers found a little known spectral characteristic, which is similar in pitch and acoustic structure to hyperphonation, to be in the ultrasonic vocalizations of rat pups that were treated with [prenatal cocaine exposure](#). This paper is one of the first translational findings of similar [drug](#) exposure effects in human and rodent subjects and highlights the CAMID research efforts to bring basic laboratory and

clinical research closer together to more quickly find target clinical interventions.

Provided by University of North Carolina Health Care

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