

**CINCINNATI CHILDREN'S HOSPITAL MEDICAL CENTER  
Pediatrics/Environmental Health**

**SUMMER RESEARCH OPPORTUNITIES  
FOR UNDERGRADUATE WOMEN**

**APPLICATION DEADLINE: MARCH 1, 2005**

*The Department of Pediatrics/Environmental Health is pleased to offer the following research project for the summer of 2005. Interested students are urged to contact the faculty member(s) directing the project that most interests them. By contacting the faculty member, you can discover more about the project, learn what your responsibilities will be and if possible, develop a timetable for the twelve-week research period.*

**Investigating the effects of drugs of abuse on brain development and behavior.**

**Professor Charles Vorhees**

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Dr. Vorhees' laboratory investigates the effects of drugs of abuse on brain development and behavior and collaborates closely with the adjoining laboratory of Dr. Michael Williams. Both labs are interested in how 'club drugs' affect the brain when exposure occurs during early periods of brain development (prenatal) and what the long-term consequences are for later function, especially, cognitive function (learning and memory). The drugs currently investigated are methamphetamine, MDMA ('ecstasy') and 5-methoxy-diisopropyltryptamine ('Foxy'). For Foxy we also investigate its effects on adult brain and behavior because little is known about this drug. The drugs are studied in rats exposed prenatally, neonatally, or as adults. Our data show that these drugs cause changes in neurotransmitters, gene expression, circulating hormones concentrations (especially corticosterone), and learning and memory.

The lab also investigates genetically modified mice that have targeted deletions of genes that transcribe proteins found in high abundance in the brain, such as phosphodiesterase 1B, Npas3, Na-K-ATPases (3 alpha isoforms), Spca (a calcium channel), a mucopolysaccharide knock-out, and 2 mouse models of ischemia-hypoxia (models of stroke). We are also currently developing a new mouse with targeted deletion of the brain-specific creatine transporter. This mouse will serve as a model of a recently discovered human genetic disorder: creatine transporter syndrome.

Projects available for summer 2005: Projects that would be most suitable for summer research would be those on meth, ecstasy or foxy. For example, we need to characterize the basic pharmacology, neurotoxicity, and behavioral effects of foxy. There is only 1 basic research paper on foxy and 1 on clinical case report (an emergency room case). We are currently conducting experiments on basic effects of the drug on core body temperature, brain monoamine neurotransmitter levels, endocrine responses, and behavior. The behavioral evaluation involves tests of anxiety, locomotor activity, and learning and memory. Students may participate in any of these projects.

