

**CHILDRENS HOSPITAL
Department of Pediatrics**

**SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN**

APPLICATION DEADLINE: March 1, 2006

The Department of Department of Pediatrics is pleased to offer the following research project for the summer of 2006. 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.

EFFECTS OF DRUGS OF ABUSE ON BRAIN DEVELOPMENT AND BEHAVIOR

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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 results thus far 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), a mucopolysaccharide knock-out, a prosaposin knockout, 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 protein. This mouse will serve as a model of a recently discovered human genetic disorder: creatine transporter deficiency syndrome.

Projects available for summer 2006: 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 one research paper on foxy and 2-3 clinical case report (emergency room cases). We are currently conducting experiments on 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. We will also be testing the role of serotonin this coming summer in mediating the effects of foxy by testing the drug against several drugs known to block serotonin receptors in the brain.