Department of Biological Sciences
MCMICKEN COLLEGE OF ARTS AND SCIENCES

SUMMER RESEARCH OPPORTUNITIES
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 3, 2008

The Department of Biology is pleased to offer the following research project for the summer of 2008. 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.

UNDERSTANDING TRANSPORT OF THYROID HORMONES

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Project Description

Thyroid diseases affect over 25 million Americans and constitute the second most common group of metabolic disorders. Thyroid hormone (TH) is critical for growth, development, and metabolism and works by binding TH receptors in the cell nucleus and changing gene expression. Importantly, TH must translocate from the blood to the cell nucleus in order to bind TH receptors. One protein in this translocation process, the L-type amino acid transporter LAT1, is strongly up-regulated during TH-dependent development. Interestingly, LAT1 expression is also associated with rapidly dividing cells, such as cancer. Even though many *in-vitro* studies on LAT1 function have been carried out, the *in-vivo* developmental role of LAT1 has not been examined. The *objective of the current project* is to study how LAT1 regulates tissue responses to TH during development. We will do this via the following two aims: **Aim 1:** Develop and characterize a tetracycline-inducible transgenic system and **Aim 2:** Examine developmental role of LAT1, a cell surface thyroid hormone transporter**.** This project complements my *long-term goal* of elucidating molecular mechanisms underlying control of TH signalling by cytoplasmic proteins. This project is expected to reveal fundamental insights about how LAT1 regulates TH signalling *in vivo*. Furthermore, in the course of these studies, we will extend the usefulness of a well-established system for studying TH-dependent development, frog metamorphosis, and provide new transgenic resources to the frog community. Knowledge of how LAT1 regulates tissue responses to TH *in-vivo* is significant because LAT1 has been identified as a target for drug development in the treatment of thyroid disorders and cancer. The WISE student will participate in this research by molecular cloning to make transgenesis constructs and analyzing results in transgenic animals.