

Department of Biological Sciences  
COLLEGE OF ARTS & SCIENCES

SUMMER RESEARCH OPPORTUNITIES  
FOR UNDERGRADUATE WOMEN

APPLICATION DEADLINE: March 2, 2009

*The Department of Biological Sciences is pleased to offer the following research projects for the summer of 2009. 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.*

**TRANSGENIC MANIPULATION OF THYROID HORMONE RECEPTORS IN  
THE PITUITARY TO STUDY CONTROL OF THYROID HORMONE  
PRODUCTION DURING DEVELOPMENT**

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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 its production is stimulated by thyroid stimulating hormone (TSH) from the pituitary. Despite negative feedback on TSH exerted by TH, TH levels continue to rise to a peak during development. One protein potentially involved in regulation of TSH production is the TH receptor (TR). Even though TR is expressed in the pituitary, the *in-vivo* developmental role of TR in control of TSH has not been examined. The *objective of the current project* is to study how TR regulates TSH levels during development. We will do this via the following two aims:

**Aim 1: Examine TSH production in animals transgenic for a dominant positive TR and Aim 2: Examine TSH production in transgenic animals over-expressing TR only in the pituitary.**

This project complements my *long-term goal* of elucidating molecular mechanisms underlying control of development by TH. This project is expected to reveal fundamental insights about how TR regulates TSH production. Furthermore, in the course of these studies, we will extend the usefulness of a well-established system for studying TH-dependent development, frog metamorphosis, by providing new transgenic resources to the frog community. Knowledge of how TR regulates TSH production *in-vivo* is significant because TH levels are critical for normal human brain development. The WISE student will participate in this research by analyzing existing transgenic animals and molecular cloning to make new transgenesis constructs and transgenic animals.