

## **AGRI5370: SPECIAL TOPICS IN ANIMAL BREEDING AND GENETICS**

### **LIPID ACTIVATED TRANSCRIPTION FACTORS**

**Instructor:** Dr. Kathleen Glover

#### **Instruction Plan**

**Course Objectives:** The objectives of this special topics course are to understand the structure and function of lipid activated transcription factors and their role in transcriptional regulation of lipid and carbohydrate metabolism in animals.

**Course Description:** In recent years much evidence has accumulated to support the role of major (glucose, fatty acids, amino acids) and minor (iron, vitamins, etc...) dietary constituents in the regulation of gene expression in a hormonal-independent manner. The focus of this course will be on the role of lipid activated transcription factors in controlling the expression of genes involved in lipid and carbohydrate metabolism. Understanding the mechanisms by which fatty acids regulate gene expression will provide insight into the role that dietary fat plays in physiology and health of humans and animal agricultural species.

**Activities:** In this course, each week students will identify and review primary research articles, give an oral presentation and prepare a short paper related to weekly discussion topics.

**Format of Instruction:** Guided independent study, student presentations, short papers and class discussions.

**Role of the Instructor:** The role of the instructor will be to provide topics for discussion, review selection of scientific literature, and guide students in their independent study. The instructor will also guide class discussions, providing critical review of the student presentations and information provided on the subject area. The instructor will evaluate the student's course work including class discussion.

**Work Schedule:** The class will meet for 2-3 hours per week from January to April, 2010. The meeting time will be chosen to accommodate students wishing to participate. Each week students will identify scientific literature on a specific topic provided by the instructor, review and critically analyze the selected literature, and then prepare an oral presentation and a short paper discussing said literature.

#### **Methods of Evaluation:**

Selection of literature: 20%

Oral Presentations: 30% (1 presentation per week for 10 weeks: the best 6 presentations will be considered for the grade, valued at 5% each)

Class Discussions: 20%

Short Papers: 30% (1 short paper per week for 10 weeks: the best 6 papers will be considered for the grade, valued at 5% each).

**PROPOSED CLASS SCHEDULE AND DISCUSSION TOPICS:**

Date:	Topic
Week 1	Nuclear Receptors: An Overview
Week 2	Lipid Activated Transcription Factors: 1) PPARs
Week 3	Lipid Activated Transcription Factors: 2) LXR & RXR
Week 4	Lipid Activated Transcription Factors: 3) HNF-4
Week 5	Lipid Activated Transcription Factors: 4) MLX
Week 6	Lipid Responsive Transcription Factors: 5) SREBP
Week 7	Lipid Responsive Transcription Factors: 6) ChREBP
Week 8	Fatty Acid Regulation of Gene Expression in Hepatic Lipid and Carbohydrate Metabolism
Week 9	Fatty Acid Regulation of Gene Expression in Adipose Tissue Lipid and Carbohydrate Metabolism
Week 10	Missing Links ???