Name and Title: Denise Belsham, Professor  
Department: Physiology  

TITLE OF RESEARCH PROJECT: Regulation of Brain Neuropeptides by Nutrients, Chemicals and Hormones.  

Number of 299Y Spots: 2  Number of 399Y Spots: 1  

OBJECTIVES AND METHODOLOGY:  
Hypothalamic neuropeptides, produced by neurons in a small region of the brain, are responsible for many physiological functions, particularly the control of energy homeostasis. My laboratory aims to understand how nutrients, endocrine-disrupting chemicals, and hormones regulate the expression and secretion of specific neuropeptides in cell models generated from the hypothalamus. We use cell and molecular biology methodologies to obtain mechanistic insights in cell lines and primary cell culture of hypothalamic neurons.  

DESCRIPTION OF STUDENT PARTICIPATION:  
The student will be trained in the routine techniques used in the lab and have an independent project assigned, based on their level of expertise. A more senior trainee will supervise progress on a daily basis, while the student will have the opportunity to meet with Dr. Belsham whenever needed. A student trained in my laboratory will be exposed to a wide variety of molecular biology technologies and will gain a general knowledge of research in endocrinology, neuroscience, molecular biology and cellular signaling.  

MARKING SCHEME (assignments with weight and due date):  
• 10% - 2-page report due end-May TBA, 2019 (double-spaced, including rationale of project, hypothesis, methods) - written  
• 30% - final report (~10 pages double-spaced, including introduction, methods, results and discussion and references, in standard journal format; figures and legends should be included, but do not count towards the page limit; by mid-Aug TBA, 2019) - written  
• 10% - Participation in weekly Journal clubs/lab meetings (by Aug TBA, 2019)  
• 10% - Oral presentation to the lab or poster presentation in Undergraduate Research Fair for summer students (held in August) (by Aug TBA, 2019)  
• 30% - lab mark: 15% by end-Jun TBA, 2019; 15% by Aug TBA, 2019
Name and Title: Jinrong Min, Associate professor
Department: Physiology

TITLE OF RESEARCH PROJECT: Structural and Functional Studies of Epigenetics Related Proteins

Number of 299Y Spots: 2 Number of 399Y Spots: 2

OBJECTIVES AND METHODOLOGY:
The goal of this research is to characterize epigenetics related proteins by X-ray crystallography in combination with other biochemical and biophysical techniques, such as isothermal titration calorimetry (ITC) and surface plasmon resonance (SPR). Specifically, we will purify the target proteins of interest by different chromatography columns, and characterize their physiological substrates and make the protein complexes for crystallization and structural studies by X-ray crystallography.

DESCRIPTION OF STUDENT PARTICIPATION:
The students will participate in all aspects of the project from preparing the LB media for E Coli cell growth to purification and crystallization of the epigenetic proteins of interest.

MARKING SCHEME (assignments with weight and due date):
• 10% - 2-page report due June TBA, 2019 (double-spaced, including rationale of project, hypothesis, methods)
• 30% - final report (~10 pages double-spaced, including introduction, methods, results and discussion and references, in standard journal format; figures and legends should be included, but do not count towards the page limit; by August TBA, 2019)
• 10% - Participation in weekly Journal clubs/lab meetings (by August TBA, 2019)
• 10% - Oral presentation to the lab or poster presentation in Undergraduate Research Forum for ROP students (by August TBA, 2019)
• 30% - lab mark: 15% by June TBA, 2017; 15% by August TBA, 2019
• 10% - Final data and lab books, labeled and explained for lab archives (by August TBA, 2019)
RESEARCH OPPORTUNITY PROGRAM
299Y/399Y PROJECT DESCRIPTIONS 2018-2019
SUMMER

Name and Title: Min Zhuo  Professor
Department: Physiology

TITLE OF RESEARCH PROJECT: The Study of Different Forms of LTP in the Cortex

Number of 299Y Spots: 1 Number of 399Y Spots: 1

OBJECTIVES AND METHODOLOGY:
Chronic pain is a major medical problem, affecting emotion, sleep, decision making and other brain functions. Peripheral and spinal sensory processes are important for the generation and transduction of painful information, and cortical areas are critical for pain perception and emotional changes. The central hypothesis of my work is that cortical plasticity contributes to chronic pain. We will investigate the roles of cortical plasticity at synaptic and circuit levels. The major goal of this project is to examine the basic mechanisms of long-term plastic changes in the cortex and how they contribute to chronic pain and anxiety.

DESCRIPTION OF STUDENT PARTICIPATION:
Student will learn basic mechanisms of cortical LTP and LTD and use MED 64 system to record LTP from mouse cortical slices. Students will also learn the data analysis and assist with the manuscript writing.

MARKING SCHEME (assignments with weight and due date):
10% time in the lab
20% master the recording technique
20% data collection and analysis
50% final report

Project Code: PSL 3S