

# PHARMACOL & PHYSIOL SCIENCE (PH)

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## PH 0101 - Blood Flow Control in Cardiac and Skeletal Muscle

**Credit(s): 7 Credits**

This group study elective will review the various control mechanisms of blood flow in resting and exercising skeletal and cardiac muscle. Especial reference will be given to neural and local humoral factors. Evidence for the participation of extracellular nucleotide molecules will be closely examined. The phenomenon of transmembrane nucleotide transport will be examined and discussed in the context of the physiological significance of extracellular nucleotides in tissue control systems.

## PH 0106 - Neurotransmitter Signaling Pathways in Stress and Development

**Credit(s): 3-6 Credits**

Participation in ongoing activities addressing the effects of stress and aging on dopaminergic, serotonergic or GABAergic pathways. We are especially interested in neuronal degeneration. Interdisciplinary approaches include molecular biology, biochemistry, behavior, genetics, immunocytochemistry and the generation of transgenics.

## PH 0113 - Novel Therapeutic Interventions in Rodent Model of Sepsis

**Credit(s): 3-6 Credits**

## PH 0115 - Neural Mechanisms in Stress Responsiveness

**Credit(s): 3-6 Credits** (Repeatable for credit)

Acute behavioral stress elicits cardiovascular responses that are very similar to responses to cocaine administration. We are studying the neural response pathways that mediate these responses since the response pattern indicates whether some rats are predisposed to develop cardiovascular disease. Similar variability in susceptibility to disease and its relationship to acute stress responsiveness has been observed in humans. We study blood flows, blood pressure and the sympathetic nerve responses in conscious, instrumented rats. We examine the CNS sites that are responsible for response variability. Due to the technical difficulties involved in these studies, this elective is only available to a student who will continue to work during the summer.

## PH 0116 - Role of Renal Nerves in Hypertension

**Credit(s): 3-6 Credits** (Repeatable for credit)

We are conducting studies to elucidate the role of the renal nerves in hypertension and related cardiovascular diseases. Renal nerve ablation is a new procedure that is being used to reduce arterial pressure in patients with essential hypertension that is refractory to other treatments. The mechanism by which this works is unclear but we believe the renal sensory nerves trigger elevated central sympathetic drive leading to hypertension, heart failure and other diseases. We will study conscious, instrumented rats to determine how selective deafferentation of the kidneys reduces sympathetic nerve activity. We will compare various means for deafferentation, and determine the effectiveness of renal deafferentation using immunohistochemical and electrophysiological procedures. We will also investigate the central neural projections of specific renal afferent modalities. Due to the technical difficulties involved in these studies, this elective is only available to a student who will continue to work during the summer.

## PH 0117 - Investigating the role of a normal hormone in the cardiometabolic response to exercise

**Credit(s): 1-12 Credits** (Repeatable for credit)

## PH 0303 - Pharmacology Self-Designed Career Exploration

**Credit(s): 1-2 Credits**

## PH 0403 - Cardiovascular Effects of Cocaine

**Credit(s): 2-12 Credits**

Studies will be undertaken to describe the cardiovascular effects of acute and chronic administration of cocaine. Specifically, regional hemodynamics, sympathetic nerve activity, and cardiac function will be measured in conscious rats. The CNS mechanisms of the cardiovascular and cardiotoxic responses to cocaine will be examined also. The student will be involved in performing experiments on rats, analyzing data, and preparing a summary of the findings.

## PH 0405 - Mechanism of Stress-Induced Cardiac Disease

**Credit(s): 2-12 Credits**

Studies will be undertaken to describe the cardiovascular effects of acute and chronic stress. We have identified a subset on rats that are more sensitive to the cardiotoxic effects of stressful stimuli. In these experiments, cardiac function will be measured in conscious rats. The CNS mechanisms mediating cardiovascular and cardiotoxic responses to stress will be examined. Students will assist in performing experiments on rats, analyzing data, and preparing a summary of the findings.

## PH 0407 - Sympathetic Regulation of Endotoxemia in Drug Abuse

**Credit(s): 6 Credits**

Studies on the effects of sympathomimetics (e.g., cocaine) on the inflammatory process elicited by endotoxin will be performed. We will record hemodynamic variables, sympathetic nerve activity, plasma cytokines and cytokine expression in conscious, instrumented rats. We will examine the central and peripheral mechanisms of toxicity using selective receptor antagonists. The student will assist in performing experiments, analyzing data and preparing a written summary of the results.

## PH 0408 - Microsurgery

**Credit(s): 2-12 Credits**

This is an elective for highly motivated students who wish to improve their manual dexterity by practicing microsurgery using a dissecting microscope. Students will learn procedures for suturing tissues using excised blood vessels. Arteries will be transected then sutured (repaired). Students may also create vascular anastomosis. This is an independent exercise that will help students identify and improve microsurgical skills.

## PH 0409 - Cardiovascular Effects of Cocaine and Behavioral Stress

**Credit(s): 2-12 Credits**

Studies will be undertaken to describe the cardiovascular effects of cocaine and of behavioral stress. We have noted that rats do not respond similarly such that some are more prone to adverse cardiovascular outcomes with cocaine or stress. We will study regional hemodynamics, sympathetic nerve responses and cardiac function in rats. The CNS pathways and neurotransmitters responsible for response variability will be examined. The student will conduct experiments on rats, analyze data and prepare a summary of the findings.

## PH 0410 - Role of Afferent Nerves in Cardiovascular Disease

**Credit(s): 2-12 Credits**

Studies will be undertaken to describe the effects of selective renal deafferentation on the development of cardiovascular disease. Renal denervation in humans ameliorates hypertension, heart failure and renal failure by unknown mechanisms. We will examine whether renal afferent nerves are responsible for these positive results in rat models. We will study experimental models of hypertension and heart failure and we will use electrophysiological techniques to identify how renal afferent nerves play a role in elevating sympathetic activity. Students will assist in performing experiments, analyze data and prepare a summary of the findings.

**PH 0903 - Pharmacological and Physiological Science Research**  
**Credit(s): 1-12 Credits** (Repeatable for credit)