MSP: Physiology & Pharmacology Concentration

Co-Directors:

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The Disciplines of Physiology & Pharmacology

Physiology:
Physiology is the study of animal (including human) function and can be investigated at the level of cells, tissues, organ systems and the whole body. The underlying goal is to explain the fundamental mechanisms that operate in a living organism and how they interact.

The study of physiology is of central importance in medicine and related health sciences, as it underpins advances in our understanding of disease.

Pharmacology and Therapeutics:
Pharmacology is the study of the action of drugs in the widest possible sense, encompassing many types of chemicals as well as medicines that affect the functioning of the body. Pharmacologists study how drugs work in the body and use this information to explore how the body itself functions.

Pharmacologists are also responsible for the discovery of hundreds of chemicals used in the treatment of disease and the relief of human and animal suffering.
First year: Physiology/Pharmacology Track

Fall:
  Molecular Biology/Genetics/Cell Biology (GMS 6001, 5 credits)

Spring (two of following):
  Fundamentals of Physiology (3)
  Principles of Drug Action (3)
  Fundamentals of Cancer Biology (3)
MSP Advanced Curriculum

Fall

Translational Research and Therapeutics: Bench, Bedside, Community, & Policy (3)
Advanced Signal Transduction (1)
Cancer Therapeutics (1)
Neuropharmacology (1)
Ion channels (1)
Neurobiology of Aging (2)
Neurotoxins (1)
Physiology of Circulation of Blood (2)

Journal Club(s) (1)
Seminar in Physiology (1)
Current Opinions in Hypertension (1)
MSP Advanced Curriculum

Spring

Principles of Physiology (5)
  • Endocrine Physiology (1)
  • Pulmonary/Respiratory Physiology (1)
  • Cardiovascular Physiology (1)
  • Renal Physiology (1)
  • Gastrointestinal Physiology (1)

Research Methods in Physiology: Advanced Renal Physiology (2)

Functional Genomic Applications in Pharmacology/Toxicology (2)

Journal Club(s) (1)
Seminar in Physiology (1)
MSP Advanced Curriculum

Summer
Grant writing

Student Data Discussions
Research presentations by graduate students
MSP: Research Areas

Neurodegenerative/Neuropsychiatric Diseases/Drug Addiction

Sensory Neuropharmacology

Cardiovascular Physiology and Disease

Skeletal Muscle Biology and Disease

Cancer Biology, Liver Diseases
Neurodegenerative/Neuropsychiatric Diseases
Drug Addiction

Roger Papke, Ph.D. – Nicotinic receptors
Electrophysiology, drug development

Edgar Rodriguez, Ph.D. – Neurodegenerative diseases (nucleotide repeat)
Gene therapy strategies

Gonzalo Torres, Ph.D. – Dopamine transporters in disease (Parkinson’s, drug addiction)
Sensory Neuropharmacology

Jeffrey Martens, Ph.D. - Mechanisms of olfaction, pathogenesis of olfactory dysfunction, and the development of curative therapies for anosmia

Steven Munger, Ph.D. – Molecular mechanisms of chemodetection; smell and taste receptors

- Taste receptors and stimulus detection
- Neuropeptide modulation of taste function
Cardiovascular Physiology and Disease

Hypertension and Control of Blood Pressure, Pregnancy and Fetal Development

Abdel Alli, Ph.D. - ENaC in salt-sensitive hypertension and diabetic nephropathy.

Deborah Scheuer, Ph.D. – Stress, corticosteroids, control of blood pressure and cardiovascular disease

Cardiovascular Physiology and Disease
Heart Failure, Vascular Biology, Anti-Arrhythmic Pharmacology

Hideko Kasahara, M.D. Ph.D –
Molecular cardiology
Human congenital heart disease associated with NKX2-5 mutations

Paul Oh, Ph.D. –
Genetic Molecular Mechanisms in the Development of the Vascular System
Novel therapeutic targets for vascular Malformation Hereditary Hemorrhagic Telangiectasia (HHT)

Jeffrey Martens, Ph.D. -
Identification of novel targets for treatment of cardiac arrhythmias
Skeletal Muscle Biology and Disease

Karyn Esser, Ph.D. - Circadian rhythms, molecular clock and skeletal muscle

H. Lee Sweeney, Ph.D. – Myosin biology and neuromuscular diseases

Glenn Walter, Ph.D. - Pathophysiology of muscle damage
Development of novel molecular and imaging approaches
Cancer Biology, Liver Diseases

Jeffrey Harrison, Ph.D. – Brain tumors (glioblastoma), chemokines/cytokines Immunopharmacology

Brain Law, Ph.D. – Breast cancer
Novel agents that downregulate HER2, EGFR, and HER3 or inactivate the pro-metastatic functions of CDCP1

Jae-Sung Kim, Ph.D. – Liver diseases Mitochondrial and autophagic dysfunction (ischemia/reperfusion, drug-induced hepatotoxicity)
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