PRINCIPLES OF NEUROSCIENCE III
’MOLECULAR NEUROPHARMACOLOGY & ITS CLINICAL APPLICATION’

GMS6023 -- SPRING/2019
3 CREDITS

CLASS LOCATION: MBI BUILDING, L1-101

MEETING TIME: MONDAYS (9 AM - 12:00 PM) EXCEPT ON 01/25, 02/01 AND 02/15

COURSE DIRECTORS: Habibeh Khoshbouei, Pharm.D., Ph.D.
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COURSE DESCRIPTION AND OBJECTIVES:
This course surveys the basic principles of neuropharmacology with an emphasis on the molecular pharmacology of drugs used to treat CNS disorders. The specific focus of this course will be to provide a description of the cellular and molecular actions of drugs on synaptic transmission with in-depth discussion of drug-induced changes in functioning of the nervous system. We will examine how the neurotransmitter systems influence nervous system as well as therapeutic targets affecting these transmitter systems. Issues surrounding drug entry into the central nervous system will be addressed. Clinical applications of neuropharmacology, the link between neuropharmacology and behavior, and current research investigating the development of drugs for neuronal targets will be addressed. This course is designed to provide a foundation for advanced knowledge in behavioral neuroscience and neuro-psychopharmacology, and to provide an introduction to the pharmacological treatment of CNS pathologies. The ultimate goal is to understand how molecular neuroscience can guide the direction of basic medical science and therapeutic approaches.

COURSE TEXTBOOK:
One of the following Textbooks is recommended for this course:

- Molecular Neuropharmacology: A Foundation for Clinical Neuroscience
  ISBN: 978-0071827690

- The Biochemical Basis of Neuropharmacology.

- Principles of Neural Science. Kandel

Reference books available at the library (on hold)
- Cell Surface Receptors: A Short Course on Theory and Methods
**PREREQUISITE KNOWLEDGE AND SKILLS:**
You are expected to be familiar with basic Neuroscience concepts before starting this course series. If you are uncertain about the sufficiency of your background, you are encouraged to read through chapters one through ten in Neuroscience Online – an electronic textbook (Open Access)
http://nba.uth.tmc.edu/neuroscience/

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<tr>
<th>Week</th>
<th>Topic</th>
<th>Lecturer</th>
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<tr>
<td>January 7th</td>
<td>Introduction to Neuropharmacology. History of Drug Discovery Past to Present</td>
<td>Dr. Habibeh Khoshbouei</td>
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<td></td>
<td>Theoretical and practical analysis of Receptor Occupancy (Part I).</td>
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<td>January 14th</td>
<td>Theoretical and practical analysis of Receptor Occupancy (Part II). Cellular and Molecular Identity of the Cells of the Central Nervous System (CNS). Neurons and circuits. Cellular Responses to drug action.</td>
<td>Dr. Habibeh Khoshbouei</td>
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<td>January 25th (Friday)</td>
<td>Principles of Nervous System Physiology &amp; Pharmacology Site of Action of Drugs &amp; Signal Transduction Mechanisms Pharmacogenomics</td>
<td>Dr. Eduardo Candelario-Jalil</td>
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<td>January 28th</td>
<td>Glutamatergic Neurotransmission – NMDA, AMPA, Kainate, and Metabotropic Receptors Pathophysiology &amp; Pharmacology of Glutamatergic Neurotransmission</td>
<td>Dr. Eduardo Candelario-Jalil</td>
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<td>February 1st (Friday)</td>
<td>GABA &amp; Glycine Neurotransmission Pathophysiology &amp; Pharmacology of GABAergic &amp; glycinergic Neurotransmission</td>
<td>Dr. Eduardo Candelario-Jalil</td>
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<td>February 11th</td>
<td>Neuropharmacology of Acetylcholine-General Aspects Drugs acting on Muscarinic Receptors</td>
<td>Dr. Eduardo Candelario-Jalil</td>
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<td>February 15th (Friday)</td>
<td>Neurophysiology of Nicotinic Acetylcholine Receptor System Nicotinic Acetylcholine Receptor System (Neuropharmacology)</td>
<td>Dr. Eduardo Candelario-Jalil</td>
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### Calendar of Events

**February 25th**  
**MIDTERM EXAM**

**Spring break March 2-9**

**BRAIN AWARENESS WEEK (March 11-15, 2019). No class**

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<tr>
<th>Date</th>
<th>Topic</th>
<th>Instructor</th>
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| March 18th| Neurophysiology of anesthania  
             Anesthesics – Neuropharmacology                                  | Dr. Anatoly Martynyuk    |
| March 25th| Neurophysiology of the Dopaminergic  
             System and its Pathology. Dopaminergic Receptor System. Therapeutic Approaches (Neuropharmacology) | Dr. Habibeh Khoshbouei  |
| April 1st | Neurophysiology & Pathology of the Adrenergic System                | Dr. Habibeh Khoshbouei  |
| April 8th | Serotoninergic Receptor System. Therapeutic Approaches (Neuropharmacology) | Dr. Habibeh Khoshbouei  |
| April 15th| Neuropeptides (Somatostatin, neurokinins, Neuropeptide Y, endorphins, enkephalins, tachykinins)  
             Opioids  
             Alcohol Dependence  
             Cannabinoids                                                | Dr. Habibeh Khoshbouei  |
| April 22nd| Basic Principles of Neuroendocrine Control. Oxytocin, vasopressin,  
             hormones of the anterior pituitary gland, Leptin, melanocortin.  
             Other mediators acting on the CNS: Histamine, Melatonin, Eicosanoids, Nitric oxide, Purines. | Dr. Eduardo Candelario-Jalil |

**April 29th**  
**FINAL COMPREHENSIVE EXAM**

**Disclaimer:** This syllabus represents our current plans and objectives. As we go through the semester, those plans may need to change to enhance the class learning opportunity. Such changes, communicated clearly, are not unusual and should be expected.

**GRADING POLICIES:**

The grade will be assigned based on numerical performance on two examinations, one mid-term, and a final comprehensive exam at the end of the course. Students will be expected to answer all of the questions on each exam. Student projects and in-class quizzes will also be considered in the final grading.

- **Student Projects:** 10%
- **In-class quizzes:** 10%
- **Midterm Exam:** 40%
- **Final comprehensive Exam:** 40%
INSTRUCTIONAL METHODS: Course materials will be delivered using traditional lectures. Student projects will be created and delivered using VoiceThread, an asynchronous communication learning platform.

STUDENT PROJECTS: Learning projects will provide opportunities to review course material and explore topics of interest in more depth. Students will select a recent paper related to one of the lectures and write an essay of ~1,000 words that would include a summary of the main findings of the study, significance of the results, and a critical evaluation of the data based on a literature review of other published work.

COURSE POLICIES:

ATTENDANCE POLICY: Attendance of lectures is mandatory.

QUIZ/EXAM POLICY: There are two exams in this course, a mid-term and a final comprehensive exam. There will be in-class quizzes comprised primarily of multiple choice and short answer questions.

MAKE-UP POLICY: You are expected to notify the course directors of any anticipated absences. You should make every effort to take the exams on the days they are scheduled. If extenuating circumstances prevent you from taking a scheduled exam, you will need to schedule an appointment to meet with the course directors to identify an alternative exam date. UF attendance policies are detailed in the following link: https://catalog.ufl.edu/UGRD/academic-regulations/attendance-policies/

ASSIGNMENT POLICY: Individual projects must be completed and posted or turned in by the due date/time to obtain credit for the work.

COURSE TECHNOLOGY: We will use VoiceThread, an asynchronous online learning system, as the media for constructing and posting your student projects. While not required, a microphone/video camera is useful when creating VoiceThreads. Most laptops are equipped with these devices. We will enroll you in the VoiceThread course which will allow you to access the VoiceThread system using your Gatorlink name and password. This technology will be introduced during the first class period.

UF POLICIES:

UNIVERSITY POLICY ON ACCOMMODATING STUDENTS WITH DISABILITIES: Students requesting accommodation for disabilities must first register with the Dean of Students Office (http://www.dso.ufl.edu/drc/). The Dean of Students Office will provide documentation to the student who must then provide this documentation to the instructor when requesting accommodation. You must submit this documentation prior to submitting assignments or taking the quizzes or exams. Accommodations are not retroactive, therefore, students should contact the office as soon as possible in the term for which they are seeking accommodations.

UNIVERSITY POLICY ON ACADEMIC MISCONDUCT: Academic honesty and integrity are fundamental values of the University community. Students should be sure that they understand the UF Student Honor Code at http://www.dso.ufl.edu/students.php

NETIQUETTE: COMMUNICATION COURTESY: All members of the class are expected to follow rules of common courtesy when creating VoiceThreads. The course directors reserve the right to remove materials deemed inappropriate.
UF’S U MATTER, WE CARE INITIATIVE: This care-related program encompasses resources for students and employees to train people to recognize signs of distress and to provide help. More information is provided in this website: http://www.umatter.ufl.edu/about

ABOUT THE LECTURERS

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