NEUR 651: MOLECULAR NEUROPHARMACOLOGY

Spring 2025; Wednesday 1:30-4:00; online synchronous

INSTRUCTOR: Nadine Kabbani, Ph.D.
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Office Hours: by appointment

Overview: This is a core graduate neuroscience course that covers key concepts in cellular and molecular neuropharmacology. It emphasizes topics such as receptor signaling, mechanisms of cell structure, neuromodulation, synaptic neuron properties, and molecular mechanisms of brain disease and treatment. The course also explores current trends in neuropharmacology research including topics in preclinical drug development.

This is an online synchronous course and weekly attendance, and participation are required.

Textbook: There is no formal textbook for this course. I do however recommend Molecular Neuropharmacology: A Foundation for Clinical Neuroscience (Second Edition or newer) by Eric Nestler, Steven Hyman, Robert Malenka, as a text to accompany the topics covered.

Class structure and grading: The class will be divided into 2 parts: A lecture by the instructor followed by a student led presentation and a discussion of a research article of your choice.

Your final grade is based on 2 exams (each worth 40%) and a presentation (20%) graded according to the below rubric. See presentation guidelines on the last page of the syllabus.

Criteria	Strong (10)	Average (8)	Below average (6)
Content (10pt max.)	Topic was discussed thoroughly and sufficient information provided.	Topic was discussed well. One or more issues were not entirely clear.	Discussion of the topic enabled a broad understanding leaving several unanswered questions.
Delivery/Organization (10pt max.)	Well prepared. Slides were clear. The presenter answered all questions.	Minor aspects of the presentation (visual or verbal) were not clear.	Presentation lacked clarity

HONOR CODE: You must follow the guidelines of the GMU Honor Code as described in the GMU catalog.

Disabilities: If you are a student with a disability and you need academic accommodations, please see me privately and contact the Office of Disability Resources at 703-993-2474.

Course Schedule (subject to modification)

Date	Lecture Title	Chapter	Presenter
1/29	Fundamentals of Neuropharmacology	Ch. 1	----
2/5	Cellular Basis of Communication	Ch. 2	Pick 2-3 articles and we decide
2/12	Synaptic Transmission/ Signal Transduction in the Brain	Ch.3/4	Natalie
2/19	Excitatory and Inhibitory Amino Acids, Widely Projecting Systems: Monoamines and Acetylcholine, Neuropeptides	Ch. 5, 6,7	Krista
2/26	**Exam 1**	**Ch. 1-5**	**-----**
3/5	Neural and neuroendocrine control of the internal milieu	Ch. 10	Emma/Wasiq
3/12	**Spring Break**		**-----**
3/19	Higher cognitive function and behavioral control	Ch. 13	Abbie
4/2	Neurodegeneration	Ch. 17	Hamzah
3/31	Mood and emotion	Ch. 14	Shivani/Pantea
4/7	Reinforcement and addictive disorders	Ch. 15	Jordynn
4/9	Psychotic Disorders	Ch. 16	Payton/Frank
4/16	**No Class**		
4/23	**Exam 2**	**Ch. 6, 7, 10-17**	

Guidelines on presentation-

The article presentation portion of the course is intended to help the student gain insight into the current literature and become familiar with trends in the field of neuropharmacology. Articles are related to topics discussed during the lecture portion of the course. My expectation is that each presentation will contain sufficient background information to enable everyone to follow the details of the presented article. In many cases this will require that you delve into the literature from sources outside of the article. It is my expectation that we as a group can discuss the article and this requires that we have all read it prior to class. Here are some guidelines:

1. Each presentation should last approximately 45. This does not include the time needed for Q&A and discussion.
2. Try to foster interaction during your presentation by critically evoking key points for discussion.
3. Visual aids including illustrations, graphs, and videos are useful during a presentation.

Guidelines for selecting an article-

1. Must be a research article
2. Best if aligned with Neuropharmacology and the topic of the week
3. No older than 2018
4. Suggested journals: Molecular Pharmacology, J Biol Chem, Neurochemistry, J Neurosci, Nature, Science, Neuron, Neuropharmacology, Molecular Psychiatry
5. Cannot be a rapid communication (too short)
6. Approve the article with me ahead of time…

General format for presentation:

A few intro slides

Identification of the main hypothesis and question asked

Explanation of Methods/Techniques

Explanation of the results: Figure or table analysis

Summary of findings