

Welcome to *Neuropharmacology for Neurobiology Majors*.

Course Objective: To provide an understanding of **how drugs interact with their targets and how receptors couple to second messenger signaling**. We will also study **how pharmacology can be used to discover new medicines and increase our understanding of the mechanism underlying brain functions and diseases**.

The philosophy of this class is to study landmark discoveries. We will present experiments in their historical context and analyze their relevance within our **current understanding** of pharmacology.

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Exam, Essay, Grading and Point Distribution

You will be tested on the material presented in class. It is therefore critical that students **attend all lectures**. Handouts for each topic will be given in class.

Grades are assigned on a 4.0 scale, composed of **3 exams** on the topics covered in class and **1 essay** prepared by groups of 4 students.

Exam 1	100 points
Exam 2	100 points
Exam 3	100 points
Essay	100 points

Total points =	400 points

- I. **Exams:** Short-answer questions (12.5 points): You will select and answer **4 (and only 4)** of 6 short-answer questions.
Half-page essay questions (25 points): You will select and answer **2 (and only 2)** of 4 essay questions.
- II. **Essay:** on a landmark result made in **neurobiology** that used **pharmacology as an approach**.
 1. Form groups of **four** students that will write an essay on **one** of the following topics (only 1 group *per* topics).

Nicotine	Benzodiazapines	Estrogen
Amphetamine	Caffeine	Alcohol
LSD	Cocaine	Melatonin
Aspirin	Histamine	Psilocybin
Glycine	PCP/Ketamine	Absinth

2. **April 6:** The TA will have a list for each group to sign up by topic.

3. Start to work on your essay **early!** *Most effective approach:* several weeks before the due date of your 1st version, **consult textbooks** that will provide you with the **background** and **history** of your topic. This will help you understand how your bioactive compound acts on the brain (for example: <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=Books>). Understanding its history and background will allow you to identify the landmark discoveries that were made in this field of research. Choose **one** landmark discovery, find its peer-reviewed paper and verify that a **pharmacological approach** was indeed used to make the discovery. Next step, identify important questions that were posed by this landmark discovery.

*The group must contact Dr. Stella to get approval of the chosen landmark result/peer-reviewed paper.
For example, email me the pdf of the peer-reviewed paper or show it to me in class.*

4. **May 4:** DUE DATE of the 1st version of your ESSAY, which will be graded and provided with feedback and corrections. Hand in **2 copies** in class and email its **Word** file to the TA.

Structure of the essay: **Maximum** 1200 words. Papers with more words will be **downgraded**.

- 1- **Introduction** (approximately 500 words): Give the background required to understand the landmark discovery that you are presenting. Place this background in its **historical** scientific context. *For example:* when and how was the bioactive compound identified? What is its pharmacokinetic and pharmacodynamic? What important questions remained unanswered before this landmark discovery? What makes this discovery **landmark**? In this section, feel free to add one or two figure(s) illustrating your argumentation (*for example:* the chemical structure of the compound

or the anatomy of the brain area that it acts on). Outline the receptor or channel family targeted by this compound. Describe how the neurotransmitter of interest is produced and inactivated. In ending this introduction, state the specific **question** that was addressed (and unambiguously answered) in the landmark discovery you will present.

- 2- **Landmark discovery** (approximately 300 words): Briefly describe the methods used to perform the experiment. Give enough elements to understand this result, yet limiting yourself to essential information. Explain the result obtained and its interpretation. At this point, insert THE figure and its legend in your text (add two figures only if necessary).
- 3- **Conclusion** (approximately 400 words): Place this landmark discovery into our current scientific understanding. Why is this discovery so important? What questions did it raise? Were these new questions answered in subsequent work?
- 4- **Reference list**. Systematically reference your statements with **peer-reviewed literature**.
Example of a complete reference:
Devane WA *et al.* (1992) Isolation and structure of a brain constituent that binds to the cannabinoid receptor. Science 258:1946-1949.
- 5- Figure legend and references are not included in the 1200 word count.
- 6- **Overall organization**: Add a cover page that has the title of your essay, the full reference of peer-reviewed paper you chose and names of students involved in this essay. References are added at the end of essay.

Your essay will be read word by word by Dr. Stella and the TA, so please pay attention to the grammar.

Grading of essay: Dr. Stella and the TA will both grade the essays (*thus the two copies*). Each student belonging to one group will receive the same grade. This will constitute **80% of the essay's grade**.

May 21: Due date of ESSAY Final version. Hand in 2 copies in class and email its Word file to the TA. The final grade for the essay will depend on progress made. Note that the original grade can be *increased* (or *decreased*) by a maximum of 0.5.

Also May 21: Grading your coworkers. Each student will provide a confidential grade of his group coworkers. Grades will be based on the coworker's involvement in the project. This will constitute **10% of the individual essay grade**.

III. **Oral Presentation:** During the last week of class, each group will have 10-12 minutes to present their essay to the class, followed by a couple of minutes for questions/general discussion. Oral presentation will be graded by the audience and will count for the remaining **10% of the essay**.

Questions: Feel free to email any questions. Make sure that you include "NBIO 404 Question" in the subject heading, so that we can answer your question in due time.

If you would like to request academic accommodations due to a disability, please contact **Disabled Student Services**, 448 Schmitz, (206) 543-8924 (V/TTY). If you have a letter from Disabled Student Services indicating you have a disability that requires academic accommodations, please present the letter to Dr. Stella so she/he can discuss with you the accommodations you might need for the class.

Lectures are MWF from 9:30 to 10:20 in T-531

<i>Date</i>	<i>Schedule</i>	<i>Instructors</i>
3/31	0. Welcome	Dr. Stella
4/2	1. Introduction to Pharmacology	Dr. Stella
4/4	1. Introduction to Pharmacology	Dr. Stella
4/07	1. Introduction to Pharmacology	Dr. Stella
4/09	1. Introduction to Pharmacology	Dr. Stella
4/11	1. Introduction to Pharmacology Due: Choice of Essay Topic	Dr. Stella
4/14	2. Cannabinoids: Pharmacokinetics	Dr. Stella
4/16	2. Cannabinoids: Pharmacodynamics	Dr. Stella
4/18	2. Cannabinoids: receptors and G-proteins signal transduction and gene expression	Dr. Stella
4/21	<i>Guest lecture: Dr. Charles Chavkin: Opioids</i>	Dr. Stella
4/23	2. Cannabinoids:	Dr. Stella
4/25	Exam on topics 1 through 4	Dr. Stella
4/28	7. Cell death: Necrosis	Dr. Stella
4/30	7. Cell death: Apoptosis	Dr. Stella
5/2	8. Stroke	Dr. Stella
5/05	9. Stroke	Dr. Stella
5/07	9. HD	Dr. Stella
5/09	<i>Guest lecture: Dr. Gwen Garden: AIDS dementia</i> Due: Essay (1st version)	Dr. Stella
5/12	Exam on topics 5 & 6	Dr. Stella
5/14	5. Depression	Dr. Bajjalieh
5/16	5. Depression	Dr. Bajjalieh
5/19	5. Depression	Dr. Bajjalieh
5/21	6. Schizophrenia	Dr. Bajjalieh
5/23	6. Schizophrenia	Dr. Bajjalieh
5/26	Memorial day → No lecture	---
5/28	<i>Guest lecture: Dr. John Neumaier: Clinical Psychiatry</i> Due: Essay (final version)	Dr. Bajjalieh
5/30	Exam Bajjalieh	Dr. Bajjalieh
6/2	Oral Presentations	Dr. Stella
6/4	Oral Presentations	Dr. Stella
6/6	Oral Presentations and general conclusions	Dr. Stella