Selected Topics in Molecular Medicine
(Sel Top Mol Med)
BIOPHRM 7823, 2 Credit Hours
Fall Semester 2023
Time: Mondays 1 PM – 2:55 PM (with a 10-minute break); Rooms: Prior 400

Instructors:
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Course Syllabus
(Topics: Cancer and Neurological Diseases)

Dr. Gu

August 28 (1st)	Ion Channels in Neuroimmunology
September 4	No class (Labor day)
September 11 (2nd)	Action potential and neurobiology of multiple sclerosis
September 18 (3rd)	Synaptic transmission and epilepsy
September 25 (4th)	Ion channel regulation and mild traumatic brain injury
October 2 (5th)	Excitation-inhibition imbalance in comorbidities among neurological disorders
October 9 (6th)	Nerve-cancer cell interaction
October 16 (7th)	**Mid-Term Exam**

Dr. Tu

October 23 (8th)	Genetic alterations in cancer
October 30 (9th)	Epigenetics in cancer

Dr. Fu

November 6 (10th)	Cancer and Cell Apoptosis
November 13 (11th)	Innate immune response and pyroptosis
November 20 (12th)	Adaptive immune response and cancer immunology
November 27 (13th)	Cancer immunotherapy
December 4 (14th)	**Final Exam**

An Overview of the Course

Class Meeting Schedule:
Days, Times: Mondays, 1-3PM

Course Policies:
All College and Program course policies apply to this course. See the link below for OSU Graduate School Handbook. https://gradsch.osu.edu/handbook

Course Description:
Topics: The course will discuss selected literature that provided insights to the molecular mechanisms underlying various diseases. This year, the topics will be neurological diseases and cancer. For neurological diseases, we will focus on abnormal electrical signaling, excitation-inhibition imbalance, and disrupted neuron-glia interactions. For cancer, we will focus on genetics and epigenetics of cancer, cell death, immune response, cancer immunology, and cancer immunotherapy.

Goals: To create an active learning experience for future biomedical investigators. The goal of this course is three-fold. **First**, to review key findings in selected topics. **Second**, to describe the logic and methods used by scientists to make some of the seminal discoveries in the field. That is, "How do we know?" (rather than "What do we know?"). It is important to realize "what we know" is a **"map of the world**" (in our case, the biological world); it is not the real world. The "map" is based on previous data and established theories, and will change when our tools and methods are better. Over time, with good scientific inquiries, the map will get closer and closer to the real world. The hope is that, by understanding the "process of discovery" not just the "discovery per se," students will be able to develop their own process and make seminal discoveries in the future. In addition, by learning what the seminal discoveries are and how they have affected our understanding today, students will develop their own perspective and be able to see what is important and what is not. **Third**, to improve students' ability to critically analyze research articles. Although the papers for discussion will be in selective areas, the hope is that students will learn the skills of critiquing and defending scientific data, and apply the principles to their own research.

Prerequisites: 1st - 4th year graduate students in all OSU graduate programs who have a basic understanding of biochemistry and molecular biology.

Learning materials including textbooks and handouts:

- Handouts will be given for the course. They review a few major concepts (past and current) in the relevant field. They also include the logic and methods that led to certain seminal discoveries in the field.
- Journal articles will be given as reading assignment.
- For background knowledge, textbooks in molecular biology, genetics, cell biology, immunology, and neurobiology can be useful. Examples: Molecular Cell Biology, by Harvey Lodish, Mattew Scott, Hidde Ploegh, etc. Freeman & Company, 2016. Principles of Neural Science by Eric Kandel, James H Schwartz and Thomas Jessell, 4th Edition (2000) or newer version. Janeway's Immunobiology, 9th Edition or 10th Edition (2022).

Course Learning Outcomes:

By the end of this course, students should successfully be able to:

- Summarize the important concepts covered by the course succinctly and accurately.
- Demonstrate an understanding of the logic and principles for carrying out basic research in molecular medicine.
- Demonstrate an understanding of experimental design, including appropriate controls.
- Demonstrate an understanding of data interpretation—avoiding under- or over-interpretation.
- Demonstrate an understanding of journal article analysis, including placing the article in context.

Mode of delivery: **(1)** This course is 100% in person. You must attend the classes on Mondays (except the Labor Day holiday) from 1-3PM. **(2)** There will be assignments (problem sets or journal articles) each week. They will be posted on Carmen each Monday after the class.

Pace of class activities: This course is divided into two modules: neurological disease module and cancer module. The course meets once a week on Mondays and handouts will be released ahead of each class. Assignments (problem sets or journal articles) will be released after each class on Mondays and your answers to the problem sets are expected by the deadline: 8PM on Fridays, unless otherwise specified.

Credit hours and work expectations: This is a **2-credit-hour course**. According to Ohio State policy (go.osu.edu/credithours), students should expect to spend around 2 hours per week in class and appropriately 4 hours of homework.

How your grade is calculated:

ASSIGNMENT CATEGORY	POINTS
In-class presentation and participation	20
Homework	20
Mid-Term Exam	30
Final Exam	30
Total	**100**

Descriptions of major course assignments

1. Problem sets
2. Journal articles

Academic integrity and collaboration:

Description:

1. Mid-term and final exams will be open book and in-class on the indicated days.
2. Journal articles are discussed in specified small groups to answer the questions. You are expected to type the answers by yourself. No copy/paste from your classmate is allowed.
3. Problem sets are included as self-checks without points attached, but are still expected to be completed on your own. You are required to turn in the problem sets by the deadline (specified by the instructor).

Late assignments

Late submissions will not be accepted.

Grading scale

Letter grades will be assigned according to the curve. In general, a minimal of 60 points is required to get a B—the passing grade for graduate school.