Bio69/173: Cell Signaling
Spring 2018

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Learning Objectives

- Learn how scientists use biochemical, cell biological, and genetic techniques to address scientific problems.
- Describe the components of major signaling pathways, and how misregulation of these components and/or pathways can lead to disease.
- Learn to critically evaluate data presented in scientific papers.
- Learn to effectively work in small groups.

Lectures

Bio69 is in the 10A time slot and class meeting are from 10:10 – 12:00. For each class meeting there will be a discussion of one or two papers from the scientific literature on the topic listed on Canvas. In addition there will be some formal lecture to provide background for the paper or group projects

The course will divided into 4 units. Each module will focus on a specific signaling pathway that is involved in a biological problem or health issue. For each module, the signaling components and processes will be introduced and explored via formal and online lectures, review articles and the discussion of primary literature. At the end of each module, there will be a group project that focuses on a specific metabolic pathway or health issue that involves the signaling pathway.

Discussions

The majority of this course will be class discussions and small group discussions centered on primary literature. The discussions and group work are the most important part of the course and student participation is critical to ensure a quality educational experience. **Therefore, it is vital that the papers are read very carefully prior to class and students are prepared to discuss them.** In addition to discussions, there will be several group oral presentations throughout the term.

Written Assignments

There will be 3 written assignments during the term with due dates listed on Canvas. These will involve a careful analysis of one or two papers from the literature and the assignment itself will consist of a series of questions about the paper(s). The written assignments will be take home.

Course Schedule

UNIT 1
Protein Kinase A Signaling: Fuel Metabolism

March 27	Course Introduction / G Protein-Coupled Receptors
March 29	Heterotrimeric G Proteins: GTPase Activating Proteins
April 3	Heterotrimeric G Proteins: Imprinting
April 5	Adenylate Cyclase / Protein Kinase A
April 10	Perilipin and Hormone Sensitive Lipase
April 12	Phosphorylase Kinase

UNIT 2
MAP Kinase Signaling: Cancer

April 17	Receptor Tyrosine Kinases
April 19	Receptor Tyrosine Signaling: Grb2
April 24	Ras
April 26	Noonan Syndrome
May 1	Ras Signaling and Cancer
May 3	Ras Signaling and Cancer Presentations

UNIT 3
Protein Kinase C Signaling: Alzheimer's Disease

May 8	Phospholipase C
May 10	Protein Kinase C
May 15	Signaling Complexes
May 17	The Role of PKC in Abeta Processing and Tau Tangles

UNIT 4
Protein Kinase B Signaling: Type II Diabetes

May 22	PI3 Kinase and Protein Kinase B
May 24	Type II Diabetes
May 29	Type II Diabetes Presentations

Course Expectations and Grading:
There are several expectations for students enrolled in Cell Signaling
Students are expected to:

- attend all class meetings.
- read the assigned papers before class.
- contribute to class and small group discussions.
- contribute to group presentations
- hand in written assignments on time.
- put forth a best-faith effort in the written assignments.

Students that meet these expectations should expect some form of an "A" grade.

Academic Honor Principle:
The Dartmouth Academic Honor Principle can be found in the Dartmouth College Bulletin. There are several aspects of the Honor Principle that directly apply to this course. Students are encouraged to discuss the written assignments amongst themselves. However, the final written work must be entirely in your own words. No computer file sharing is allowed. In addition, sources including websites, must be cited properly. Failure to adhere to these rules is a direct violation of the Academic Honor Principle.

Note to Students with Physical or Learning Disabilities:
Any student with a documented disability, including "invisible" disabilities such as chronic diseases and learning disabilities, needing academic adjustments or accommodations is requested to speak with Prof. Dolph by the end of the second week of the term. All discussions will remain confidential, although the Director of Student Disabilities may be consulted if questions arise.

Mental Health:
I recognize that the academic environment at Dartmouth is challenging, that our terms are intensive, and that classes are not the only demanding part of your life. There are a number of resources available to you on campus to support your wellness, including your undergraduate dean (http://www.dartmouth.edu/~upperde/), Counseling and Human Development (http://www.dartmouth.edu/~chd/), and the Student Wellness Center (http://www.dartmouth.edu/~healthed/). I encourage you to use these resources and come speak with me in order to take care of yourself during the term.

Religious Holidays:
Some students may wish to take part in religious observances that occur during the academic term. If you have a religious observance that conflicts with your participation in the course, please speak with Prof. Dolph as soon as possible to discuss appropriate accommodations.