

## CAMB/PHRM 632 Syllabus (2012 Spring)

### Course Directors:

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### Guest Faculty:

Warren Pear	611 BRB II/III	215-573-7764	wpear@mail.med.upenn.edu
Peter Klein	364 CRB	215 898-2179	pklein@mail.med.upenn.edu
Michael May	200E VET	215-573-0940	maym@vet.upenn.edu

**When: Fridays 11:00PM – 1:00PM**

**Where: Room 901 BRB II/III**

How do extracellular signals regulate cells and how do cells respond to these signals? Answers to these questions are crucial for understanding the molecular cascades that control cell function, tumorigenesis and ultimately developing targeted therapies. This course, "Cell control by signal transduction pathways", will examine how various signal transduction pathways influence cell functions such as gene transcription, protein translation, intracellular protein trafficking, and cell proliferation. The primary signal transduction pathways to be examined include those mediated by PI-3 kinase, Notch, TGFbeta, NF-kB, Wnt, and Ras.

### Objectives:

After taking this course participants will:

1. Become familiar with the principle of cellular signal transduction pathways, regulation of cellular behavior by the pathways, and typical approaches to investigation of signaling pathways.
2. Further develop and strengthen skills that are critical for success in scientific research. These include critical analysis of the scientific literature, generation of testable new hypotheses based on the literature, and oral and written scientific presentations.

### Presentation:

1. In the first half of the seminar course, in each class session, each of two students will be assigned a paper related to a specific signaling pathway. The students will have an opportunity to discuss with a guest faculty member the background, scope, and critical points in the paper prior to presentation. In addition, the faculty member will provide one or two reviews that are closely related to the assigned papers to the students. The students will then carefully prepare a presentation of the paper to the whole class that will last 45 min including time for questions from students and faculty. This presentation will be structured to provide a thorough background of the work being discussed, analysis of the experiments and results, and discussion of the strengths and weaknesses of the paper. Students are encouraged to critically analyze the data, including providing alternative explanations to the results in the papers as well as suggesting new experiments to further the studies presented in the paper. The intention is that the course will lead students to think more about experimental design and interpretation rather than re-iteration of the biology learned as undergraduates.

2. In the second half of the course, each student will choose one of his or her own favorite papers (selecting one from 2-3 candidate papers after discussing with one of the co-directors) and a related review paper. The paper should be distributed to the class by the presenter at least one week prior to

the presentation related to the topics covered in this course. The student will read the paper and related literature carefully, and prepare a PowerPoint presentation on introductory and related information to facilitate discussion. The other students in the class are expected to present and critically evaluate the figures from the paper. Finally, the presenting student will summarize the paper, and provide overall an evaluation of its strengths and weaknesses. In addition, the presenter must write a 5 page double-spaced essay for the paper on its significance, strength and weakness. This essay should be written in the format of a Nature News and Views article, and should be turned in for grading one week before the end of the course.

Graduate students who have taken BIOM 600 or other relevant coursework on cell and molecular biology are eligible for the course.

**Participation:**

Active participation in the discussion is an important way of learning. Therefore, we encourage that all students ask questions, provide comments, and suggest new experiments to strengthen the conclusions drawn from the paper presented. These are also important skills in scientific research that can be improved by practice. There are no bad questions. Therefore, everyone is expected to ask questions and provide comments during each class session.

**Evaluation:** Evaluation is based on the presentations, in-class participation in discussions, attendance, and the final paper. As rapid-feedback, presentations will be briefly discussed in private with the faculty immediately after each class.

***Presentations 50% Participation 30% (including attendance) Essay 20%***

<b>Date</b>	<b>Topic</b>	<b>Faculty Coach</b>
1/20/12	Organizational session plus lecture. Summary of the general principle of signal transduction pathways and the general experimental approaches used in the field	Hua, Field, Chou
1/27/12	NF-κB Signaling	Michael May
2/3/12	Notch signaling	Peter Klein
2/10/12	WNT signaling	Xianxin Hua
2/17/12	Ras signaling	Warren Pear
2/24/12	Rho family signaling	Margaret Chou
3/2/12	AKT/mTOR Signaling	Jeffrey Field
3/9/12	Spring Break	No class
3/16/12	Student Presentations	Field, Hua, Chou
3/23/12	Student Presentations	Field, Hua, Chou
3/30/12	Student Presentations	Field, Hua, Chou
4/6/12	Student Presentations	Field, Hua, Chou
4/13/12	Student Presentations	Field, Hua, Chou
4/20/12	Student Presentations and Papers Due (Last Day of Class Spring Semester)	Field, Hua, Chou

Refreshments: Pizza or Hoagies, and soda will be provided.

Note: Again, articles for class must be handed out at the class meeting one week BEFORE your presentation.