BIOC/PHCO 744 Topics on Stem Cells and Development

Course Director: Steve Crews
Course units/hours: 1 credit hour
Grading basis: (GRAD – H,P,L,F)
Course Component: Lecture

Course Description
This graduate-level course addresses key issues in developmental biology with a focus on the role of stem cells. This will include an understanding of key developmental switches leading to diverse cell types. Experimental systems to be studied include human stem cells as well as mouse, zebrafish, and *Drosophila* model systems. Cell types to be explored include iPS and ES cells, the nervous system, epidermis, and cardiovascular system. The role of stem cells in human oncogenesis, and their therapeutic use in human disease will be discussed. The class format combines lectures and in-class discussion of assigned readings selected from both seminal works and recent articles. Students are expected to have taken undergraduate courses in genetics, cell biology, and molecular biology or to have acquired knowledge in those fields; registration is by permission of the instructor.

Course objectives
The objectives of this course are to provide graduate students in biomedical research programs familiarity with biological principles and modern approaches to the study of development and stem cells. Students will increase critical thinking skills in the context of the topics discussed in the course. By the end of the course students should be familiar with the major paradigms in the field, with the research approaches and tools used to establish and extend those paradigms, and with the major unanswered questions under current investigation. Students should have working knowledge sufficient to apply those principles to emerging research topics, including their own graduate research, and to propose strategies to solve existing research questions.

Course Assignments
Reading assignments will be posted by the individual instructors and will be a combination of review articles, research papers of seminal importance to the field, and recent research articles. At times, the instructor will ask the students to present in class their analysis of the reading assignment.

Assessments
Achievement of course objectives and individual student grades will be determined from a combination of written exams, student presentations in class, and class participation.

Instructors

Stephen Crews	Robert Duronio	Li Qian
Victoria Bautch	Jiandong Liu	Scott Williams

Lecture #	Date	Instructor	Topic
1	Th Feb 13	Stephen Crews	Generation of Neural Cell Fate
2	T Feb 18	Stephen Crews	Mechanisms Controlling Neuronal Differentiation
3	Th Feb 20	Victoria Bautch	Mouse ES Cells and Vascular Stem Cells
4	T Feb 25	Robert Duronio	Control of the Cell Cycle during Development 1
5	Th Feb 27	Robert Duronio	Control of the Cell Cycle during Development 2
6	T Mar 4	Scott Williams	Asymmetric Stem Cell Division
7	Th Mar 6	Scott Williams	Epithelial Stem Cell Division
	T Mar11	No class	Spring Break
	Th Mar 13	No class	Spring Break
	T Mar 18	Stephen Crews	Gene Regulatory Networks
8	Th Mar 20	Jiangdong Liu	Heart Development and Progenitor Specification
9	T Mar 25	Li Qian	Cellular Reprogramming
	T Mar 25		Take home exam posted
	Th Mar 27	No class	Exam Day
	F Mar 28		Take Home exam due at 4:00pm