BIOC/PHCO 745
Intercellular Signaling in Development and Disease

Effective term: Spring
Course units/hours: 1 credit hour
Grading basis: (GRAD – H P L F)
Course Component: Lecture

Course Director:

Yuliya Pylayeva-Gupta: Assistant Professor, Genetics, with expertise in cell adhesion signaling, pancreatic and mammary gland biology, cancer and immunobiology.

Co-Instructors:

Stephanie Gupton: Associate Professor, Department of Cell Biology and Physiology, Member of UNC Neuroscience Center with expertise in axon guidance.

Graham Diering: Assistant Professor, Department of Cell Biology and Physiology, Member of UNC Neuroscience Center with expertise in synaptic signaling.

Shehzad Sheikh: Assistant Professor, Department of Medicine with expertise in inflammation and gastro-intestinal diseases.

Elena Batrakova: Associate Professor, UNC Eshelman School of Pharmacy with expertise in exosomal signaling and therapeutic delivery.

Course Description
This graduate-level course concentrates on up-to-date views of intercellular signal processing, with emphasis on signal transduction mechanisms as they relate to cellular/physiological responses in both normal development and disease. Signaling mechanisms that will be discussed include paracrine, juxtacrine signaling and cell-matrix interactions. Model systems will include examples from neurobiology, gastrointestinal biology, cardiovascular system and immune system. The role of intercellular signaling and its targeting in cancer will be discussed. The course format will combine lectures and in-class discussion of assigned readings, with particular emphasis on state-of-the art research methods to study cell signaling between cells. In addition to materials focused on recent advances, hallmark historical papers will be discussed. Students are expected to have prior knowledge of genetics, cell biology and molecular biology.

Short Description
The focus of this graduate-level course is on intercellular signaling as they relate to cellular/physiological responses in both normal development and disease. The course format will combine lectures and in-class discussion of assigned readings, with particular emphasis on state-of-the art research methods to study cell signaling between cells. This class is part of the “Contemporary Topics in Cell Signaling” course modules. Students are expected to have prior knowledge of genetics, cell biology and molecular biology.

Course objectives

- To familiarize graduate students with concepts in intercellular signaling in normal and disease states
- To provide students with a toolkit for addressing complex signaling problems in a research setting
- To improve students' critical thinking skills

Course Assignments
Reading material will be assigned by individual instructors and will be a combination of reviews, hallmark papers and latest state-of-the art research articles. Students will be expected to complete reading assignment in advance and be prepared for discussion.

Assessments
Students will be evaluated based on a combination of take-home quizzes, journal club presentations and overall class participation.

Class Schedule: Tue/Thu 2-3:30pm

date	Topic	instructor
1/09/18	Growth factor signaling in normal development	Y. Pylayeva-Gupta
1/11/18	Growth factor signaling in disease: emphasis on angiogenesis	Y. Pylayeva-Gupta
1/16/18	Axon guidance	S. Gupton
1/18/18	Synaptic signaling	G. Diering
1/23/18	Cell-matrix signaling in normal tissue homeostasis	Y. Pylayeva-Gupta
1/25/18	Mechanisms of cancer promotion by cell-matrix interactions	Y. Pylayeva-Gupta
1/30/18	Immune regulation in health and disease	Y. Pylayeva-Gupta
2/01/18	TLR signaling topic	S. Sheikh
2/06/18	Juxtacrine signaling in patterning, cell fate and disease	Y. Pylayeva-Gupta
2/08/18	Signaling by exosomes	E. Batrakova