

BC207: Advanced Molecular Genetics

Literature-based discussion of molecular principles in genetics and functional genomics with focus on cancer and stem cell biology.

Overview

Graduate students are introduced to modern concepts of molecular genetics approaches to address current questions in cancer and stem cell biology. This is a team-taught course with about 40% lecture time and 60% literature discussion. Each of the 2 hour meetings will begin with an overview of the relevant topic followed by in depth discussion of one important paper from the current literature. Student involvement and critical evaluation of published primary literature is a focus of the course.

Topics of BC207 in 2016

Lectures 1-4 (P. Kaiser)

- Technologies for high throughput analysis of gene expression
- Approaches to genome-wide single cell analyses

Lectures 5-7 (X. Dai)

- Functional genomics and growth-based screens (genetic concepts and genome-wide approaches using shRNA and CRISPR/Cas9 strategies)
- Chemical genomics

Lectures 8-10 (F. Qiao)

- Mouse molecular genetics in cancer and stem cell research
- Approaches using the CRISPR/Cas9 technology

Lectures 11- 14 (H. Liu)

- Molecular genetics of cell cycle control and its implications to cancer (e. g. oncogenes and tumor suppressors)
- The role of the ubiquitin proteasome system and the SUMO conjugation machinery in cancer and the challenges drugging these pathways

Lectures 15-18 (S. Sandmeyer)

- Molecular genetics approaches to chromosome biology and implications for cancer and stem cell biology (e. g. telomere and telomerase in tumorigenesis and pre-mature aging)
- Histone modifications and epigenetic regulations.

Instructors

- Xing Dai, Professor Biological Chemistry
- Peter Kaiser, Professor Biological Chemistry (course director)
- Haoping Liu, Professor Biological Chemistry
- Feng Qiao, Assistant Professor Biological Chemistry
- Suzanne Sandmeyer, Professor Biological Chemistry and Director of the Genomics High-Throughput Facility