

Bi23 Winter 2009/2010 Tutorial Descriptions

Tutorial #	Title	Tutor's name	Paragraph description of Tutorial
01-10	Regulatory networks in the maintenance of stem cells	Christopher Brower	Stem cells are characterized by their ability to self-renew and to produce differentiated cell types. Maintenance of self-renewal and differentiation is accomplished through the regulation of gene expression occurring at the genetic, epigenetic, transcriptional, mRNA, translational, and post-translational levels. This class will review the latest literature in the quickly evolving field of stem cell biology specifically related to the regulation of stem cell maintenance and differentiation.
02-10	MRI: Intro. & Applied Skills	Ralph Lee	A technical introduction to MRI / fMRI theory and human brain image acquisition skills for the non-physicist. Overview of the magnetic resonance phenomena and its relationship to MRI image quality. Magnetic field safety overview. Hands-on skills development related to human brain scanning. Emphasis on image acquisition skills leading to quality experimental data (as opposed to other offerings concentrating on fMRI experimental design).
03-10	Biology of Environmental Science	Toni Lee	The chemistry and biology of life extends beyond the physical boundaries of an organism. As such, environmental influences may profoundly affect the biochemical processes and ecology of species in unexpected but identifiable ways. This course will examine historical and contemporary topics in environmental science that have and continue to impact various lifeforms. The biochemical and ecological nature of this impact will be addressed through assigned primary literature readings, short instructor-conducted lectures, and group discussions. Topics may include ozone production/destruction, DDT, plastics, agricultural pollutants, chemical warfare agents, waste management, urban planning, visual and auditory stimuli, and social action.

04-10	Clinical Approach to Cancer	James Pierce	<p>Because cancer provides such an excellent model system for many aspects of cell and developmental biology, it is not surprising that there are many courses that talk about cancer biology on a molecular, cellular, and tissue level. This course aims to depart from that approach and will introduce clinical aspects of cancer and present three solid organ tumors: Breast, Colon, Lung. Our goal is to present an orientation to the issues that face clinicians and patients facing cancer. Many of these practical issues raise important questions regarding the biology of cancer - and these often translate to active areas of research. In addition, a good perspective of cancer frames many of the biologic questions studied at Caltech, and can demonstrate just how exciting some of the active research at our institute is. We will begin by reviewing cancer epidemiology, cancer databases, and organizations studying and treating cancer. Then, after some introductory concepts regarding cancer, cancer staging, and therapy, we will attack three solid organ tumors. For each, we will review presentation, clinical work up, therapy, and outcome. Emphasis will be placed on translation of tumor biology into clinical care. Readings will be landmark or recent papers from the medical and biology literature. Evaluation of students will be on two critical reviews of papers and one final essay. Grading will be Pass / Fail.</p>
05-10	Transposable Elements and their role in Genome Evolution	Konstantin Piatkov	<p>Transposable elements (TEs) are ubiquitous components of all living organisms, and in the course of their coexistence with their respective host genomes, these parasitic DNAs play a fundamental role as drivers of evolution, shaping both genes and genomes and often affecting a large fraction of the genome. Much attention will be focused on the function of TEs: such as, recombination, regulation of gene expression and neogenes, classification and distribution.</p>

06-10	Introduction to neuroendocrinology	Frederique Ruf-Zamojski	In most animals, hormones are essential to coordinate basic biological functions. Neuroendocrinology is the field that studies the effects of hormones on behavior, and more generally the interactions between the endocrine system and the brain. The purpose of this tutorial will be to introduce students to the molecular basis of neuroendocrine regulation, and to various topics in neuroendocrinology, including reproduction, stress, feeding behavior and circadian rhythms. Each topic will be introduced and discussed based on scientific papers and reviews. Students' participation will be important.
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