1/28/2010

Cancer Related Courses

BIOC 408 - Genes and Genetic Engineering (4) [Sp] **David Samols, PhD**

An examination of the flow of genetic information from DNA to RNA to protein. Topics include: nucleic acid structure; mechanisms and control of DNA, RNA, and protein biosynthesis; recombinant DNA; and RNA processing and modification. Eukaryotic and prokaryotic systems are compared. Special topics: yeast as a model organism, molecular biology of cancer, and molecular biology of development. Discussion of current literature as introduction to techniques of genetic engineering.

BIOC 420 - Molecular Genetics of Cancer (3) [Fall] **Edward Stavnezer, PhD**

This course provides an in-depth analysis of cancer as a genetic disease in the Mendelian sense of inheritance and in the sense of causation by somatic mutation. Objectives of this course are to examine both the proto-oncogenes and tumor suppressor genes that are the target of oncogenic mutations and the mechanisms of mutational change. Discussions emphasize experimental approaches used to identify and study oncogenes and tumor suppressor genes. Course also covers viral mechanisms of oncogenesis that involve interactions between viral proteins and the products of cellular proto-oncogenes or tumor suppressor genes.

BIOC 460 - The Biology and Mathematics of Micro-array Studies (3) [Sp] **Patrick Leahy, PhD**

This hands-on computer-based course, which upon completion will enable participants to conduct meaningful analyses of expression microarray and proteomics data. The course is multi-faceted and cross-disciplinary in nature. Upon completion, participants will have a thorough understanding of the principles underlying available micro-array technologies, including: sample preparation, sample processing on microarrays, familiarity with the use of Affymetrix Expression Console software, generation of microarray data sets, an ability to move data effortlessly from EC MS Excel and from there into MS Access in order to trim, query and globally manipulate and pre package data. Importation of data into other third party software such as, GeneSpring (Agilent), DecisionSite (Spotfire) and PathwayStudio (Ariadne, Genomics) will enable participants to cluster and mine the data in search of higher-order patterns and pathway annotation and assignment. A new module on proteomics and introduction to systems Biology has been added Payment of Lab fee ($600).

CBIO 453/455 – Cellular and Molecular Biology (8) [Fall] **Martin Snider, PhD**

Topics include: the replication of DNA, transcription of RNA and its regulation, mechanism of protein synthesis, and the regulation of gene expression in growth and development. Genetics; from classical genetics to genomics. Cell biology--an introduction to cellular organelles and structures in both eukaryotic and prokaryotic cells.

EPBI 497 - Cancer Epidemiology (1-3) [Fall] **Jill Barnholtz-Sloan, PhD**

This is a 1-3 credit modular course in cancer epidemiology and will consist of 3 five-week modules: 1) introduction to cancer epidemiology (study design, etiology and causal inference, cancer statistics and cancer biology); 2) site-specific discussions of various cancers involving natural history of disease and risk factors and etiology and 3) cancer prevention and screening and cancer survivorship. Each of the modules is worth 1 credit hour for a total of 3 credit hours.

EVHS 401B – Exposure of Environmental Toxins (1.5) [Fall] **Martina L. Veigl, PhD**

The toxicity, mutagenicity, carcinogenicity, and teratogenicity of environmental agents and the potential for human exposure to these agents through environmental, occupational and medicinal routes are discussed.

EVHS 402A - Fundamentals of Environmental Health Sciences: Risk Assessment (1.5) [Fall]
Martina L. Veigl, PhD

An overview of the scientific approaches used to determine whether environmental agents are potentially dangerous to people. Criteria utilized for establishing exposure limits are presented and short-term assays, epidemiology studies and clinical trials are used to assess the impact of environmental exposure on normal and genetically susceptible individuals.

EVHS 502 - DNA Damage and Repair (3) [Sp] **W. David Sedwick, PhD**
Martina L. Veigl, PhD

In-depth consideration of agents that alter DNA directly or indirectly through effects on its synthesis and examine the mechanisms and repair processes through which cells respond to this damage. Topics include fidelity of DNA replication, excision repair, mismatch repair, transcription-linked repair, SOS repair and recombinational repair. Other DNA damage responses controlling decision points between DNA repair and apoptosis considered. Agent-specific DNA damage, such as that caused by agents leading to bulky adducts, AP sites, base-base mismatches and damage to DNA bases are considered in the context of specific repair processes responding to these DNA insults in prokaryotes and eukaryotes.

IBMS 500 – On Being a Professional Scientist (0) [Summer] **Jessica Berg, JD**

This course provides students with an opportunity to think through their professional ethical commitments before they are tested, on the basis of the scientific community's accumulated experience with the issues. Students will learn the current state of professional policy and federal regulation in this area, and, through case studies, will discuss practical strategies for preventing and resolving ethical problems in their own work.

MBIO 518 - Signaling via Cell Adhesion (3) [Sp] **Susann M. Brady-Kalnay, PhD**

This course emphasizes current advances in cell-cell and cell-substrate interactions including molecular mechanisms by which cells interact with and are regulated by extracellular matrices and other cells. There is an emphasis on aberrant adhesion in cancer.

PATH 416 – Fundamental Immunology (3) [Sp] **Alan D. Levine, MD**

Provides an overview of the immune system, including activation, effector mechanisms, and regulation. Topics: antigen-antibody reactions, immunologically important cell surface receptors, cell-cell interactions, cell-mediated immunity, innate versus adaptive immunity, cytokines, and basic molecular biology and signal transduction in B and T lymphocytes, and immunopathology. Three weekly lectures emphasize experimental findings leading to the concepts of modern immunology. Required recitation hour integrates the core material with experimental data and known immune mediated diseases. Five 90 minute group problem sets per semester. Critical analysis of a recently published, landmark scientific article. Prereq: BIOL 215, graduate standing and consent of instructor.

PATH 425 - Stem Cell Biology and Therapeutics Course (3) [Sp] **Kevin Bunting, PhD**

This course provides a broad overview of various fetal and adult stem cells and their potential application in regenerative medicine. At the heart of regenerative medicine in cancer is the continually evolving practice of stem cell transplantation. New uses of stem cells as delivery vehicles for cancer treatment and gene therapy for cancer are also being developed and moving toward clinical trials. For example, genetic modification of the stem cells in patients receiving stem cell transplants can be used to protect the bone marrow from the dose-limiting toxicity of DNA damaging agents, allowing dose-escalation. Mesenchymal stem cells [MSC] are being used to suppress graft-vs.-host disease and promote hematopoietic stem cell engraftment in cancer patients. An additional ability of MSCs to track to tumors provides a unique mode of tumor-targeted therapy.

PHRM 520 - Cancer Biology and Therapeutics (3) [Sp] **David Danielpour, PhD**

This course is an introduction to the genetics, prevention, and treatment of cancers. This course covers: DNA damage and repair; cancer genetics; chemical carcinogenesis and prevention; signal transduction; cell cycle checkpoint regulation; hormonal regulation; chemotherapy and apoptosis. Also includes an examination of the pathology of cancer and cancer epidemiology and biostatistics, in addition to the cellular and molecular biology of cancer.

PHRM 434 - Mechanisms of Drug Resistance (3) [Sp] **Eric J. Arts, PhD**

This course focuses on and compares the drug resistant mechanisms selected by viruses, bacteria, parasites, fungi, and tumor cells. Topics include antiretroviral resistance (e.g., AZT and protease inhibitors), antibiotic resistance (e.g., Blactams), resistance to chemotherapeutic agents, and resistance to anti-malarial drugs (e.g., chloroquinone). Experts in the field at both CWRU and from other institutions across the US provide the comprehensive lectures. The journal, Drug Resistance Updates is provided as a support text.