

CANCER BIOLOGY (CBIO)

CBIO 101. Cancer Biology. 4 Units.

Experimental approaches to understanding the origins, diagnosis, and treatment of cancer. Focus on key experiments and discoveries with emphasis on genetics, molecular biology, and cell biology. Topics include carcinogens, tumor virology, oncogenes, tumor suppressor genes, cell cycle regulation, angiogenesis, invasion and metastasis, cancer genomics, cancer epidemiology, and cancer therapies. Discussion sections based on primary research articles that describe key experiments in the field. Satisfies Central Menu Areas 1 or 2 for Bio majors. Prerequisite: Biology or Human Biology core or equivalent, or consent of instructor. Same as: PATH 101

CBIO 240. Molecular and Genetic Basis of Cancer. 4 Units.

Required for first-year Cancer Biology graduate students. Focus is on fundamental concepts in the molecular biology of cancer, including oncogenes, tumor suppressor genes, and cellular signaling pathways. Emphasis will be given to seminal discoveries and key experiments in the field of cancer molecular biology. Course consists of two 1 hour lectures and one 2 hour discussion per week. Enrollment of undergraduates requires consent of the course director.

CBIO 241. Cellular Basis of Cancer. 4 Units.

Focus on tumor cell biology including angiogenesis, metastasis, metabolism, stem cells, and other topics. Prerequisite: CBIO240.

CBIO 242. Cellular and Clinical Aspects of Cancer. 4 Units.

Required for first-year Cancer Biology graduate students, and for first- and second-year medical students intending to complete the Cancer Biology Scholarly Concentration. Focus is on the cellular biology of cancer, including discussion of basic biology including tumor angiogenesis, metabolism, and immunology, as well as clinical oncology and cancer therapeutics. Emphasis will be given to seminal discoveries and key experiments in the field of cancer biology and oncology. Course consists of two 1 hour lectures and one 2 hour discussion per week. Enrollment of undergraduates requires consent of the course director.

CBIO 243. Principles of Cancer Systems Biology. 3 Units.

Focus is on major principles of cancer systems biology research that integrates experimental and computational biology in order to systematically unravel the complexity of cancer. The opportunity to embark on cancer systems biology research has been enabled by the rapid emergence of numerous and increasingly accessible technologies that provide global DNA, RNA and protein expression profiles of cells under a variety of conditions following environmental, drug and genetic perturbations. Course addresses the challenge of how to analyze high-dimensional and highly-multiplexed data in order to synthesize biologically and clinically relevant insights and generate hypotheses for further functional testing. Aims to broaden student exposure to the experimental and computational skills needed to apply the emerging principles of systems biology to the study of cancer.

CBIO 244. Lecture Series in Cancer Systems Biology. 1 Unit.

Presents new concepts in the field of cancer systems biology, demonstrating the integration of novel experimental and computational approaches for addressing outstanding critical questions in cancer biology. Invited speakers share insights about state-of-the-art trends and advice on navigating a career in cancer systems biology. Course required for CSBS Fellows.

CBIO 245. Lecture Seminar Series in Cancer Biology Program. 1 Unit.

Invited speakers share insights about state-of-the-art trends. Presents new concepts in the field of cancer biology. Science talks presented by students.

CBIO 246. Clinical Cancer Research Internship Program. 1 Unit.

As this is a limited enrollment course, graduate students interested in this course will contact must be affiliated with Cancer Biology Ph.D. Program and must contact the primary instructor Dr. Majeti and the course director Drs. Attardi and Sage by email. A prerequisite for the course is the successful completion of the online training component for HIPAA certification: In addition, the following is required: 1. Documented proof of Measles, Mumps & Rubella immunity in the form of vaccine dates or positive blood tests. 2. Documented proof of Varicella (chicken pox) immunity in the form of vaccine dates or positive blood tests. 3. Annual TB screening (PPD for US born or born in Canada and QFT for foreign born of high risk TB countries) 4. Annual Influenza vaccine (between Nov 1-March 31) In the first component of the course, Dr. Majeti will identify an oncologist (adult or pediatrics) actively working in the clinic that the student can shadow that quarter for a minimum of 4 hours and will put the student in contact with the clinician. Shadowing hours can be at any time of the week or the weekend. The clinician will contact Dr. Majeti to confirm that the student has shadowed him/her for 4 hours. In the second component of the course, Dr. Majeti will inform the student when the oncology clinical tumor board meets. The student must attend at least 3 tumor board sessions in the quarter (1h30 each). In the third component of the course, the student will write a one-page analysis of a clinical paper related to cancer biology.

CBIO 260. Teaching in Cancer Biology. 1-10 Unit.

Practical experience in teaching by serving as a teaching assistant in a cancer biology course. Unit values are allotted individually to reflect the level of teaching responsibility assigned to the student.

CBIO 275. Tumor Immunology. 3 Units.

Tumor Immunology focuses on the mechanisms by which tumors can escape from and subvert the immune system and conversely on the ability of innate and adaptive arms of the immune system to recognize and eliminate tumors. Topics include: tumor antigens, tumor immunosurveillance and immunoeediting, tumor microenvironment, tumor induced immunosuppression, tumor immunotherapy (including cancer vaccines, CARs, TILs, checkpoint antibodies, monoclonal antibodies and bispecific antibodies, as well as bone marrow transplantation and radiation therapy). Tracks the historical development of our understanding of modulating tumor immune response and discusses their relative significance in the light of current research findings. Prerequisite: for undergraduates, human biology or biology core. Same as: IMMUNOL 275

CBIO 280. Cancer Biology Journal Club. 1 Unit.

Required of and limited to first- and second-year graduate students in Cancer Biology. Recent papers in the literature presented by graduate students. When possible, discussion relates to and precedes cancer-related seminars at Stanford. Attendance at the relevant seminar required.

CBIO 290. Curricular Practical Training. 1-2 Unit.

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CBIO 299. Directed Reading in Cancer Biology. 1-18 Unit.

Prerequisite: consent of instructor.

CBIO 399. Graduate Research. 1-18 Unit.

Students undertake investigations sponsored by individual faculty members. Cancer Biology Ph.D. students must register as soon as they begin dissertation-related research work.

CBIO 801. TGR Project. 0 Units.

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CBIO 802. TGR Dissertation. 0 Units.

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