

On Draft #5 07/12/2017

USC/Norris Cancer Center and the Departments of Molecular Microbiology and Immunology, Biochemistry and Molecular Biology, and Pathology, Keck School of Medicine.

Four-Unit Interdisciplinary Graduate Course, INTD504

'THE MOLECULAR BIOLOGY OF CANCER' Fall Semester, 2017

Mondays and Wednesdays afternoons, 3:00-5:00 pm, in McKibben Room #256 (confirmed)

Lecture-notes will be posted on the USC Blackboard site (<https://blackboard.usc.edu>), either as Power-Point or as PDF files.

Suggested general textbook for additional reading:

Robert A Weinberg: The Biology of Cancer (2ND ed, 2013) [GS Garland Science, Taylor & Francis Group]. Specific papers (as PDFs) will be posted on Blackboard.

LECTURE GOALS:

Upon completion of this course, the student should:

- Understand basic aspects of Cancer Pathology. What is cancer?
- Understand basic concepts of Cancer Epidemiology. Know what causes cancer.
- Know and understand the molecular mechanisms of Chemical and Viral Carcinogenesis.
- Understand basic principles and applications of cell cultures and animal models to study cancer.
- Understand what oncogenes are, how they contribute to cell signaling, and their roles in chemical and viral carcinogenesis.
- Understand what tumor suppressor genes are, their role in cellular signaling, and how mutational inactivation of, and/or methylation of, and/or loss of chromosomes bearing tumor suppressor genes, contributes to mechanisms of viral and chemical carcinogenesis
- Understand the genomics and genetics of cancer
- Know and understand the structure and function of chromatin as it relates to gene expression.
- Know and understand epigenetics and somatic genetic changes in tumors.
- Understand modern aspects of RNA biology.
- Be familiar with the molecular mechanisms of hormonal carcinogenesis
- Understand the cell cycle, angiogenesis and apoptosis.
- Be familiar with basic facets of chemical carcinogenesis and methods to study the process.
- Understand how genetics contributes to predisposition and progression of cancer.
- Understand the differences and overlap of cancers by tissue type.
- Understand what immunotherapy is, and how it can be used to treat human cancer: strategies, advantages, and hurdles to overcome to realize its potential.
- Be familiar with the basic ideas in each of the six modules of this course.

COURSE OVERVIEW:

In the past several years dramatic advances in cancer knowledge have established the foundation for a new era in the understanding and ultimate cures of this deadly group of diseases. The goal of this Cancer Center flagship course is to expose new investigators to modern strategies of understanding the mechanisms of cancer development and progression. Such strategies encompass cell biological and genomic approaches. Hence, this course is the main one in the Cancer Biology and Genetics (CBG) Ph. D. program. The questions being addressed in this course all relate to what goes wrong with normal cellular control mechanisms, which then leads to cancer. The lecture series applies a multidisciplinary approach toward these goals, with the full realization that cancers in different organs represent different diseases. However, all cancers (i) are characterized by uncontrolled cell proliferation and (ii) have strong genetic components, both in the germline and the somatic tissues. The ultimate aim of the course is to understand how multidisciplinary and molecular approaches are necessary to provide a basis for the ultimate treatment development for this group of diseases. By necessity, the course content is basic in nature, given by experts in their respective fields.

COURSE POLICIES:

Primary didactic materials will be distributed to students preceding each lecture, by posting them on the Blackboard Website. Expanded supporting information can be obtained from the textbook and specific references (also posted on Blackboard). Professors are responsible for all material presented in course, either orally, by projection, or in handouts, and any assigned readings specified in the syllabus or by the faculty. To preserve the integrity of the course and the educational program within the School of Medicine, assigned grades will not be further ‘negotiated’ unless there are major mistakes in the grading (such as significant arithmetic errors). Medical issues may be reported to the course coordinator for consideration for accommodations, but only when the medical issue is reported before the exam is taken and graded. Photography or videotaping of the course lectures is explicitly prohibited, in accord with USC School of Medicine policy.

TESTS & FORMAT:

- There will be two examinations, a Midterm Exam (Wednesday, October 1) and a Final Exam (Wednesday, December 6), in the room the class is taught in from 3:00 – 5:00 P. M., or later if the students need more time to complete the exam.
- Exam questions can be of any format, and there will be choices.
- The Midterm Exam will comprise 50% of the final grade, and the Final exam will comprise 50% of the final grade.
- The Final Exam will cover the material presented since the Midterm Exam.

STUDENTS WITH DISABILITIES:

Any student requesting academic accommodations based on a disability is required to register with Disability Services and Programs (DSP) each semester. A letter of verification for approved accommodations can be obtained from DSP. Please be sure the letter is delivered to the course instructor as early in the semester as possible. DSP is located in STU 301 and is open 8:30 AM to 5:00 PM, Monday through Friday. The phone number for DSP is (213) 740-0776.

Schedule:

Date	Subject	Lecturer
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Module 1: Cancer Epidemiology, Tumor Pathology, and Viral and Chemical Carcinogenesis

08/21/17	Brief Introduction to the Course.	Drs. Joseph R. Landolph, Jr., and David Cobrinik.
	Introduction to Cancer Epidemiology and Introduction to Molecular Epidemiology	Dr. Mariana Stern
08/23/17	Pathology of Neoplasia	Dr. Louis Dubeau
08/28/17	History, Carcinogen Bioassays, Initiation/Promotion	Dr. Joe Landolph
08/30/17	Classes of Carcinogens, Mol. Mechanisms of Action of Carcinogens, Regulation of Carcinogens	Dr. Joe Landolph
09/04/17	Labor Day – Holiday	No Class
09/06/17	RNA and DNA Tumor Viruses and Cancer	Dr. David Cobrinik

Module 2: Molecular Pathways and Genomics and Genetics of Cancer

09/11/17	Oncogenes and Signaling	Dr. Axel Schönthal
09/13/17	Tumor Suppressor Genes and Signaling	Dr. Axel Schönthal
09/18/17	Apoptosis	Dr. Florence Hofman
09/20/17	Rosh Hashanah Jewish Holiday	No Class
09/25/17	Molecular Biology of Chemically Induced Cell Transformation/Chemical Carcinogenesis	Dr. Joe Landolph
09/27/17	Cancer in Mouse Models	Dr. Rob Maxson
10/02/17	Cellular Cancer Evolution	Dr. Darryl Shibata
10/04/17	Putting the Pathways Together – The Hallmarks of Cancer	Dr. David Cobrinik

10/09/17 1st Midterm Examination **Dr. David Cobrinik-Proctor**

Module 3: Epigenetics and Deregulation of Transcription

10/11/17	Transcriptional Regulation and Deregulation	Dr. Ruchi Baipai
10/16/17	Epigenetic Mechanisms and Aberrations	Dr. Gangning Liang
10/18/17	Early Detection and Epigenetic Diagnostics	Dr. Ite Laird-Offringa
10/23/17	ncRNA in Cancer	Dr. Muller Fabbri

Module 4: Organ Specific Carcinogenesis

10/25/17	Molecular Analysis of Liquid Biopsies in Prostate/Other Cancers	Dr. Amir Goldkorn
10/30/17	Cell and Molecular Biology of Breast Cancer	Dr. Mike Press
11/01/17	Cell and Molecular Biology of Ovarian Tumors	Dr. Louis Dubeau
11/06/17	Cell and Molecular Biology of Brain Tumors	Dr. Anat Erdereich Epstein

Module 5: Immunological and Molecular Approaches to Cancer Therapy

11/08/17	Tumor Micro-Environment	Dr. Yves Declerk
11/13/17	Angiogenesis as a target for therapy	Dr. Young Kwon Hong
11/15/17	Introduction to Tumor Immunology	Dr. Martin Kast
11/20/17	Translational Aspects of Tumor Immunology	Dr. Martin Kast
11/22/17-11/26/17	Thanksgiving Recess	No Class
11/27/17	Epigenetic Therapy	Dr. Gangning Liang
11/29/17	Targeted Therapy	Dr. Lee Helman
12/02/17-12/05/17	Study Days for Final Exam	No Class

12/06/17 Final Exam**Dr. Joe Landolph –
Proctor**

12/15/17 Grades Due

For additional information, contact the Graduate Assistant in the Dept. of Molecular Microbiology/Immunology at 442-2337 or in the Dept. Biochemistry/Molecular Biology at 442-1145.

Course Coordinators: Drs. Joseph R. Landolph [T: (323)-442-6908]: email: <Joseph.Landolph@med.usc.edu>] and David Cobrinik [T:(323)-(361-2275); email:<dcobrinik@chla.usc.edu].

Postdoctoral fellows, interns/residents, and other interested parties are welcome to attend.

ACADEMIC INTEGRITY STATEMENT AND RESOURCES TO HELP STUDENTS

Please be aware that there are many resources to help students during times of stress in the academic year. The Provost's Office has compiled a list of these resources. The Provost has indicated that Faculty Course Coordinators/Co-coordinators should post these along with Course Syllabi to aid students in finding various types of help during stressful times in the academic year, such as exam times. Of course, please feel free to contact Dr. Joseph R. Landolph, Jr., or Dr. David Cobrinik, the Co-Coordinators of this course during this course if we can be of help to you in any way. In addition, there is a statement defining academic misconduct from the Provost that the students should read.

OFFICE OF THE PROVOST Michael W. Quick, Ph.D. *Provost and Senior Vice President for Academic Affairs*
University of Southern California 3551 Trousdale Parkway, Suite 102, Los Angeles, California 90089-4019 • Tel: 213 740 2101 • uscprovost@usc.edu

MEMORANDUM**To:** All Faculty**From:** Michael W. Quick

Provost and Senior Vice President for Academic Affairs

Edwin Saucedo

President, Undergraduate Student Government

Victoria Montrose

President, Graduate Student Government

Date: May 4, 2017

Subject: Statement on Academic Conduct and Support Systems

Through the joint efforts of the Undergraduate Student Government, the Graduate Student Government, the Office of Undergraduate Programs, and the Graduate School, we are pleased to announce the enclosed revised Statement of Academic Conduct and Support Systems.

It is crucial that USC students, faculty, and staff are aware of policies and resources related to the university's standards of academic work and behavior. To this end, the Statement on Academic Conduct and Support Systems should be available in multiple forms and easily accessible.

Pursuant to current practice, this statement should be attached to all USC syllabi and posted as a prominent link on school webpages. The statement can be cut and pasted from this memo and will also be available on the following webpages:

<http://arr.usc.edu/services/curriculum/resources.html>; <http://graduateschool.usc.edu/>;

<https://undergrad.usc.edu/>

Please feel free to contact any of us if you have any questions.

cc: Elizabeth Graddy

Sally Pratt

Andrea Hodge

Paula Cannon Kristine Moe

Statement on Academic Conduct and Support Systems**Academic Conduct:**

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in *SCampus* in Part B, Section 11, “Behavior Violating University Standards” <https://policy.usc.edu/scampus-part-b/>. Other forms of academic dishonesty are equally unacceptable. See additional information in *SCampus* and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct>.

Support Systems:

Student Counseling Services (SCS) - (213) 740-7711 – 24/7 on call

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

<https://engemannshc.usc.edu/counseling/>

National Suicide Prevention Lifeline - 1-800-273-8255

Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. <http://www.suicidepreventionlifeline.org>

Relationship & Sexual Violence Prevention Services (RSVP) - (213) 740-4900 - 24/7 on call

Free and confidential therapy services, workshops, and training for situations related to gender-based harm. <https://engemannshc.usc.edu/rsvp/>

Sexual Assault Resource Center

For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: <http://sarc.usc.edu/>

Office of Equity and Diversity (OED)/Title IX compliance – (213) 740-5086

Works with faculty, staff, visitors, applicants, and students around issues of protected class.

<https://equity.usc.edu/>

Bias Assessment Response and Support

Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. <https://studentaffairs.usc.edu/bias-assessment-response-support/>

Student Support & Advocacy – (213) 821-4710

Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. <https://studentaffairs.usc.edu/ssa/>

Diversity at USC – <https://diversity.usc.edu/>

Tab for Events, Programs and Training, Task Force (including representatives for each school), Chronology, Participate, Resources for Students