BIMM134 – The Biology of Cancer
SPRING 2014

Lectures:
WLH 2204
Tuesdays/Thursdays, April 1 – June 5
8:00 – 9:20 AM

Instructor: Eric Bennett, Ph.D. – email - e1bennett@ucsd.edu
Office Hours: Tuesday and Thursday 3-4 pm, Natural Sciences Building, Room 5316

Required Textbook:
The Biology of Cancer – 2nd Edition
Robert A. Weinberg
Copies of the textbook are on reserve at the Biomedical Library

Exams:
Midterm I: April 24, in-class
Midterm II: May 15, in-class
Final: June 12 – 8AM, comprehensive

Final grade breakdown
Midterm I – 30%
Midterm II – 30%
Final – 35%
In class participation – 5%

Exam policy:
There will be **NO** makeup exams.

The midterm exams are not required. If you chose to not take one of the midterm exams, or are unable to take one of the midterm exams, there will be no penalty. However, the subsequent exams will comprise a larger portion of your final grade. For example, if you miss the first midterm exam, the second midterm will be worth 45% and the final will be worth 50% of your final grade. If you choose to take neither of the midterm exams, the final will be worth 95% of your grade.
You are required to take the final exam without exception.

You can also cancel the results of a midterm exam after taking the exam. After taking either of the midterm exams, you can cancel the grading of that exam up until midnight of the day of the exam. Midterm cancelation requests will only be valid if I receive an email prior to midnight (sharp) of the day of the exam. After that time, all exams will be graded and will count toward your final grade.

Midterm exam re-grade requests will be allowed. Requests will need to be made in writing no later than 1 week prior to date at which graded exams are returned to the

class. Re-grade requests must be typed and printed and appended to the original exam. Email requests will not be allowed and all re-grading decisions are final.

Teaching Assistants: (Discussion sessions to be held in Weeks 2 to 10)

Name	Email Address	Sessions
Noah Spiegel	nspiegel@ucsd.edu	Wed 2-2:50 CENTR 207, Fri 2-2:50 HSS 2321
Nathan Zuzow	nzuzow@ucsd.edu	Mon 11-11:50, 12-12:50 CENTR 207

Email policy:
Use the teaching assistants as your primary contact point for questions - I will attempt to answer short and direct clarification questions as long as you include BIMM134 in subject line of email. Long open-ended emails will likely receive either no response or a short response. I will respond to emails only once a day so if you don't receive an immediate response, wait.

Course Learning Goals:

I. Understand the heterogeneity and complexity associated with human cancers.

- **Key Concepts**
  - **What extrinsic and intrinsic factors lead to cancer initiation?**
  - **What cell types contribute to cancer initiation?**
  - **How does the surrounding tumor microenvironment as well the interactions between the tumor and other body systems impact cancer formation?**

II. Understand the molecular features that drive cancer formation.

- **Key Concepts**
  - **How do cells lose the ability to control their growth?**
  - **What cellular signaling pathways are commonly perturbed during cancer formation?**
  - **What defects in cellular and molecular failsafe mechanisms expose vulnerabilities to cancer formation?**

III. Understand the genetic basis for cancer formation

- **Key Concepts**
  - **How does cancer result from genetic clonal evolution?**
  - **What molecular pathways prevent genetic alteration?**
  - **How does genetic alteration lead to cancer formation and chemoresistance?**
  - **How is our current genetic understanding of cancer being used to treat specific cancers?**

IV. Understand the experimental basis for historical and current discoveries in cancer biology.

- **Key Concepts**
  - **How were/are oncogenes and tumor suppressors discovered?**
  - **Who were scientists responsible for historically significant discoveries in cancer biology?**
  - **How are current cancer research efforts reshaping our view of cancer?**

BIMM134
Biology of Cancer

Lecture subject	Reading
April 1 - Introduction to Cancer A. Cancer Stats B. Genetics vs Environment	Chapter 2 – tBoC Pgs 31-44;59-69
April 3 – Principles of cancer initiation A. Properties of cancer initiating cells B. Cancer stem cell hypothesis	pdf on course website Meacham_Morrison_Nature_review_2013
April 8 – Tumor heterogeneity and clonal evolution of cancer A. Multi-step tumorigenesis B. Clonal evolution theory C. Hallmarks of Cancer	Chapter 11 – tBoC Pgs 439-474 pdf on course website New_Hallmarks_of_Cancer
April 10 – Tumor Viruses and the discovery of oncogenes	Chapter 3 - tBoC
April 15 – Cellular Oncogenes	Chapter 4 - tBoC
April 17 – Loss of proliferation control I RTKs – Ras	Chapter 5 – tBoC Chapter 6 - tBoC Pgs 175-193
April 22 – Loss of proliferation control II – A. Cell cycle Cdks B. Tumor suppressors - Rb	Chapter 8 – tBoC Chapter 7 – tBoc Pgs 231-254
April 24 – Midterm - I	
April 29 – Cancer Metabolism – Reuben Shaw Guest Lecture	
May 1 – Loss of feedback inhibition – A. nutrient growth control B. PI3K – mTOR	Chapter 6 – tBoC Pgs 193-202 pdf on course website

May 6– Avoiding cell growth suppressive signals – p53 and Apoptosis I	Chapter 9 - tBoC Pgs 331-378 pdf on course website
May 8 - Avoiding cell growth suppressive signals – Apoptosis II	pdf on course website
May 13 - - Avoiding cell growth suppressive signals - Senescence	Chapter 10 – tBoC pdf on course website

May 15 – Midterm 2

May 20 – Genomic instability and DNA damage – I	Chapter 12 – tBoC Pgs 511-538; 555-574
May 22 – Genomic instability and DNA damage - II	Chapter 12 – tBoC Pgs 538-555
May 27 – Cancer microenvironment and chemotherapy resistance A. Hypoxia and HIF1α B. Redox Stress and NRF2	pdf on course website
May 29 – Angiogenesis and Metastasis	Chapter 13 – tBoC Pgs 606-639 Chapter 14 – tBoC Pgs 641-694
June 3 – Cancer genomics – Rafael Bejar guest lecture	
June 5 – Cancer Immunology – Li-Fan Lu guest lecture	Chapter 15 - tBoC

June 12 – Final Exam 8AM