

BMSC 212 Cell Biology: Spring '09

Time and Room: 8:30 – 10:30 AM; Ross Hall 643

Course Director: Robert G. Hawley

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Weeks 1-4

Introduction to Eukaryotic Cells – Methods of Visualization

Jan. 12	Course overview and discussion of grading Eukaryotic cells	R. Hawley
Jan. 13	Microscopic imaging techniques	A. Popratiloff
Jan. 14	Flow cytometry	T. Hawley

Intracellular Organization and Trafficking

Jan. 19 **Martin Luther King, Jr. Day – No class**

Jan. 20 **Inauguration Day – No class**

Jan. 22*	The cytoskeleton	M. Bottazzi (*rescheduled)
Jan. 26	Membrane trafficking	J. Donaldson

Cell Contacts and Communication

Jan. 27	Integrins	M. Stepp
Jan. 28	Extracellular matrix and basement membrane	M. Stepp
Feb. 2	Intercellular junctions	V. Hu

Signal Transduction Pathways

Feb. 3	Cell fate signaling networks	I. Riz
Feb. 4	Ligand-gated ion channel receptors	T. Hales

Weeks 5-7

Developmental/Stem Cell Biology

Feb. 9	Tissue inductions in development	S. Moody
Feb. 10	Patterning and organogenesis	S. Moody
Feb. 11	Stem cells	R. Hawley

Tissue Formation and Repair

Feb. 16 **President's Day – No class**

Feb. 17	Hematopoietic system	A. Ramezani
Feb. 18	Cardiovascular system	T. McCaffrey
Feb. 23	Central nervous system	J. Corbin
Feb. 24	Immune system	D. Leitenberg
Feb. 25	Epithelial systems	M. Stepp

Course Description

In this course, students will attain knowledge about the fundamental processes of eukaryotic cell biology and cell systems. In so doing, students will be able to apply principles and concepts to solve biomedically relevant problems in preparation for advanced dissertation research in the biomedical sciences. The course consists of six modules, starting with microscopic imaging and flow cytometry techniques used in modern cell biology research. The next three modules cover cell structure and function, including cellular organelles, the cytoskeleton, membrane trafficking, cell contacts and communication, and signal transduction pathways. The fifth module provides an introduction to developmental and stem cell biology including tissue inductions and patterning during organogenesis. The final module covers tissue formation and repair, introducing students to the hematopoietic, immune, cardiovascular, nervous and epithelial systems.

Texts

Molecular Biology of the Cell, Fifth Edition by Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter, Garland Science (New York, N.Y.), 2008.

Molecular Cell Biology, Sixth Edition by Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Matthew P. Scott, Anthony Bretscher, Hidde Ploegh and Paul Matsudaira, W.H. Freeman and Company (New York, N.Y.), 2008.

Learning Outcomes

As a result of completing this course, students will be able to:

1. Visualize and analyze eukaryotic cells and their properties
2. Explain the fundamentals of eukaryotic cellular organization
3. Distinguish the different types of cellular communication
4. Apply cell fate signaling networks to developmental processes
5. Apply concepts on organ and tissue system formation to therapeutic applications
6. Synthesize the rapidly evolving knowledge on stem cells
7. Evaluate current scientific literature and the reliability of potential resources

Grading

The final grade will be based on a take-home exam on the material covered on Weeks 1-4, which will be distributed on Wednesday, February 4, 2009 (due by 5 PM on Monday, February 9, 2009), and a take-home exam on the material covered on Weeks 5-7, which will be distributed on Wednesday, February 25, 2009 (due by 5 PM on Monday, March 2, 2009). Each exam will consist of 10 essay/problem solving questions worth 5 marks each (answers limited to 1 page maximum) and will count for 50% of the final grade. Make-up exams are not given except under exceptional circumstances.

Class Policies

Class attendance is mandatory. A sign-in sheet will be passed around at the beginning of each class and the attendance list will be maintained by the IBS office. Students with three or more unexcused absences will lose a letter grade in the course.

<http://www.gwu.edu/~academic/Teaching/main.htm>

Academic Integrity

I personally support the GW Code of Academic Integrity. It states: “Academic dishonesty is defined as cheating of any kind, including misrepresenting one's own work, taking credit for the work of others without crediting them and without appropriate authorization, and the fabrication of information.” For the remainder of the code, see: <http://www.gwu.edu/~ntegrity/code.html>

Support For Students Outside The Classroom

DISABILITY SUPPORT SERVICES (DSS)

Any student who may need an accommodation based on the potential impact of a disability should contact the Disability Support Services office at 202-994-8250 in the Marvin Center, Suite 242, to establish eligibility and to coordinate reasonable accommodations. For additional information please refer to: <http://gwired.gwu.edu/dss/>

UNIVERSITY COUNSELING CENTER (UCC) 202-994-5300

The University Counseling Center (UCC) offers 24/7 assistance and referral to address students' personal, social, career, and study skills problems. Services for students include:

- crisis and emergency mental health consultations
 - confidential assessment, counseling services (individual and small group), and referrals
- <http://gwired.gwu.edu/counsel/CounselingServices/AcademicSupportServices>

Security

In the case of an emergency, if at all possible, the class should shelter in place. If the building that the class is in is affected, follow the evacuation procedures for the building. After evacuation, seek shelter at a predetermined rendezvous location.