

LS 5HA (4 units)
Biomedical Research: Concepts and Strategies

Instructors

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Course Description

In this class, you will be immersed in the world of biomedical research at UCLA. You will listen to two Faculty Research Seminars that will expose you to cutting-edge biomedical research conducted on campus. These seminars are one-hour lectures given by outstanding UCLA faculty on primary research projects from their own laboratories. They will introduce you to questions of general biological interest that are studied in UCLA research labs. This quarter we will focus on stem cells and blood development.

Each seminar will be followed by a series of classes in which we will explore the science behind the research. We will discuss scientific concepts and experimental approaches used in the talk. We will learn how to analyze a seminar in terms of its central questions, experimental data, conclusions of the speaker, significance of the work and possible future directions. We will also read and discuss papers from the primary literature with the same goals in mind. Finally, we will learn how to use the Internet to find published literature and scientific data that can enhance our research.

By the end of this class, you will have the confidence and intellectual tools to understand biomedical research!

Class Time and Location

Lecture: Tuesdays and Thursdays, 3:30-4:45 PM
 Kinsey Pavilion, Room 1240B

Assignment and Grading

Class participation is important! Your grade will depend in part on how much you speak up or ask questions in class. Remember, there is no such thing as a foolish question. If you don't understand something, it is more foolish not to ask a question! And some of the most simple or apparently naïve questions end up being the most provocative. So speak up!

There will be several short assignments or problem sets of 4-6 questions based on material covered in class. They will be used to monitor your understanding and to encourage you to think creatively about the science.

Your midterm assignment will consist of a short paper of about 3 pages, in which you will summarize the problem(s) studied by the seminar speaker, the experiments and their results, and the conclusions and significance of the work. You will also suggest one or two future directions that you might want to investigate if you were doing the research.

The final assignment will be a 3-5 page paper, the topic of which will be revealed later in the course.

Your final grade will be calculated as follows:

Class participation –	100
Problem sets –	350
Midterm paper –	250
Final paper –	300
Total –	1000 points

Course Evaluation

Please go to the following website to fill out a pre-course survey. There will be another survey at the end of the course at the same site. The URL is:

<http://sci.grinnell.edu/surveys/prot/cure.htm>

The login name is “cureresp” and the password is “blue2white”.

(tentative schedule)

Week 1

Tuesday, Apr. 3

Introduction. Components of a research seminar.
Overview of stem cells and other basic concepts.

Thursday, Apr. 5

Seminar 1. Dr. Hanna Mikkola – “Origins of blood:
Hematopoietic stem cells and their niches.”

Reading assignment – Kline, R.M. (2001) “Whose blood is it, anyway?”

Week 2

Tuesday, Apr. 10

What are stem cells and how can we study them?

Reading assignment – Cookson, C. (2005) “Mother of all cells”

Problem set due.

Thursday, Apr. 12

Niches for blood-forming stem cells.

Week 3

Tuesday, Apr. 17

Transplantation as an assay for long-term HSCs.

Reading assignment – Soares, C. (2005) “Repair workers within”

Problem set due.

Thursday, Apr. 19

Identifying cells by molecular markers.

Week 4

Tuesday, Apr. 24

Home-grown or imports? Where are placental HSCs born?

Reading assignment – Gibbs, W.W. (2005) “The California Gambit”

Problem set due.

Thursday, Apr. 26

How relevant is this to human development?

Week 5

Tuesday, May 1

Reading assignment – Research paper TBA.

Problem set due.

Thursday, May 3

Review. Introduction to model systems and genetic approaches.

Week 6

Tuesday, May 8

Midterm assignment 1 due. Recap of Seminar 1.

Thursday, May 10

Seminar 2. Dr. Utpal Banerjee – “Thicker than blood:
Drosophila as a hematopoietic model.”

Week 7

Tuesday, May 15
Problem set due.

Do flies bleed? Looking at blood cells in Drosophila.

Thursday, May 17

How do cells talk to each other? Understanding signal transduction.

Week 8

Tuesday, May 22
Problem set due.

What do you have to do to be a stem cell, anyway?

Thursday, May 24

Niches in model systems. Is there one in the lymph gland?

Week 9

Tuesday, May 29

The Hedgehog pathway - a key signaling mechanism in development.

Problem set due.

Thursday, May 31

Genetic changes underlying cancer progression.

Week 10

Tuesday, June 5

Can fly genetics help us understand cancer?

Thursday, June 7

Recap of Seminar 2. **Final assignment due.**