BioSci 0067 Foundations of Biology II Laboratory: Water Channels

Department of Biological Sciences
University of Pittsburgh

Faculty

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Office Hours: Tuesday 2-3 and Friday 1-2 *and* by appointment

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Linda O'Reilly, Ph. D.
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Office Hours: Tuesday 11-12 Langley Lobby

UTAs

Days & Time

Tuesday	8:30 – 11:20am (Dr. Grubb Langley A148)
Wednesday	9:00 – 11:50am (Dr. Bisi Langley A148)
Wednesday	9:00 – 11:50am (Dr. O'Reilly Langley A146)
Thursday	8:30 – 11:20am (Dr. Bisi Langley A148)
Friday	9:00 – 11:50am (Dr. Bisi Langley A148)
Friday	12:30 – 3:20pm (Dr. O'Reilly Langley A148)

Course Overview

This course is designed to ground students in the foundations of scientific reasoning using real hypothesis driven research. Students will work in lab to characterize mutations in the human Aquaporin 2 gene that lead to the disease Nephrogenic Diabetes Insipidus. Students will refine their scientific communication skills by keeping a laboratory notebook and presenting their findings in a scientific poster at the end of the semester.

Textbook

No textbook is required. The required readings are recently published papers on the course topic. They will be available on CourseWeb. Each week protocols will be posted on CourseWeb and some will have listed additional suggested readings from the web that you can read to learn more about the topics being covered.

CourseWeb

Course materials and updates will be posted on CourseWeb. You are expected to check regularly for notes, assignments, announcements, and other material. Main communication with the class will be via CourseWeb announcements and emails sent via Courseweb.

Course Policies

Attendance is mandatory and there will be no make-up labs. You are required to be in lab every week. Any absence must be properly excused by a doctor for an illness or a University official for University business. A written excuse with acceptable documentation must be submitted to the instructor within one week of the missed class or it will not be accepted (ideally the instructor will be notified before the absence). An unexcused missed lab will result in your final grade being reduced by one letter grade. Missing more than two labs for <u>any</u> reason may result in a failing grade for the class.

Objectives

At the end of the course, students will be able to:

- Develop hypotheses based on observed experimental results, and design experiments to test these hypotheses
- Perform lab techniques to answer new biological questions
- Present data/communicate in an appropriate scientific manner
- Evaluate experimental results and draw logical conclusions

Grading

Final grades will be based on assignments, evaluation of your laboratory notebook, the final poster and presentation of the poster, participation and preparedness. Final grades will be determined by the percentage of the total points you earn in the course. The points distribution will be roughly one third of the points for lab notebooks, one third for lab meeting and Journal Club type assignments, and one third for poster related assignments.

A+= 98-100%, A=93-97%, A-=90-92%, B+= 87-89%, B=83-86%, B-=80-82%, C+=77-79%, C=73-76%, C-=70-72%, D+=67-69%, D=63-66%, D-=60-62%, F=59% and below.

- **Assignments** – there will be assignments due throughout the term that will assess your overall understanding of the course objectives. Some may be given in class and some may be assigned as homework. These are written into the course schedule, but additional assignments may arise throughout the semester. Unless otherwise noted in the course schedule, all assignments are due at the beginning of class. Any assignment handed in late will be docked 10% and will not be accepted after two days late without special permission from the instructor.

- **Lab Notebook** – Each student must use "Labarchives" the University of Pittsburgh's electronic notebook to record and analyze all of the data related to your project. A link will be emailed to you inviting you to join the notebook, which you can access with your University email. Documenting your work in the lab is an essential part of developing your skills as scientists. Before coming to lab you are expected to read through the protocol for the day and prepare your lab notebook according to the provided handout. **At the beginning of the lab period the relevant sections of the notebook must be complete**. While we strongly encourage scientific discussions with your peers, your assignments and analysis of experiments must be your own work.

- **Final Poster** – Students will be working in groups throughout the semester to perform and analyze experiments. At the end of the semester, each group will assemble a scientific poster to be presented during the last week of class in our Research-based Foundations of Biology Lab Poster Symposium. The date and time of presentations will be announced in class and can be found in the course schedule.

Academic Integrity Cheating/plagiarism will not be tolerated. Students suspected of violating the University of Pittsburgh Policy on Academic Integrity, from the February 1974 Senate Committee on Tenure and Academic Freedom reported to the Senate Council, will be required to participate in the outlined procedural process as initiated by the instructor. A minimum sanction of a zero score for the quiz or exam will be imposed.

Disability Resources If you have a disability for which you are or may be requesting an accommodation, you are encouraged to contact both your instructor and the Office of Disability Resources and Services, 140 William Pitt Union, 412-648-7890/412-624-3346 (Fax), as early as possible in the term. Disability Resources and Services will verify your disability and determine reasonable accommodations for this course. For more information, visit www.studentaffairs.pitt.edu/drsabout.

Email Policy Each student is issued a University e-mail address (username@pitt.edu) upon admittance. This e-mail address may be used by the University for official communication with students. Students are expected to read e-mail sent to this account on a regular basis. Failure to read and react to University communications in a timely manner does not absolve the student from knowing and complying with the content of the communications. The University provides an e-mail forwarding service that allows students to read their e-mail via other service providers (e.g., Hotmail, AOL, Yahoo). Students that choose to forward their e-mail from their pitt.edu address to another address do so at their own risk. If e-mail is lost as a result of forwarding, it does not absolve the student from responding to official communications sent to their University e-mail address. To forward e-mail sent to your University account, go tohttp://accounts.pitt.edu, log into your account, click on Edit Forwarding Addresses, and follow the instructions on the page. Be sure to log out of your account when you have finished. (For the full E-mail Communication Policy, go to www.bc.pitt.edu/policies/policy/09/09-10-01.html.)

Office Hours The posting of office hours on the office door is University policy, and the responsibility of the faculty member as a courtesy and convenience to students. (Source:www.pitt.edu/~provost/ch3_off_hrs.htm). Most administrative offices are open from 8:30 a.m. to 5:00 p.m., Monday through Friday. A few offices, such as the College of General Studies, have extended hours. In addition, according to the Academic Integrity Guidelines, under I. Faculty Obligations, Point 2, faculty are "To be available at reasonable times for appointments with students, and to keep such appointments." (Source:www.as.pitt.edu/faculty/policy/integrity.html)

Anticipated Course Schedule:
Due to the nature of the research, the schedule may change throughout the semester based on the results of our experiments.

Week of:	Lab Discussions	LAB TECHNIQUES/ EXPERIMENTS - Prepare your notebooks accordingly	Homework - DUE at the start of Lab
9-Jan	Introduction to the Course	DNA gel electrophoresis	Due at the end of class - Notebook entry Introduction to the Project
16-Jan	Do we have the correct aquaporin DNA to put into yeast cells? Journal Club #1	Restriction Digests to check DNA and gel electrophoresis	Prepare Notebook Prepare for Journal Club #1
23-Jan	Discuss results of Digest How do we put foreign DNA into a different organism Lab Meeting #1	Yeast Transformations of AQP2 into *pdr5Δ* or *pep4Δ* + BY4742 Computationally predicting Transmembrane domains in a protein	Prepare Notebook Results Fig and Analysis - Restriction Digest Prepare for Lab Meeting #1
30-Jan	How do you determine if a protein is stable or is being degraded in the cell? Which pathway is degrading AQP2? Aspects of a Good Poster	Cycloheximide Chase	Prepare Notebook View Posters in the Building
6-Feb	Western Blotting Review Poster Introductions	Cell Extracts, SDS-PAGE, Transfer	Prepare Notebook Introduction for Poster

13-Feb	Antibodies and Chemiluminescence Using Image J to Quantify Chase Data Journal Club #2	Develop Western Blots Quantify and Graph Results	Prepare Notebook Journal Club #2
20-Feb	Where are the aquaporin mutants localized within the cell? Computational Modeling	Yeast Transformations of AQP2 into BY4742 Computational Modeling of Mutant AQP2	Prepare Notebook Results Fig. and Analysis - Cycloheximide Chase
27-Feb	Using density gradient centrifugation to determine localization of a protein in a cell	Lyse cells, Pour and Run Sucrose Gradients	Prepare Notebook Results Fig and Analysis - Computational Model of Mutant AQP2
6-Mar	**SPRING BREAK**	**SPRING BREAK**	**SPRING BREAK**
13-Mar	Resident proteins as markers for specific organelles **Guest Visit from a Research Lab** Lab Meeting #2	SDS-PAGE and Transfer	Prepare Notebook Set Up Your One Slide PowerPoint Presentation for your Poster - outline layout Prepare for Lab Meeting #2
20-Mar	Discuss good figures for the methods section Using Microscopy to determine Localization of Proteins within the cell Journal Club #3	Develop Western Blots Set Up for Indirect IF	Prepare Notebook Methods section for Poster Prepare for Journal Club #3

27-Mar	Indirect Immunofluorescent Microscopy	Indirect Immunofluorescence - make slides and examine slides that were made in the research lab Repeat experiments if necessary	Prepare Notebook Future Directions for Poster Results Fig and Analysis - Sucrose Gradient
3-Apr	Using Image J to quantify Cycloheximide Chase Data	Indirect immunofluorescence - examining slidesRepeat experiments if necessary	Prepare NotebookComplete Poster Draft
10-Apr	Course Surveys - OMETS and PITS Discuss poster session	Finish Data Analysis Final Poster Edits	Prepare Notebook - final summary of research project including all results and analysis Final Poster Due Friday 9am (except Friday classes)
17-Apr	POSTER SESSION DAY	**PRESENT POSTERS** - The poster session will be held in Langley Hall 219B on **Wednesday April 19th and Thursday April 20th**. If your class is held on Wednesday or Thursday you will present during class time, if you have class on Tuesday or Friday you will sign up with your group for a time slot to present on Wed or Thurs	

*** **Tuesday and Friday Classes** – Final Poster Session will be held on Wednesday April 19th and Thursday April 20th. You must sign up for a timeslot to present on one of these days.***