Membrane Biochemistry and Biophysics
Chem 674

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Lecture: Tuesdays, Thursdays, 11:30 am – 1:00 am, REIC 165

Text: Mary Luckey
Membrane Structural Biology: With Biochemical and Biophysical Foundations
Cambridge University Press
ISBN: 9780521856553
3/17/2008

Course:
This 3 credit course focuses on biophysical and biochemical processes involved in membrane mediated events. These include the chemical characteristics of membrane lipids and proteins, families of membrane proteins, ion channels, excitability and membrane fusion. We will address aspects of membrane lipid rafts and lipid-dependent regulation of protein function. All course topics will be discussed in biomedical context if appropriate, while using historic, current and review literature to supplement the primary text. The use of topics pertaining to student research will be discussed in the perspective of membrane biochemistry and signaling and this incorporation will be a large portion of this course.

Course Goals:
- Develop an understanding of the basic biophysical processes that are involved in membrane-mediated events.
- Develop an understanding of the different families of proteins classified as membrane proteins.
- Use basic concepts to formulate hypothesis, select pertinent literature, interpret experimental data and propose meaningful experimental approaches to solving current questions in membrane biochemistry
- Strengthen and develop resource sharing and individual and group presentation skills.

Learning Outcomes

1. Identify the primary functional components and chemical characteristics of cell membranes.
2. Correlate the physical properties of cell membranes and membrane proteins with their role in cell function.
3. Describe the processes of exocytosis and membrane fusion.
4. Identify the types and characteristics of integral membrane proteins present in cell membranes.
5. Lead literature discussion(s) in a current or relevant research area in Membrane Biochemistry and Biophysics.
6. Select key concepts from the text and arrange information in a relevant way for group dissemination and for use as a study guide. Use mixed technology or teaching aids. Group interaction is encouraged.

7. Create a multi-media project describing for example, a membrane protein or signaling pathway.

**Instructional Methods:**

The course is composed of instructor-led and group-prepared lectures, group discussion, student and instructor led manuscript review, and multimedia project presentations. Typically, a course topic will begin with an introductory lecture or group discussion with further exploration through discussions of primary literature. Some aspects of discussions are to identify “missing knowledge”, understand the materials and methods used, and critique result interpretation.

Blackboard will be utilized as a central communication platform for announcements, posting of lectures and reading material, and distribution/collection of exams. Other resource sharing will likely be used as the course progresses. A big part of this course will be to share and develop alternative methods for learning/teaching/disseminating scientific information. While this will focus on topics in membrane biochemistry, it is likely that most if not all of your research areas involve membranes to some extent, and it is encouraged to share your research. Sharing of multimedia resources for understanding scientific topics will benefit our own personal research as well as engaging and possibly strengthening the research of others. The amount of new technology, applications and tools available is mind-boggling so this class will act as a platform for sharing ideas, trials, successes etc.

**Evaluation:**

Students will be evaluated in four key areas – class preparation, leading and participating in manuscript discussion, in-class group and individual lectures, multi-media project, final exam.

- Preparation: 20%
- Lead and participation in manuscript review: 20%
- Lecture preparation and delivery: 20%
- Multi media project: 20%
- Final Exam: 20%

- Participation will be calculated based on a daily average score.
- Grading breakdown will be provided for projects.

**Course Policies:**

**Attendance:** Regular student attendance is expected to ensure consistent discussion and activities. Active student participation is expected and will receive a participation score.

**Presentations & lectures:** Students will receive adequate preparation time for all assignments and many assignments will have time allocated in class. Content and organization of topics are the primary concern, however presentation and discussion are also subject to score.

**Multi-media Project:** Most graduate students have fundamental pathway that either describes your work or is fundamental to the background of your work. For most of you, the membrane will be involved. This project is designed to create that “quintessential” slide or slides that you can
incorporate into your research presentations. The idea is to share resources with each other, whether it is applications such as drawing, model building, video and picture editing etc. and/or online resources like prezi, slide rocket and jux.

**Exams:** One final exam will be given and will constitute 20% of the overall grade. A makeup exam will only be allowed with pre-approval of the instructor or with an acceptable, documented reason such as unexpected illness, family emergencies or other unavoidable events. The format of makeup exams will be at the discretion of the instructor.

**Late Work:** All assignments are due when indicated in the class schedule. No late work will be accepted except in the case of illness or emergency.

**Ethical Considerations:**
The Chemistry Department’s policy of cheating is as follows: “any student caught cheating will be assigned a course grade of F. The student’s academic advisor will be notified of this failing grade and the student will not be allowed to drop the course”.

**Plagiarism Policy:**
Plagiarism is defined as the use of “other” intellectual property without proper reference to the original author. Intellectual property includes all electronic, spoken or print media. *Thus any information taken off the web is included under this statement.* Students are expected to cite all sources used. Cases of plagiarism will be taken seriously with a grade 0 for the particular assignment.

**Support Services:**
Support services will be provided by the University of Alaska Library system, online resources and the instructor. Additional services are available through Student Support Services ([http://www.uaf.edu/sssp/](http://www.uaf.edu/sssp/)) at UAF.

**Disabilities Services:**
We will work with the Office of Disabilities Services (203 WHIT, 474-7043) to provide accommodations for students with disabilities. If you have a disability and require special assistance, please contact the instructor as soon as possible. Students with disabilities must provide a written statement indicating any special requirements that will be necessary as early in the semester as possible (preferably within the first week).