



Misdirected, hijacked and used as  
camouflage:

Membrane traffic in human disease.

BIOL 590-019/ BIOL842

Advanced topics: CELL BIOLOGY & BIOCHEMISTRY SEMINAR

Meeting time: T/Th 11-12:15

## Syllabus

### Instructor:

Dr. Mara Duncan  
304 Coker Hall  
843-8435

### Course Description:

The course content is selected to give students a full overview of membrane traffic pathways and how these pathways or defects in these pathways contribute to a variety of diseases including: viral infection, cancer and bacterial pathogenesis. Readings include primary literature and review articles and will be available online.

The goal of this course is to teach students to read and evaluate primary literature and to familiarize students with common experimental techniques. This course uses three primary formats to achieve this goal.

- 1) At the beginning of the semester, each Thursday meeting will consist of a discussion of one or more research article addressing a major discovery leading to HIV therapeutic or prevention. Each Tuesday meeting will consist of a discussion of one or more review articles or techniques introducing a topic or approach for the following Tuesday.
- 2) In the second third of the semester, Tuesday meetings continue in the same format. Thursday meetings will consist of round table discussions of disease relevance for a particular aspect of membrane traffic. Each student presents his or her best justification for why studying this aspect is important to improve human health. These justifications are based on independent research.
- 3) In the final third of the semester, Tuesday meetings continue in the same format. Thursday meetings will consist of formal student presentations highlighting the research on some aspect of membrane traffic in human disease.

Grades are based on presentations (25%), questions sets (25%), participation (25%) and two exams (25%). Students are required to meet with the instructor prior to their presentations. Presentations will be evaluated based on accuracy as well as clarity. Each student in the class is expected to read the research article and answer a question set. Homework assignments are due prior to the corresponding discussion. Homework assignments are evaluated based on accuracy and clarity. Students can resubmit homework assignments for regrade of up to ½ the points within 2 weeks of a returned homework.

Exams are essay format and are open note. Exam answers will be evaluated based on accuracy as well as clarity.

**Feedback, resources and help:**

There are textbook and presentation resources available on blackboard. Dr. Duncan will be available to discuss papers, questions sets and exam questions in office hour. Within the week after a presentation, the presenter must meet with Dr. Duncan to get feedback on presentation.

<u>Date</u>	<u>Topics</u>	<u>Reading</u>
Week 1 Jan 12/14	Introduction and review of cell biology	TBD
Week 2 Jan19/23	Introduction to experimental design Background for COPII & vesicle formation assays	TBD
Week 3 Jan26/29	Primary literature COPII Background for SNARE and fusion assays	TBD
Week 4 Feb2/4	Primary Literature SNARES and fusion assays Background for Endocytosis and live cell imaging	TBD
Week 5 Feb9/11	Primary literature endocytosis Background for Retrograde transport and small molecule inhibitors	TBD
Week 6 Feb16/18	Primary literature Retrograde transport 1 <sup>st</sup> pitch session ER-Golgi traffic	TBD
Week 7 Feb23/25	Primary literature HIV effects on membrane traffic 2 <sup>nd</sup> pitch session intra-golgi traffic	TBD
Week 8 Mar 2/4	Spring Break	TBD
Week 9 Mar 9/11	Primary literature on Vac14 3 <sup>rd</sup> pitch session TGN-endosome traffic	
Week 10 Mar 16/18	Primary literature on viral entry Effective presentation skills	TBD
Week 11 Mar 23/25	Primary literature on cancer cell environmental modulations 4 <sup>th</sup> pitch session endocytosis	TBD
Week 12 Mar 30/April1	Primary literature on membrane traffic in dementia Student presentations	TBD
Week 13 April6/8	Primary literature on membrane traffic in cancer cell migration Student presentations	TBD
Week 14 April 13/15	Primary literature on bacterial pathogens in retrograde transport Student presentations	TBD
Week 15 April 20/22	Primary literature on intracellular bacteria Student presentations	TBD

Week 16 April 27	Wrap up and review	TBD
	Final exam	

## Appendix 1: Grading criteria

### Homework (25% of course grade):

High pass-Student answered all questions correctly or if no correct answer possible made a good attempt at a correct answer or pointed out the lack of a correct answer.

Pass-Student answered all questions some are incorrect.

Low Pass-Student answered some questions which may or may not be correct

### Final (25% of course grade): Take home exam due April 27.

High pass- Student answered all questions correctly or if no correct answer possible made a good attempt at a correct answer or pointed out the lack of a correct answer.

Pass-Student answered most or all questions some may be incorrect.

Low Pass-Student answered only some questions which may or may not be correct

### Weekly presentation (50% of course grade):

#### Focus questions (25% of presentation grade)

High pass-Directs attendee to most important aspects of paper, reveals attendee understanding of techniques used, reveals attendee understanding of paper conclusions, reveals attendee understanding of whether experiments support conclusions.

Pass- lacks a few of the above criteria, unclear, no answer possible

Low Pass-e.g. not based on the paper, random facts

#### Background and significance (25% of presentation grade)

High Pass-Engaging presentation, contains an appropriate level of detail, introduces as much background information as required to understand paper, all items are factually correct, identifies important previous research and explains importance of current study

Pass- lacks a few of the above criteria and/or a few factual errors

Low Pass-e.g. unclear, missing essential information, not based on the paper, clear lack of understanding of assigned paper, many factual errors

#### Group discussion (35% of presentation grade)

High Pass-Involves many attendees in the discussion, allows attendees to demonstrate understanding of techniques used, leads attendees to the correct answer for fact based questions, draws attendees to point out flaws and strengths of the conclusions and/or experiments, stimulates an engaging discussion and allows appropriate time for open ended discussion.

Pass- lacks a few of the above criteria

Low Pass-e.g. unclear, does not involve attendees, no prepared questions, does not understand paper

#### Final exam question (15% of presentation grade)

High Pass-Focuses on most important aspects of paper, reveals attendee understanding of techniques used and/or paper conclusions and/or whether experiments support conclusions, and exhibits a clear correct answer with an easy grading rubric.

Pass- lacks a few of the above criteria, unclear, no answer possible

Low Pass-e.g. not based on the paper, random facts