Misdirected, hijacked and used as camouflage: Membrane traffic in human disease.

BIOL 842 CELL BIOLOGY & BIOCHEMISTRY SEMINAR
Meeting time: TBD

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. Each week selected student(s) will lead a discussion about papers selected for that meeting. One of the goals of this course is to teach students how to lead a discussion and design graded problems. One week prior to the presentation, the student will provide attendees with 2-4 focus questions which must be handed in at the beginning of class. After a short formal presentation detailing the background for the paper, a student will lead a round-table discussion similar to the sorts of round table discussion a professor might lead in an undergraduate seminar. In the round table discussion, the leader may pose questions to other class participants about experimental design and interpretation of results (see Appendix 1 for details).

Grades:
One half of the grade will be determined by the student’s presentation, one quarter will be determined by weekly homework assignments and one quarter will be determined by a final exam. Students presenting papers will design and grade 2-4 focus questions to be handed in at the beginning of the class period. Students will also design one question for the final exam based on their presentation. See Appendix 1 for grade criteria.

Feedback, resources and help:
There are textbook and presentation resources available on blackboard. I will be available to discuss papers, focus questions and final exam questions by appointment. Within the week after a presentation, the presenter must meet with me to get feedback on presentation.
January 13, 2009—Meeting 1: Organizational meeting.
Topics: Course organization issues
Meeting time
Group responsibilities (what should the policy be on)
Late focus questions
Missed classes as an attendee
Missed classes as a presenter
What will the final look like?
Can we change the assigned papers?
Getting to know the class
What do you know about membrane traffic?
How do you read a paper?
How to organize a background and significance
How to design focus questions
How to lead a discussion
Preparation
Canned questions (describe fig 1, what is the control in this experiment)
Open ended questions (What is missing? What would you do next?
Does this help the paper?)
How to involve all students in a discussion
How to deal with a quiet class
How to manage over talkers
Developing a teaching portfolio
January 20: No meeting.
January 27 Meeting 2: How do viruses invade our cells #1-clathrin mediated endocytosis
Paper: Assembly of endocytic machinery around individual influenza viruses during viral entry. Rust el al.
Nature Structural and Molecular 2004. 11:567-573
Review: Penetration of Nonenveloped Viruses into the Cytoplasm
Presenter:
February 3 -Meeting 3: How do viruses invade our cells #2-caveolae
Paper: Caveolar endocytosis of simian virus 40 reveals a new two-step vesicular transport pathway to the ER
L. Pelkmans et al. NCB 2001. 3:473-483
Review: Virus Entry: Open Sesame
Presenter:
February 10-Meeting 4: How do viruses invade our cells #3-non-non
Paper: Clathrin- and Caveolin-Independent Entry of Human Papillomavirus Type 16- Involvement of Tetraspanin-Enriched Microdomains (TEMs)
G. Spoden et al. PLOS ONE 2008. 3:e3313
Review: Tetraspanins as Regulators of Protein Trafficking F. Berditchevski and E. Odintsova Traffic 2006.8:89-96
Presenter:
February 17-Meeting 5: How do viruses like HIV prevent their host cells from being destroyed by the immune system


Presenter:

February 24-Meeting 6: How do viruses mask themselves in our own cellular components?


Presenter:

March 3-Meeting 7: Intracellular bacteria 1.


Presenter:

March 10-Spring Break

March 16-Meeting 8: Intracellular bacteria 2


Presenter:

March 23-Meeting 9: Bacterial toxins and membrane traffic-Shiga toxin


Presenter:

March 31-Meeting 10: Bacterial toxins and membrane traffic-Cholera toxin

Paper: Retrograde transport of cholera toxin from the plasma membrane to the endoplasmic reticulum requires the trans-Golgi network but not the Golgi apparatus in ExoZ-treated cells. Y. Feng et al. EMBO reports. 2004 5:596-601.
Presenter:

April 7-Meeting 11: Membrane traffic in cell overgrowth-ESCRTs
Presenter:

April14-Meeting 12: Membrane traffic in cell overgrowth-HPV and lipid rafts
Paper: HPV-16 E5 oncoprotein upregulates lipid raft components caveolin-1 and ganglioside GM1 at the plasma membrane of cervical cells
F.A. Suprynowicz et. al. Oncogene 2008. 27:1071–1078
Presenter:

April 21- Meeting 13: Traffic proteins in schizophrenia
Paper: Evidence That the BLOC-1 Protein Dysbindin Modulates Dopamine D2 Receptor Internalization and Signaling But Not D1 Internalization. Y Iizuka Journal of Neuroscience 2007. 27:12390-12395
Presenter:

April 27: Final exam due

May 4: Student grading of final exam due.

Unpresented paper
(The contribution of normal secretion to the cancer micro environment
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