

IMUN 601 Molecular Immunology – Syllabus – Fall 2019

Course Director: Andrew Wells: adwells@penndmedicine.upenn.edu

Purpose

The purpose of this course is to provide examples in which the cell biology topics covered in BIOM 600 are studied in the context of immune cells or used to explain immune system function. This course will help students become proficient at reading and critically assessing the published literature and encourage students to actively participate in scientific discussions with their peers.

Format

The course format will be as follows:

We will meet once weekly (Thursdays, 10:00 – 11:30 am, B205 Richards) to discuss one of the papers provided by participating faculty members. This is not necessarily the most cutting-edge article in the field, but one that demonstrates key cell biology concepts. **All articles are available as pdf files on the Canvas site.**

Each week, one student (as assigned) will give a 10-15 minute chalk-talk style overview of the key concepts covered in the article. PowerPoint presentations are not allowed. After the assigned student introduces the paper, other students will take turns presenting figures from the paper. The discussion of each figure will cover:

- 1) What is the question being addressed?
- 2) Describe the techniques being used.
- 3) State the results.
- 4) Explain the statistical analysis used to interpret the data.
- 5) What are the authors' conclusions?
- 6) Are there alternative explanations? Were the appropriate controls used?
- 7) How did this figure fit within the overall context of the paper?

As a group, we will also discuss:

- 1) Whether the paper is convincing, and why or why not.
- 2) The significance of the work to the fields of immunology and cell biology.
- 3) Unresolved questions for the field going forward.

On Canvas you will find copies of the course schedule as well as pdf files for the individual papers we will be considering. The course schedule contains contact information for all course faculty and a list of students assigned to each paper. You are strongly encouraged to contact the faculty member associated with the paper to discuss your 10-15 minute overview before your

scheduled date. Participation is a big part of your grade in this class. Be prepared to participate in discussion of all figures and all aspects of the papers.

Final Project

At the end of the term there will be a short “final project”. This final project will allow you to hone your analytical and writing skills while learning something new about a topic of interest. To complete this project you will select an immunology-focused paper that is related to a topic covered in BIOM 600. Based upon this published work you will write a brief (1- 2) page review that includes an illustration (model) of the key findings.

The paper should include the following parts:

- 1) Synopsis of the main conclusion(s) of the paper.
- 2) A schematic model (illustration) of the findings.
- 2) A summary of methods used and key experimental discoveries.
- 3) How it draws upon cell biology and basic cell biological principles.
- 4) How this impacts our understanding of immune system functions.
- 5) Future questions related to this topic that remain unresolved.
- 6) Literature cited

Final projects must be submitted by December 12th via email to Andrew Wells (adwells@penncmedicine.upenn.edu). Also please direct any questions about the project or requirements directly to Andrew Wells (adwells@penncmedicine.upenn.edu).

Assessment and Course Grades

Grades for this course will be determined by:

- 1) The quality of your 10-15 minute overview (approximately 25%).
- 2) Your overall level of participation and intellectual engagement (approximately 50%)
- 3) The quality of your final project (approximately 25%).

IMUN 601 Molecular Immunology 2019

Thursdays, 10:00 – 11:30 am
B205 Richards

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THEMES (based on BIOM 600)

Signal Transduction

- NFkB (May)
- Signal transduction (Wells)
- Ubiquitin regulation (Oliver)

Cytoskeleton and Cell Motility

- Immune cell motility
(Burkhardt/Roy)
- Cytoskeleton (Burkhardt/Roy)

Membrane traffic

- Protein folding (Argon)
- Immune endocytosis (Eisenlohr)

Ion Channels

- Ca²⁺ ion channels (Freedman)

Cell Stress and Cell Metabolism

- Cell stress response (Argon)
- Immune cell metabolism (Bailis)

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DATE	FACULTY	TOPIC	PAPER	STUDENT
9/5	May	NFkB: Gateway to cell signaling	Sen/Baltimore, Cell, 1986	Amanda
9/12	Wells	Signal transduction	Razani, Sci Signaling, 2008 & Lee, Science, 2005	Razani – Lee –
9/19	No class	Writing Week	-----	-----
9/26	Oliver	Ubiquitin regulation of immune signaling	Ahmed, NI, 2011	
10/3	Oliver	Ubiquitin regulation of T cell persistence	Onizawa, NI, 2015	
10/10	Argon	Protein folding or exocytic trafficking	Feige, Molecular Cell, 2009	
10/17	Eisenlohr	Immune endocytosis	Sengupta, EMBO, 2019	
10/24	Burkhardt/ Roy	Immune cell motility	Lämmermann, Blood, 2012	
10/31	Burkhardt/ Roy	Actin cytoskeletal control of T cell activation	Kumari, eLife, 2015	
11/07	No class	IGG Retreat	-----	-----
11/14	Argon	Cell stress response	Zhang, JCI, 2005	
11/21	Freedman	Calcium ion channels	Oh-hora, Immunity, 2013	
11/28	No class	Thanksgiving week	-----	-----
12/5	Bailis	Immune cell metabolism	Chang, Cell, 2013 & Xu, Nature, 2017	Chang – Xu –
12/12	No class	Paper due	-----	-----