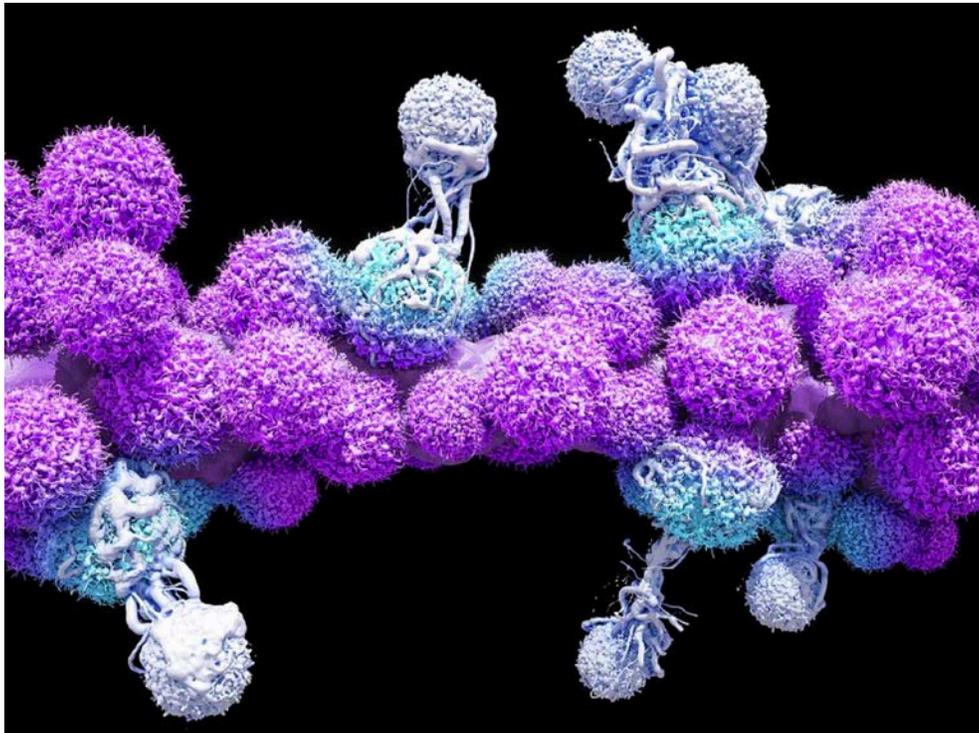


Emerging Concepts in Immunology



T Cells Attacking Cancer Cells is a photograph by Maurizio De Angelis

August 29 – October 31, 2018

SCR1/2/3/4

Wednesday/Friday 3:00 – 5:00 PM

EMERGING CONCEPTS IN IMMUNOLOGY

COURSE DETAILS

GS06 1102 Emerging Concepts in Immunology (2 Credit hours)

Fall Semester (Half Semester)

Course Coordinator: Pamela Wenzel, Ph.D.

Time and Location: Wednesday, Friday 3-5 PM

SCR1/2/3/4

Rooms: 2SCR1 room 1, room 5; 3SCR5.3202ab; 4SCR1.1110

(See Course Outline for classroom location for each session)

OBJECTIVES

This course will provide an understanding of emerging concepts in immunology. From current literature, students will explore new areas of research in antigen processing, cytokines, development of T and B lymphocytes, antigen recognition by T lymphocytes, cellular activation, and cell interactions. Each student will read and critically assess selected papers in molecular and cellular immunology. Students prepare several oral presentations and gain experience leading scientific discussions in a small group setting. Papers presented in this course will be used as the basis for developing a proposal in the GSBS Scientific Writing course.

Competencies to be acquired in this course include all core competencies of the Immunology Program, with emphasis on critical thinking and presentation skills.

FACULTYCoordinator:email**Pamela Wenzel, Ph.D.**Pamela.L.Wenzel@uth.tmc.edu**UTHealth Pediatric Surgery/Institute of Molecular Medicine**Lecturers:**Gregory Lizee, Ph.D.**glizee@mdanderson.org**MDACC Melanoma Medical Oncology/Immunology****Momoko Yoshimoto, M.D., Ph.D.**Momoko.Yoshimoto@uth.tmc.edu**UTHealth Institute of Molecular Medicine****Tomasz Zal, Ph.D.**tzal@mdanderson.org**MDACC Immunology****Jin Seon Im, M.D., Ph.D.**JIm@mdanderson.org**MDACC Stem Cell Transplantation and Cellular Therapy****Qing Ma, Ph.D.**qma@mdanderson.org**MDACC Stem Cell Transplantation-Research****Jagannadha Sastry, Ph.D.**jsastry@mdanderson.org**MDACC Immunology****Kimberly Schluns, Ph.D.**kschluns@mdanderson.org**MDACC Immunology****Laura Bover, Ph.D.**lbover@mdanderson.org**MDACC Genomics Medicine/Immunology****Michael Curran, Ph.D.**MCurran@mdanderson.org**MDACC Immunology****Rick Wetsel, Ph.D.**Rick.A.Wetsel@uth.tmc.edu**UTHealth Institute of Molecular Medicine****Jeffrey Actor, Ph.D.**Jeffrey.K.Actor@uth.tmc.edu**UTHealth Pathology and Laboratory Medicine****Shao-Cong Sun, Ph.D.**ssun@mdanderson.org**MDACC Immunology****Dorothy Lewis, Ph.D.**Dorothy.E.Lewis@uth.tmc.edu**UTHealth Internal Medicine – Infectious Diseases****Florencia McAllister, M.D.**FMcAllister@mdanderson.org**MDACC Clinical Cancer Prevention**

EMERGING CONCEPTS IN IMMUNOLOGY
SCR1/2 Conference Center, Wed/Fri 3-5 PM

COURSE OUTLINE

SESSION	DATE	ROOM	INSTRUCTOR	SESSION TOPIC
1	Wed Aug 29	4SCR1.1110	Pamela Wenzel	Introduction
2	Fri Aug 31	4SCR1.1110	Pamela Wenzel	Hematopoiesis
3	Wed Sept 5	2SCR1 room 5	Gregory Lizee	MHC, Antigen Presentation
4	Fri Sept 7	2SCR1 room 5	Momoko Yoshimoto	Marginal Zone B Cells
5	Wed Sept 12	2SCR1 room 5	Tomasz Zal	TCR Immune Synapse
6	Fri Sept 14	2SCR1 room 5	Tomasz Zal	$\gamma\delta$ and Other Non-classical T Cells
7	Wed Sept 19	2SCR1 room 5	Jin Seon Im	CD1 Restricted T Cells and Diseases
8	Fri Sept 21	2SCR1 room 5	TBA	TBA
9	Wed Sept 26	2SCR1 room 4	Qing Ma	GVL and Tumor Immunotherapy
10	Fri Sept 28	2SCR1 room 5	Jagannadha Sastry	Vaccine and Adjuvants
11	Wed Oct 3	2SCR1 room 5	Kimberly Schluns	Memory T Cell Differentiation
12	Fri Oct 5	2SCR1 room 5	Laura Bover	Monoclonal Antibodies
13	Wed Oct 10	2SCR1 room 5	Michael Curran	Checkpoint Blockade
14	Fri Oct 12	3SCR5.3202ab	Rick Wetsel	Complement
15	Wed Oct 17	2SCR1 room 1	Jeffrey Actor	Inflammation/Innate Immunity
16	Fri Oct 19	No class		Immunology Program Retreat
17	Wed Oct 24	2SCR1 room 5	Shao-Cong Sun	Metabolic Regulation of T Cell Function
18	Fri Oct 26	2SCR1 room 5	Dorothy Lewis	T Cells in Adipose Tissue
19	Wed Oct 31	2SCR1 room 5	Florencia McAllister	Tumor Microenvironment

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GRADING CRITERIA

50% Presentations

- a. Coverage of relevant background literature and identification of critical observations
- b. Identification of critical problems and hypotheses addressed in the paper
- c. Understanding of the experimental design and methods utilized
- d. Presentation, interpretation and discussion of the data
- e. Length and style of presentation

15% In Class Quizzes

- a. Short (5 minute) multiple choice or short answer quiz at the beginning of class on papers to be presented – 1 question per paper

35% Participation/Attendance

- a. Novelty/originality of ideas expressed
- b. Relevance of comments to the issues being discussed
- c. Frequency of productive contributions to discussion

EMERGING CONCEPTS IN IMMUNOLOGY

EVALUATION SHEET FOR ORAL PRESENTATIONS

Scoring for each category:

1.9-2.0 – Excellent

1.6-1.8 – Good

1.4-1.5 – Fair

1.2-1.3 – Poor

Presenter:

Instructor:

Paper #:

Date:

1. Coverage of Relevant Background Literature and Identification of Critical Observations Score:

2. Identification of Critical Problems and Hypotheses Addressed in the Paper Score:

3. Understanding of the Experimental Design and Methods Utilized Score:

4. Presentation, Interpretation, and Discussion of the Data Score:

5. Length and Style of Presentation Score:

Overall Score:

EMERGING CONCEPTS IN IMMUNOLOGY

CRITERIA FOR ORAL PRESENTATIONS: GENERAL COMMENTS

Summary of the OPTEMA approach

O = **Critical Observations (CO)** are trust-worthy facts (not hypotheses)

P = **Problematization: Critical Problems (CP)** are (1) based on critical observations and (2) worth solving

T = **Testable ideas** (hypotheses, engineering designs, etc.) potentially solve problems and make specific predictions. Hypotheses are NOT predictions.

E = **Experimental Design** will test the prediction, including logical controls. Designs tests predictions, not hypotheses.

M = **Materials and Methods** to realize the experimental design

A = **Analysis**

1. Coverage of Relevant Background Literature and Identification of Critical Observations

- a) **Relevant background.** This is the information the audience needs to understand
- a. why they should trust the critical observations
 - b. why the critical problem is important
 - c. why the hypotheses are proposed (the “supporting observations”)
 - d. how the hypotheses make the predictions
 - e. how the experimental design works
 - f. how the methods work

The background material should not be presented entirely at the beginning of the presentation, but *when it is needed*.

By “coverage” we mean your ability to *teach* the material, which requires you not only to know it, but to understand it well enough to teach others to teach it.

- b) **Critical observations.** These are statements of “fact” that justify the critical problem. They are critical in two senses,
- a. they are *decisively factual*
 - b. they can be made into a critical problem

Highly effective writers make it very clear what problem they are solving, but most will not be clear about this at all and you will have to *reconstruct* the CP.

- c) **When and what to read for background.** Read background *after* you have read the paper through, and identified key questions for yourself. It is reasonable to *consult* five to ten background papers, mostly chosen from the reference list of the paper; perhaps detailing a key methodology or phenomenon. Another paper might be a review article. You **SHOULD** check to see if anyone else has recently published in the area. Be sure you understand the methods. You do not have time to present all the background, but you may need it to respond adequately to questions.

2. Identification of Critical Problems and Hypotheses (Testable ideas) Addressed in the Paper

Problem-type	Example	Testable ideas	Common Design and prediction types
Mechanistic	How does Y happen? What is the mechanism of reverse diapedesis?	Mechanistic hypotheses X causes Y through M	Necessity: inhibiting M will cause less Y after X Sufficiency: more M will cause Y independently of X.
Design-Engineering	How can we make Y happen? How can we increase tumor infiltration by CAR T cells?	Design Y can be achieved by doing X	Sufficiency: Doing X will cause Y
Description/Search	What diagnostic markers are found on cells undergoing reverse diapedesis? What gene is selectively required for reverse diapedesis?	Typically vague Markers will belong to a certain set of molecules Gene is selectable Gene is selectively expressed	Descriptive studies Arrays, screens, pull-downs Selections

- a. Critical problems.** There are two sets of CP and two sets of hypotheses.
- i. The first or “parent” problem is the one that the paper as a whole addresses. There should be a single parent CP. For example, “How do neutrophils carry out reverse diapedesis?”
 - ii. The many critical problems that arise while unfolding of the story. For example, in Fig 1 the authors might find that chemokine X is needed for reverse diapedesis. This creates a new critical problem: “How does chemokine X cause reverse diapedesis?”
- b. Testable Ideas.** If true (effective), the hypothesis (design) solves the problem. If true (effective) the hypothesis (design) predicts certain things will be observed if a certain experimental design is executed appropriately (as verified by controls). Note that:
- i. Predictions are not hypotheses
 - ii. Multiple hypotheses can make the same predictions
 - iii. Failed predictions do not automatically falsify the hypothesis, because the design or execution of the design could be flawed

3. Understanding the Experimental Design and Methods Used

- a. **Design.** This provides the logical conditions that permit the prediction. It is the “methodology”, “strategy” or “approach” used to solve the problem. You should explain the design in a few words: necessity, sufficiency, etc.
- b. **Materials and Methods.**
 - i. These refer to the materials and techniques used to carry out the design.
 - ii. Explain what your audience needs to know but doesn't already know.
 - iii. Be prepared to explain anything.
 - iv. Controls are there to make sure that the logical conditions of the test are in place. You need positive controls for cases when you fail to get the predicted result. You need negative and specificity controls for cases when you do get the predicted results.

4. Presentation, Analysis and Interpretation of the Data

- a. **Presentation.**
 - i. **DO** : Background/Introduction. Set up the parental CO and CP. It is often helpful to make up a graphic which illustrates the central and any competing hypotheses, as well as one to illustrate the critical methodology. Be concise and brief. Be effective. Teach your audience. What do you want them to know at the end of your presentation?
 - ii. **DO NOT**: present every figure and supplementary figure.
- b. **Analysis and Interpretation.**
 - i. Present the critical data: If there are 7 figures and 4 tables, you may want to use only the three most important figures and the two most important tables.
 - ii. Be critical: Decide how solid the important data really are, and let us know what you think.
 - iii. Be discriminating: Some experiments are shaky but not critical to the interpretation.
 - iv. Be logical: Do NOT say : “Next they did”. Do say, “this result led to a new question or problem which is.....”
 - v. Future Directions (re-problematization): derive from re-problematizing what is not known.

Future directions (assuming a parent problem of what mediates reverse diapedesis of neutrophils)		
Type	Comment and example	Future direction and example
Caveats	<p>What is uncertain about the findings?</p> <p>The antibody for the adhesion molecule might not be specific.</p>	<p>Repeat with another antibody</p> <p>Demonstrate specificity</p> <p>Use Fc-block</p>
Unfinished Business	What remains unsolved from the original CP?	What prevents reverse diapedesis during forward diapedesis?
New critical observations	How can the work be extended deeper into the problem?	<p>What is the ligand for this molecule?</p> <p>What controls expression or function of adhesion molecule?</p>
New Directions	What "sibling" or "unrelated" problem does this make me think of solving?	<p>Does reverse diapedesis of PMN occur during multiple sclerosis? (new problem is about MS)</p> <p>Do T cells carry out reverse diapedesis? New problem is about T cells.</p>

5. Length and Style of Presentation

- a. **Timing.** Time management is one of the most important professional skills. Your listener's time is valuable to them. If someone else is presenting, they should not be squeezed out of their allotted time, or be forced to present to a tired audience. Even if you have just won the Nobel Prize, keep to your allotted time. For a thirty minute time-slot, plan on about 3 minutes for introduction, and at least five minutes for discussion at the end. Be prepared for some give-and-take during the presentation, but also learn to manage the audience.
- b. **Style.** The whole point of a presentation is to *communicate effectively*. Your style is yours. If it works, it works.
- c. **Connection.** STAND UP!!! Make sure you have the attention of everyone. Bring their eyes up to yours or to the board/screen. Make eye contact with different people, including those in the back of the room.
- d. **Visibility.** If you use a pointer-use it effectively. But remember that not everyone will see your pointer - so make the pointer be a complement to your voice: tell your audience where to look on the slide ("in the upper right panel", etc.).
- e. **Audibility.** Speak up and clearly. Articulate speech and thoughtful words are useless if no-one can hear you.
- f. **Visual clarity.**
 - i. Use LARGE FONTS on the screen so the audience can see – 22 or larger.
 - ii. Keep each visual field simple (one figure per screen usually, avoid extraneous visual noise such as background graphics or cute but unneeded graphics).
 - iii. Make sure you use high resolution imports from PDF files, or use high resolution jpeg files.
- g. **Demeanor.** You are making a professional presentation. In general, forget "jokes" and "cuteness". But, if you are a humorous person, there is no need to change that.
- h. **Clarity.** Avoid the use of lab jargon. Keep the ideas simple and straightforward. Use the right word, and don't mispronounce them. It is unprofessional to make a presentation and not know how to pronounce an author's name, or the name of a reagent. If you don't know- ask someone who does know. This is good advice for when you introduce your own students, or a visiting speaker.

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TIPS FOR PRESENTATIONS

This document includes tips for both primary talks and the impromptu format/popcorn style discussion.

Before the day of your presentation, you should check in with the faculty running your session to be sure that you include appropriate figures from your paper. Each figure panel should be legible on the screen, so you'll likely need to split figure panels across slides. You should also ask if the faculty would like you to include any supplemental figures in the presentation file.

The following 4 points are less relevant for the impromptu format, but should be seriously considered for primary presentations and future scientific talks during your career:

1. We find that the background info is best leveraged when woven throughout the talk. Just before a complex experiment or description of an especially critical reagent, the speaker includes a slide, diagram, or description dedicated to the experiment or reagent.
2. The best talks include a brief explanation of important aspects of a reagent/tool which highlight the reason(s) it/they were selected. For example, NSG mice were used because they lack T and B cells, which permitted specific analysis of the human T cells they introduced in the human PBMC.
3. Another strength of the best talks is that they include summary text over key data which interprets the data and leads to the next question/hypothesis/conclusion (for example, the data indicated "x", so the authors hypothesized "y").
4. A critical component of facilitating audience understanding is the ability to walk the audience through the figure (point at axes and describe what they represent, then point to key data or even highlight the important finding with a red box or arrow).

As a primary presenter running the introduction and conclusion of the impromptu or popcorn style discussion, I also include some tips and lessons learned from past years' strongest presentations. Some items are relevant to the impromptu format (for example, background information), whereas others related to the figures portion will not be required (textual data summaries over figure panels). Please also revisit suggestions in the criteria file included in the syllabus.

1. The most successful talks provide a view of the big picture at the start – "why do we care about this research?"
2. The best talks also draw upon background info from other sources/from other papers and even present primary data or images from that other work.
3. Addition of caveats, criticisms, future directions improves impressions and fosters audience interest

As a presenter of data/figures (drawn randomly from the audience), you'll want to explain the experimental method briefly and emphasize why certain reagents/experimental designs were selected, describe the data (walk the audience through the details, any relevant graph axes, plots, etc.), interpret the meaning of the data (what question is answered), and indicate if possible what the next logical question/hypothesis/step might be in the research (this will prepare us for the next figure).