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BIOM 502.01: Advanced Immunology

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ADVANCED IMMUNOLOGY (BIOM 502)
SPRING 2018 SEMESTER
SYLLABUS

Professor: Scott Wetzel CHCB 216 x2168 Email scott.wetzel@mso.umt.edu
Meeting Time: Monday 2:00 – 3:30 and Wednesday 2:00 – 3:00
Meeting Location: Monday SB270 Wednesday SB 337
Textbook: None Required. Course will be based on current review articles and primary literature.
Recommended for reference: Parham *The Immune System* or Janeway's *Immunobiology* 9th ed.

COURSE OVERVIEW: This course is designed as a literature survey of current topics in immunology. Each session (or week) we will cover a topic by reading a review article as well as one or more related research articles from the primary literature. This is a discussion-based course and as such these **ARTICLES MUST BE READ BEFORE ATTENDING CLASS**. The review articles are listed in the schedule below. In order to keep the class as current with the literature as possible, under extraordinary circumstances substitutions of the primary literature articles may be made up to 2 weeks prior to the class in which they will be discussed. No changes in reading material will be made within the 2 weeks of a particular lecture.

GRADING will be based on the following:
100 points – Midterm exam (take home exam)
105 points – Grant Proposal (100 for paper, 5 pts for Letter of Intent)
50 points – Research Article Reviews
35 Points – Grant review
30 points – attendance, participation, preparation, and consciousness

Final grades will be based upon a straight 10% grading scale based upon the total number of points (90% for A, 80% for B, 70% for C, 60% for D, below 60% = F). Late policy is outlined below.

ASSIGNMENT DUE DATES

MIDTERM EXAM: Emailed out March 16, Due March 23 5 PM

GRANT LETTER OF INTENT: Due 5 pm April 6

FINAL GRANT PROPOSAL: Due 5 pm Friday April 27

GRANT REVIEW: Due 5 pm Friday May 4

* ALL Papers turned in electronically, MUST be in .doc/.docx or .pdf format (as indicated)

CLASS SCHEDULE

| WEEK | DATES | MONDAY | WEDNESDAY |
|------|------------------|---|---|
| 1 | Jan 22 Jan 24 | Introduction, Syllabus, Immunology Review | Immunology Review #2 |
| 2 | Jan 29 Jan 31 | Immunology Review #3 | Immunology Review #4 |
| 3 | Feb 5 Feb 7 | Immunology Review #5 & Techniques | Immunology Review #6: Immunological Techniques |
| 4 | Feb 12 Feb 14 | Pillars: VDJ, MHC Restriction, Clonal Selection, CD4 Subsets | Pillars: Regulatory T cells |
| 5 | Feb 19 Feb 21 | PRESIDENT'S DAY HOLIDAY-- NO CLASS | Endogenous Ligands in Pos Selection |
| 6 | Feb 26 Feb 28 | Necroptosis | Necroptosis |
| 7 | Mar 5 Mar 7 | T Follicular Helper & T Follicular Regulatory Cells in SLE | T Follicular Helper & T Follicular Regulatory Cells in SLE |
| 8 | Mar 12 Mar 14 | Pyroptosis | Pyroptosis MIDTERM EMAILED MAR 16 |
| 9 | Mar 19 Mar 21 | Microbiota and Cancer | Innate Memory MIDTERM DUE 5PM MAR 23 |
| 11 | Mar 26 Mar 28 | SPRING BREAK - NO CLASS | |
| 12 | Apr 2 Apr 4 | Gasdermin D Regulates Interleukin-1 Secretion from Living Macrophages | Cytokines in CD8 ⁺ Development LOI DUE 5PM APR 6 |
| 13 | Apr 9 Apr 11 | Antibody-dependent Enhancement of Dengue Virus | IgA ⁺ Cells Inhibit Tumor Immune Response |
| 14 | Apr 16 Apr 18 | NLRP3, NK & and Cancer | Sequence of Signals Controls T Cell Activation |
| 15 | Apr 23 Apr 25 | MAIT Cells In Type 1 Diabetes | Viral Infections Alter Mac Populations and inhibit Asthma Induction GRANT DUE APRIL 27 5PM |
| 16 | Apr 30 May 2 | Mitochondrial Priming by CD28 | ** Anti-PD-1 Therapy Alters Metabolism and Emotional Behavior |
| | Finals Week | Final Exam: Grant Review Study Section Section | |

Midterm Exam will be sent out by email on March 16. Due 5 pm Friday March 23 (must be returned by email)

READING:

All posted articles will be on the course Moodle site. While no changes are anticipated, as noted above the primary literature articles are subject to substitution up to 2 weeks prior to the class meeting. You will be notified in class and I will email you pdf files of any substituted papers. **ALL ARTICLES AND REVIEWS ARE TO BE READ BEFORE CLASS!**

RESEARCH ARTICLE REVIEWS:

Students will read and write a synopsis/review of 5 separate immunologically-related, primarily literature articles. They should be related to topics covered in this course. They must be double-spaced with a MAXIMUM of 2 pages each. The articles are to be chosen by the students and must be in peer-reviewed journals from 2015 to present. I have not given specific due dates for these summaries and they can be turned in any time during the semester. I STRONGLY URGE you to write these summaries throughout the semester rather than waiting for the last day. The last date they will be accepted is May 7. These must be in PDF format.

GRANT PROPOSAL

Each student will be responsible for writing a grant proposal **based upon one of the topics presented in the course**. We will follow the format of a postdoctoral fellowship application to the Life Science Research Foundation (LSRF.org).

LETTER OF INTENT (DUE 5 P.M. APRIL 6)

Each student will submit a letter of intent (LOI) to me on or before 5 p.m. April 6. The letter will be a 1 PAGE summary of your topic. In your letter, you will include an introductory paragraph, your aims of the project, and a paragraph of expected results and relevance to knowledge of the field. You want to identify the question you are asking, and relate why you have chosen this area to examine and why it is important.

I will review your LOI and will return it with suggestions on how to proceed. If there are significant problems with your intended proposal, I will meet with you individually to formulate an alternative approach.

GRANT APPLICATION (DUE 5 P.M. FRIDAY APRIL 27):

There is a **10 PAGE MAXIMUM including references**. You are limited to 10 pages, single-spaced with at least a 1 inch margin on all sides. You must use Arial font, no smaller than 11 pts. You do NOT have to fill 10 pages. If you can be more concise and do it in less than 10 pages, do it. **These MUST be in .doc or .docx formats ONLY.**

COVER PAGE (1 PAGE):

Include Title of Project, Author, Institution and Abstract. Your abstract should be a single paragraph (200 words maximum) summarizing the goals of the research project and should contain a brief description of your planned research (i.e. your approach to address your goals)

SPECIFIC AIMS (1 PAGE):

In a paragraph define the purpose of the proposal and then numerically list your specific aims of the research proposal. The specific aims should be in the form of a testable hypothesis (e.g. "We hypothesize that HAART therapy for HIV infection causes a significant decrease in CD8⁺ T cells" rather than "We want to see if HAART therapy for HIV infection does something to CD8 T cells". Don't get too carried away here, two or three aims will usually suffice. Remember that a successful grant will have 2 or 3 specific aims that are related, but not dependent upon the others. In other words if specific aim 1 fails, specific aim 2 should still be a viable project.

BACKGROUND AND SIGNIFICANCE (1 - 2 PAGES):

You want to summarize very briefly the background findings from the literature that support your hypothesis and lead you to the specific aims you listed above. This should also include in a separate paragraph or two the significance of the proposed project in the area of your grant and to our knowledge of immunology as a whole. This is where you want to sell your ideas – tell the reader why your ideas are better than everyone else's in the applicant pool and why you deserve the \$51,000 a year salary.

RESEARCH PROPOSAL: 5 PAGES

In a logical sequence, explain and justify the methods you will use to accomplish your research goals outlined in the specific aims section. Identify potential pitfalls with your approach. Do you have any alternative approaches in case the first one fails? You should use citations from the literature and adequate protocol descriptions to explain the findings for the reviewer.

REFERENCES: (1 PAGE MAXIMUM)

Citations and references must follow the format of the Journal of Immunology (<http://www.jimmunol.org/misc/authorfullength.shtml#manuscript>). References must be numbered as they appear in the text. All authors must be listed for each reference. If citations are included in tables or in figure legends, they must be numbered according to the position of citation of the table or figure in the text. Only published papers and papers "in press" may be included in the References.

GRANT REVIEW:***DUE 5PM FRIDAY MAY 4***

When grants are received, they will be given a grant number and distributed to members of the study section after removal of identifying information. Each student will serve as a primary reviewer of one other grant and is responsible for writing a comprehensive 2 page critique of that grant. Directions for the review will be given when grants are distributed. This critique is to be turned in and distributed to the entire class prior to our final meeting. We will meet during finals week to discuss each grant and determine which are to be funded (using current NIAID paylines). Please note, these reviews will not affect the grading of the proposal, but your critique of the grant will be graded. This is your final exam so be thorough!

LATE WORK:

Late work is strongly discouraged. **For assignments with a specified due date, a late penalty of 10% per day of tardiness will be subtracted from the grade.** There is **ONE EXCEPTION** to this rule – **THE GRANT APPLICATION WILL NOT BE ACCEPTED LATE!**

LEARNING OUTCOMES:

- By the end of semester the students should be able to critically evaluate primary literature.
- They should be able to explain scientific methods including flow cytometry, production of transgenic animals, and imaging techniques.
- They will be able to critique experimental approaches and identify any shortcomings.

- They should be able to propose alternative approaches and methods to address any issues that they have identified in a paper.
- They should be able to propose experiment to extend/expand on the focus of a manuscript.
- They should be able to identify gaps in the scientific knowledge.
- They should be able to write a cogent, and comprehensive grant application that addresses gaps in the scientific knowledge and proposes experiments that will function to fill in these gaps.
- They will be able to evaluate and critically review grant proposals and identify shortcomings in the designed experiments.

DSS ACCOMMODATIONS: The University of Montana assures equal access to instruction through collaboration between students with disabilities, instructors, and Disability Services for Students (DSS <http://www.umt.edu/dss>). If you think you may have a disability adversely affecting your academic performance, and you have not already registered with DSS, please contact DSS in Lommasson 154. I will work with you and DSS to provide appropriate accommodation.

Please note: You are bound by the University of Montana student conduct code. All work will be performed solely by the student. Plagiarism and cheating of any kind will result in referral for disciplinary action and you will receive a zero on the assignment. This will significantly impact your final course grade.