

BHS 316 – Principles of Immunology

Spring 2018

Principles of Immunology is a 3-credit 300-level immunology course designed for **non-microbiology** students who are not required to take extensive chemistry courses as part of their major, but who would find a solid understanding of the immune system beneficial to their future career goals. Students will be challenged to think critically about the advantages of our immune system, but also its limitations. Students will be instructed with a variety of methods including lectures, interactive graphics, regular assessments, group discussions and checkpoint activities. Through these approaches, students will learn to think critically about how our immune system operates and immunotherapies that have developed from this scientific knowledge. Based on this context, students will be able to make predictive assessments of both hypothetical and real world immune system malfunctions as well as current and emerging immunotherapies.

Instructor: Dr. Malcolm Lowry

Contact Information: Malcolm.lowry@oregonstate.edu

541-737-8309

Credit hours: 3

Meeting times: 10:00am - 11:20am Tuesday and Thursday

Prerequisites: C- or better in MB 230 or (BI 212 and BI 213) or (BI 204 and BI 205)

Learning Resources: All required learning resources will be self-contained within the course. This content will include lectures, visual graphics to illustrate concepts, web links to current or pertinent information.

Canvas: Within the course Canvas site, you will access the learning materials, such as the syllabus, class discussions, assignments, projects, and quizzes.

Course Catalog Description:

Interactions of the innate and adaptive immune responses in the context of infectious diseases, autoimmune diseases, immunodeficiencies and immunotherapies. This course is designed for non-microbiology majors.

Student Learning Outcomes

- Students will be able to differentiate between threats to the host body, with an emphasis on infectious diseases.
- Students will be able to distinguish between innate and adaptive immune responses and analyze their role in effectively responding to distinct threats.
- Students will be able to predict immune outcomes resulting from real world and hypothetical malfunctions of the immune system.
- Students will be able to analyze existing and emerging applications of immunology such as vaccines and immunotherapies.

Assessment Activities:

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|----------------------------|-----|
| Assessment Activities (x6) | 30% |
| Group Activities | 10% |
| Midterm exams | 35% |
| Final Exam | 25% |

Evaluation of Student Performance:

| | | | |
|----|-------|----|-------|
| A | >92% | C | 73-76 |
| A- | 90-92 | C- | 70-72 |
| B+ | 87-89 | D+ | 67-69 |
| B | 83-86 | D | 63-66 |
| B- | 80-82 | D- | 60-62 |
| C+ | 77-79 | F | <60% |

Course Content

Week 1: Introduction to the Immune System

- Role and challenges of immune system
- Immune system organs and anatomy
- Immune system cell types

Assessment Activity #1

Week 2: Tools of the Immune System

- Recognizing pathogens
- Screening human cell function for dubious activities
- Cytokines

Assessment Activity #2

Week 3: Innate Immunity

- Complement system.
- Macrophages
- Neutrophils and natural killer cells

Checkpoint Activity for Week 1-3

Week 4: Antigen Presentation (MHC's and APC's, dendritic cells)

- Major Histocompatibility Complexes
- Antigen presenting cells
- Migration of dendritic cells

Assessment Activity #3

Week 5: Adaptive Immunity

- T-Cells
- B-Cells
- The developmental origin and migration of lymphocytes

Assessment Activity #4

Week 6: Adaptive Immunity - Gene Rearrangement

- Mechanism of gene rearrangement
- Antibody class switching
- Clonal selection to increase needed antibody production

Checkpoint Activity for Week 4-6

Week 7: Interaction between Innate and Adaptive

- Lymph node, spleen, Peyer's patches
- Migration of immune cells through the body

Assessment Activity #5

Week 8: Vaccines and Immunotherapeutics

- Features of immune system that immunotherapies can target
- Vaccines
- Current challenges for immunotherapy development

Assessment Activity #6

Week 9: Immune System Malfunctions

- Hypersensitivity
- immunodeficiency's

Checkpoint Activity for Week 7-9

Week 10: Tumor Immunology and Promising Cutting Edge Technologies

Final Exam

Statement Regarding Students with Disabilities

"Accommodations for students with disabilities are determined and approved by Disability Access Services (DAS). If you, as a student, believe you are eligible for accommodations but have not obtained approval please contact DAS immediately at 541-737-4098 or at <http://ds.oregonstate.edu>. DAS notifies students and faculty members of approved academic accommodations and coordinates implementation of those accommodations. While not required, students and faculty members are encouraged to discuss details of the implementation of individual accommodations."

Statement of Expectations for Student Conduct:

http://studentlife.oregonstate.edu/sites/studentlife.oregonstate.edu/files/code_of_student_conduct.pdf

Diversity Statement

We strive to create an affirming climate for all students including underrepresented and marginalized individuals and groups. Diversity encompasses differences in age, color, ethnicity, national origin, gender, physical or mental ability, religion, socioeconomic background, veteran status, sexual orientation, and marginalized groups. We believe diversity is the synergy, connection, acceptance, and mutual learning fostered by the interaction of different human characteristics.

Religious Holiday Statement

Oregon State University strives to respect all religious practices. If you have religious holidays that are in conflict with any of the requirements of this class, please see me immediately so that we can make alternative arrangements.