

PBS/Micro/MM&I 528

Immunology

fall 2014

credits: 3

prerequisites: 2 semesters chemistry; 1 semester zoology or general biology

welcome

Welcome to Immunology 528. This syllabus provides an outline of the course, lists all required readings, lecture topics, summarizes our grading system and provides instructor contact information. The syllabus also **lists all dates for exams**, so please read it carefully!

schedule at a glance

classroom	108 Plant Sciences, 1575 Linden Drive
meeting time	11:00 am M, W, F
office hours	3:00pm Mondays, room tba
skype office hours	4:00pm-5:00pm Thursdays (Skype name: Immunology528)
exam schedule	1 Fri 26 Sep 2 Mon 27 Oct 3 Wed 19 Nov Exams 1-3 during class periods final Wed 17 Dec 12:25-2:25, location tba

instructors

The course will be taught by a team of core instructors whose expertise covers a broad range of topics in immunology. Our expertise will be complemented from time to time by guest lecturers from multiple departments across the University, who will provide examples of how the topics we've discussed are used in actual research and medicine.

core instructors

Dr. Thomas Friedrich, Associate Professor, Dept. of Pathobiological Sciences
Dr. Charles Czuprynski, Professor and Chair, Dept. of Pathobiological Sciences
Dr. M. Suresh, Professor, Dept. of Pathobiological Sciences
Dr. Shelby O'Connor, Assistant Professor, Dept. of Pathology and Laboratory Medicine
Dr. Matthew Reynolds, Associate Scientist, Dept. of Pathology and Laboratory Medicine
Dr. Justin Greene, Assistant Scientist, Dept. of Pathology and Laboratory Medicine

course coordinator, core instructor

Dr. David Gasper, Research Assistant, Dept. of Pathobiological Sciences

guest lecturers

Dr. Bruce Klein, Professor, Depts. of Pediatrics and Medical Microbiology & Immunology
Dr. David O'Connor, Professor, Dept. of Pathology and Laboratory Medicine
Dr. Christine Seroogy, Associate Professor, Dept. of Pediatrics
Dr. Jenny Gumperz, Associate Professor, Dept. of Medical Microbiology & Immunology
Dr. Ronald Schultz, Professor, Dept. of Pathobiological Sciences
Dr. Robert Bush, Professor Emeritus, Dept. of Medicine, Allergy and Immunology
Dr. Clifford Cho, Associate Professor, Dept. of Surgery

evaluation: how grades are determined

assessments

There will be 4 assessments during the semester, as outlined below. Grades will be determined based on the percentage of possible points you accumulate in these assessments. The grading scale is described at the end of this section. **Any material covered in lecture, including guest lectures, and in assigned readings, is fair game for assessments.** That is, if we talk about it in class, or it's in an assigned reading, it may appear on an exam!

Exam 1	100 points
Exam 2	100 points
Exam 3	100 points
Final exam	200 points

midterm exams

There will be 3 midterm exams, each given during a regular class period. Each exam will cover material taught during one course unit. (Note, however, that each unit may introduce concepts that build upon what you've learned in previous units.) Exams will consist of 25 multiple choice questions. In general, our goal is to test your knowledge, not to trick or confuse you.

midterm exam policy

The 3 midterm exams will administered during regular class time. Therefore the potential for schedule conflicts with your other courses and responsibilities is minimal. Therefore, **we will not as a rule grant requests to make up exams.** Exceptions to this policy are medical emergencies, religious observances, or overlap of an Immunology 528 exam with exams in other classes. We may request a doctor's note to verify the nature of medical emergencies.

If you must miss a class period during which there's an exam, you must **notify Dr. Gasper in advance** of your absence to arrange to take a make-up. Explain the reason for your absence. Except in medical emergencies, it's extremely unlikely that you'll be allowed to take a make-up if you do not notify Dr. Gasper in advance of your absence.

final exam

There will be a comprehensive final exam (i.e., one that tests you on material covered throughout the semester) on Wednesday 17 December from 12:25pm to 2:25pm. Location will be announced in class and on Learn@UW.

grading scale

Instructors may opt to curve grades (i.e., we may be more generous than this scale); we may also use AB and BC for grades on the border between two letter grades.

A	90 and above
B	80-89
C	70-79
D	60-69
F	below 60

learn@uw site

<https://learnuw.wisc.edu/>

Login with your UW Net ID and password.

Follow link to PBS/Micro/MM&I 528: Immunology.

There are discussion forums on which you can post questions about course content (scientific information) or about logistics (scheduling, etc). You can post anonymously if you wish. While we attempt to answer questions promptly, we cannot guarantee that questions posted, say, the night before an exam will be answered in time for you to study up on the response. If you have a question you'd rather not post to the forum, please ask us after class or email Dr. Gasper at dgasper@wisc.edu.

office hours

We will hold weekly office hours. These will be times when you can ask instructors to help clarify things you're having trouble understanding. There will be 2 types of office hours each week.

In-person office hours will be held Monday afternoons at 3pm. Room will be announced in the first week of class.

We will also use Skype to hold an additional period of office hours at 4pm on Thursdays. You can login to Skype and call us (Skype name: Immunology528) to ask questions.

If neither of these times works with your schedule, please contact an instructor directly to set up an individual appointment to have your questions answered.

a note on academic integrity

As UW–Madison faculty and staff, we strive to foster an environment that is challenging and stimulating, and promotes learning for all students. To do this, we strive to clearly state our expectations of you, and to present course information in an interesting and digestible manner. It is incumbent on each of you to strive to learn the material—most importantly, the concepts underlying the facts we present—as best you can. This means that you must answer questions on exams to the best of your ability. (Note, however, that we encourage you to study and discuss course material together with friends and classmates.) For guidelines on UW's policies on academic integrity and academic misconduct, please see the [webpage](#) of the Dean of Students' office.

If we suspect academic misconduct, for example, that you have copied answers from another student, we will first meet with you to discuss the matter. Issues that cannot be resolved through individual meetings may be referred to the Dean of Students. If you have concerns about potential academic misconduct, please contact a core instructor.

required readings

For most lectures we will assign readings from the required textbook (full citation below), which we will usually refer to as *Kuby*. Pro tip: You will get the most out of lectures if you do the assigned reading beforehand.

required textbook

Owen, Punt, Stranford, and Jones (eds). *Kuby Immunology*. 7th Edition. New York: W.H. Freeman and Sons, 2013.

Pages for reading assignments will correspond to this, the latest edition. While we recommend that you rent or purchase this edition, you may find used previous editions at lower prices.

Note that there is an ebook version of the text available from the publisher for an additional charge. **You are not required to purchase the ebook**, but you may find it useful. We may use materials from the ebook and associated online resources in our presentations.

Unit 1 | Introduction and innate immunity

unit learning objectives

1. Understand the overall organization of the immune system into innate and adaptive “arms” that distinguish “self” from “nonself.”
2. Understand how hematopoietic cells act to provide rapid, innate immune responses.
3. Learn how innate immunity is based on “sensing” of pathogen-associated molecular patterns.
4. Learn the essential properties of innate immune effectors, such as complement and natural killer cells.

week 1 | 3-5 September 2014

Kuby chapter 1, pp. 1-23; 27-37

W Course introduction (Drs. Friedrich and Gasper)

F Meet the Immune System 1 (Dr. Gasper)

week 2 | 8-12 September 2014

Kuby pp. 37-48; 48-60

M Meet the Immune System 2 (Dr. Gasper)

W Meet the Immune System 3 (Dr. Gasper)

F Hematopoietic cells in innate immunity (Dr. Czuprynski)

week 3 | 15-19 September 2014

M Pattern-recognition receptors and induced innate responses (Dr. Czuprynski)

W The complement system (Dr. Czuprynski)

F Natural Killer cells (Dr. Gasper)

week 4 | 22-26 September 2014

M **Guest lecture: Som Nanjappa: Innate mucosal immunity against fungal pathogens**

End of material covered on Exam 1

W Immunogens, antigens, and epitopes (Dr. Gasper)

F **26 September: Exam 1**

Unit 2 | Adaptive immunity: B cells and T cells

unit learning objectives

1. Understand how the diversity of antigen recognition receptors is generated, and how it allows for functional plasticity in adaptive immune responses.
2. Understand the mechanisms by which B cells and T cells provide immunological memory.
3. Understand the effector functions of B cells and T cells, and how cytokines—signaling molecules—direct and shape these functions in health and disease.
4. Understand the functional significance of major histocompatibility complex genetic diversity.

Note: Unit 2 material begins with the lecture on Wednesday 24 September.

week 5 | 29 September- 3 October 2014

- M Antigen recognition by lymphocytes (Dr. Gasper)
- W Molecular and genetic basis of antigen recognition by T cells (Dr. Gasper)
- F Generation of T cell receptor diversity (Dr. Gasper)

week 6 | 6-10 October 2014

- M Antigen processing and recognition 1 (Dr. S. O'Connor)
- W Antigen processing and recognition 2 (Dr. S. O'Connor)
- F MHC structure and diversity 1 (Dr. Suresh)

week 7 | 13-17 October 2014

- M **Guest lecture: David O'Connor: HIV escape from T cell detection**
- W MHC structure and diversity 2 (Dr. S. O'Connor)
- F T cell effector function and activation: CD8 T cells (Dr. Gasper)

week 8 | 20-24 October 2014

- M T cell effector function and activation: CD4 Th1 and Th2 cells (Dr. Gasper)
- W T cell effector function and activation: CD4 Th17 and Treg cells (Dr. Gasper)
- End of material covered on Exam 2**
- F **Guest lecture: Christine Serogy: T cell dysfunction in human disease**

week 9 | 27-31 October 2014

- M **27 October: Exam 2**

week 9 ct'd | 29-31 October 2014

- W Immunoglobulins (Dr. Reynolds)
- F Generation of antibody diversity in B cells 1 (Dr. Friedrich)

week 10 | 3-7 November 2014

- M Generation of antibody diversity in B cells 2 (Dr. Friedrich)
- W Monoclonal antibodies in research and treatment 1 (Dr. Greene)
- W Monoclonal antibodies in research and treatment 2 (Dr. Greene)

Unit 3 | Immune responses in health and disease

Unit learning objectives

1. Understand how immune mechanisms work together to eliminate pathogens and tumors.
2. Understand how immune responses can lead to pathological outcomes.
3. Understand how vaccines stimulate immune responses.

week 11 | 10-14 November 2014

- M Hypersensitivity Types 1 and 2 (Dr. Gasper)
- W **Guest lecture: Jenny Gumperz: NK T cells**
- F Hypersensitivity Types 3 and 4 (Dr. Gasper)

End of material covered on Exam 3

week 12 | 17-21 November 2014

- M Tolerance, autoimmunity, and transplantation 1 (Dr. Suresh)
- W **19 November: Exam 3**
- F Tolerance, autoimmunity, and transplantation 2 (Dr. Suresh)

week 13 | 24-28 November 2014

- M **Guest lecture: Ronald Schultz: Stimulating immunity with vaccines**
- W **Guest lecture: Robert Bush: Food allergies**
- F **No class: Thanksgiving recess**

week 14 | 1-5 December 2014

- M **Guest lecture: Clifford Cho: Cancer immunology**
- W HIV pathogenesis 1: consequences of CD4 T cell depletion (Dr. Friedrich)
- F HIV pathogenesis 2: controlling and curing HIV (Dr. Friedrich)

week 15 | 8-12 December 2014

- M Innate immunopathology in influenza pathogenesis (Dr. Friedrich)
- W Vaccines: broadly neutralizing antibodies against HIV and influenza (Dr. Friedrich)
- F Course review

Wed 17 December: Comprehensive final exam at 12:25pm