

Dept. Of Science  
Grande Prairie Regional College

MI 2950  
Infection and Immunity

Course Outline  
Winter 2006-07

Instructor

Philip Johnson B.Sc., M.Sc., Ph.D., M.S.P.H.

Office: J224

Phone: 539 2863

E-mail: [johnson@gprc.ab.ca](mailto:johnson@gprc.ab.ca)

Course Description: This course introduces the principles and mechanisms of immunity in eucaryotes. It will provide an overview of the major groups of infectious agents (viruses, bacteria, parasites) and examine selected microorganisms within the context of the host response to pathogens and pathogen evasion strategies.

Credits / hours: 3 (3-0-0)

Transferability: IMIN 200 University of Alberta

Pre-requisites: MI 2650 General Microbiology  
BC 2000 Introductory Biochemistry

Objectives:

1. To provide students with basic knowledge and understanding of the immune system and its response to pathogens.
2. To allow students to enroll in advanced undergraduate courses in immunology and infectious disease biology.
3. To provide students with the ability to understand media reports dealing with immunology and infectious disease.

Texts: There are no assigned texts for this course, but students will find the text from MI 2650 (Brock - Biology of Microorganisms) to be useful. In addition the following books will be available on reserve in the GPRC library:

1. Roitt's Essential Immunology (11<sup>th</sup> Edition)  
I.M. Roitt *et al*  
Blackwell Publishing Inc.. (2006)
2. Bacterial Pathogenesis: A Molecular Approach (2<sup>nd</sup> Edition)  
A.A. Salyers and D.D. Whitt  
American Society of Microbiology Press (2002)
3. Principles of Virology - Molecular Biology, Pathogenesis and Control  
Jane S. Flint *et al*  
American Society of Microbiology Press (2000)

Evaluation:

Mid-term Exam I	30%
Mid-term Exam II	30%
Final Exam	40%

Mid-term Exam I will examine knowledge of material covered in the Immunology section of the course.

Mid-term Exam II will examine knowledge of material covered in the Bacterial Pathogenesis section of the course.

The Final Exam will be cumulative with approximately half of the marks being assigned to questions about the Virology section of the course.

Grading: Students will be assigned percentage marks for each of the three exams. A final grade on the Alpha Scale will be awarded only after all course requirements are completed

MI 2950  
Immunology and Infection

Topic Schedule

Part I: IMMUNOLOGY

1. Introduction and overviews of the immune system and its relationship to infectious organisms
2. Cells and Organs of the Immune System
3. Innate Defenses
4. Antigens and Immunity
5. Immunoglobulins
6. Development of B-lymphocytes
7. Development of T-lymphocytes and antigen presentation
8. Cell-mediated Immunity
9. Inflammation, lymphocyte trafficking and tolerance
10. Parasitic infections

Part II: BACTERIAL PATHOGENESIS

1. *Vibrio cholerae*: virulence factors and toxins
2. *Corynebacterium diphtheriae*: toxins and vaccine development
3. *Clostridium* and *Staphylococcus*: toxinosis
4. *Bordetella pertussis*: adherence and toxins
5. *Neisseria gonorrhoeae*: antigenic variation
6. *Pseudomonas aeruginosa* and the immunocompromised host
7. *Escherichia coli*: motility, colonization factors and toxins
8. *Listeria monocytogenes*: intracellular lifestyle
9. *Mycobacterium tuberculosis*: intracellular lifestyle
10. *Streptococcus pneumoniae*: inflammation
11. *Streptococcus pyogenes*: autoimmunity
12. Fungal infections

Part III: VIROLOGY

1. Viral Structure and Classification
2. Viral Pathogenesis
3. Attachment and Entry
4. Viral Replication Strategies
5. Innate Defenses to viral infections
6. Immune Response to Viruses
7. Evasion of the Immune Response
8. Emerging Viruses