

## Session 10 - Medical Microbiology

Text:	Chapters 31 through 40
Anticipated time:	Whatever we have left
Basic Objectives:	You should be able to discuss the basic concepts that explain the parasitic relationships that exist between microorganisms and humans. We will emphasize general concepts, and use specific examples to help us understand the role that microorganisms play in disease. We will not try to cover the entire spectrum of infectious diseases, the complexity of our immune defense mechanisms, or the diverse spectrum of antibiotic treatments that are available as cures. Instead, we will emphasize basic principles of microbial pathogenicity.

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### Chapter 31 - Normal Microbiota and Nonspecific Host Resistance

Overview	This chapter covers the diversity of mo's that inhabit our body and the beneficial roles they play in our body. It also introduces mechanisms of nonspecific immunity to infectious agents of disease, including the normal inhabitants that stray from their appropriate locations in the body.
Introduction	<i>Read.</i> Define: Pathogenicity.
31.1 Gnotobiotic Animals	<i>Review</i> for concepts.
31.2 Normal Microbiota of the Human Body	<i>Review</i> , including Fig 31.2 and Techniques Box 31.1. Pay less attention to specific mo's and more about concepts. Define: Normal microbiota and opportunists.
31.3 Overview of Host Resistance	<i>Read carefully.</i>
31.4 Cells, Tissues, and Organs of the Immune System	<i>Read</i> the Introduction and <i>Summarize</i> the rest if time permits.
31.5 Physical and Chemical Barriers in Nonspecific (Innate) Resistance	<i>Read</i> the Introduction and <i>Review</i> the rest, including Fig 31.7.
31.6 Inflammation	<i>Read, including Fig 31.11.</i>
31.7 The Complement System	<i>Summarize</i> if time permits.
31.8 Phagocytosis	<i>Review</i> if time permits, including Fig 31.16.
31.9 Cytokines	<i>Summarize</i> if time permits.
31.10 Natural Killer Cells	<i>Summarize</i> if time permits.

### Chapter 32 - Specific Immunity

Overview	This chapter is an introduction to specific immune responses.
Introduction	<i>Read.</i>
32.1 Overview of Specific (Adaptive) Immunity	<i>Read</i> the Introduction and work on Fig 32.1. Differentiate Adaptive from Innate immunity and reconcile humoral and cellular immunity.
32.2-32.8	<i>Skip.</i>

## Chapter 33 - Medical Immunology

Overview This chapter covers disorders of the immune system and the consequences of these disorders, as well as applications of immunology to the prevention, treatment and diagnosis of disease.

*Skip* this chapter. But a *Review* of Tab 33.1 would be useful.

## Chapter 34 - Pathogenicity of Microorganisms

Overview This chapter covers the basic principles of medical microbiology that are most important to us. Specifically, it involves discussion of the host-parasite relationship from the perspective of the parasite. It details the important features of microbial pathogenicity, i.e. the genetically determined features of mo's that result in tissue damage to the host when they replicate in that host.

Introduction *Read.*

### 34.1 Host-Parasite Relationship

*Read very carefully.* Define: Parasite (Review Tab 34.1), Host (*Read carefully* and understand Fig 34.1), Infection & Infectious Disease, Pathogen, Opportunistic Pathogen and Pathogenicity, Virulence, Invasiveness and Toxicity.

### 34.2 Pathogenesis of Viral Diseases

Introduction *Read carefully.*  
Entry, Contact... *Read.* Define: Vectors.  
Viral Spread... *Read.* Define: Viremia and Tropism.  
Cell Injury... *Read carefully.*  
Host Immune... *Read.*  
Recovery... *Read.*  
Virus Shedding *Read.*

### 34.3 Pathogenesis of Bacterial Diseases

Introduction *Read carefully.* Define: Reservoir.  
Maintaining... *Read.*  
Transport... *Read.* Define: Fomite.  
Attachment... *Read.* Define: Colonization. Review Tab 34.3.  
Invasion... *Read carefully,* including Tab 34.4.  
Growth... *Read.* Define: Differentiate Bacteremia and Septicemia.  
Leaving the Host *Read.*  
Clonal... *Read.*  
Regulation... *Read.*  
Pathogenicity... *Read,* and *Review* Fig 34.4.  
Toxicogenicity *Read carefully.* Differentiate and understand: Exotoxins and Endotoxins (*Read* Tab 34.5). Develop an understanding of how exotoxins work: *Read* Tab 34.6 and understand Figs 34.5 & 34.6. Understand the nature of Endotoxins and their biological activity: *Review* Fig 34.7 for concepts and *Review* Techniques Box 34.1.

### 34.4 Microbial Mechanisms for Escaping Host Defenses

*Read.*

## Chapter 35 - Antimicrobial Chemotherapy

Overview This chapter discusses the theory of antimicrobial chemotherapy. It explains the basis of antibacterial, antifungal and antiviral therapy using common antibiotics. It is wealth of practical information.

Introduction *Read.*

- 35.1 The Development of Chemotherapy  
*Read* for concepts, including Techniques Box 35.1.
- 35.2 General Characteristics of Antimicrobial Drugs  
*Read* for perspective. Understand the language. *Review* Tabs 35.1 and 35.2.
- 35.3 Determining the Level of Antimicrobial Activity  
*Skip*.
- 35.4 Mechanism of Action of Antimicrobial Agents  
*Read very carefully*, including Tab 35.4. Note the 5 categories of antimicrobials!
- 35.5 Factors Influencing the Effectiveness of Antimicrobial Drugs  
*Read* for concepts.
- 35.6 Antibacterial Drugs  
*Summarize* , only if you wish to learn something of specific interest to you.
- 35.7 Drug Resistance *Review* for concepts.
- 35.8 Antifungal Drugs *Review* for concepts.
- 35.9 Antiviral Drugs *Read* for concepts.

### Chapter 36 - Clinical Microbiology

Overview This is a detailed chapter that covers clinical procedures for identifying microorganisms in clinical specimens. We will not cover this in class. You should page through this chapter and look at the photographs.

### Chapter 37 - The Epidemiology of Infectious Disease

Overview This chapter covers the incidence, distribution, spread and control of infectious diseases. There is a lot of language here, but there are also significant concepts. We will spend a day on this material.

Introduction *Read*. Define Epidemiology. *Read* Box 37.1.

37.1 Epidemiological Terminology  
*Read*. Differentiate: Endemic, epidemic and pandemic. Define: Epizootic and zoonosis.

37.2 Measuring Frequency: The Epidemiologist's Tools  
*Read*. Define: Morbidity and mortality rates.

37.3 Infectious Disease Epidemiology  
*Read*.

37.4 Recognition of an Infectious Disease in a Population  
*Review* for concepts. *Read* Box 37.2. What a gall!

37.5 Recognition of an Epidemic  
*Review* for perspective.

37.6 The Infectious Disease Cycle: Story of a Disease

Introduction *Read*. *Understand* Fig 37.5.

What Pathogen... *Review*, including Tab 37.1.

What was the... *Review*.

How was the... *Review*, including Tab 37.2 and Box 37.3.

Why was the... *Review*.

How did the... *Review*.

37.7 Virulence and the Mode of Transmission  
*Read*.

### 37.8 Emerging and Reemerging Infectious Diseases and Pathogens

Introduction *Read carefully. Review Fig 37.8.*

Reasons for... *Read, including Fig 37.9 and Box 37.4.*

### 37.9 Control of Epidemics

*Review.*

### 37.10 The Emerging Threat of Bioterrorism

*Read carefully, including Tabs 37.3 and 37.4. Read Box 37.5 for fun.*

### 37.11 Global Travel and Health Considerations

*Read.*

### 37.12 Nosocomial Infections

*Read.*

## Chapter 38 - Human Diseases Caused by Viruses

### Overview

*Review the chapter as your interest dictates. This chapter covers virus diseases of man. The agents are listed by the Route of Transmission. Read about a few of the diseases that are of interest to you, e.g.: Chicken pox and shingles, Influenza, Measles, viral pneumonias, hemorrhagic fevers (see Box 38.2), AIDS (Fig 38.9), cold sores and genital herpes, common colds, Mononucleosis, rabies, viral hepatitis, viral gastroenteritis, polio, and "slow" viral diseases.*

## Chapter 39 - Human Diseases Caused Primarily by Bacteria

### Overview

*Review the chapter as your interests dictate. Read about a few of the specific diseases/agents that interest you, e.g.: diphtheria, meningitis, pertussis, streptococci (especially pneumonia, Fig 39.6), tuberculosis (Fig 39.7), lyme disease, plague (Fig 39.9), gonorrhea, ulcers, staphylococci (Fig 39.18 and Tab 39.3), syphilis (Tab 39.4), tetanus, cholera, botulism, campylobacter, salmonellosis (see Tab 39.5), shigella, staphylococci, *E coli*, typhoid and septic shock, chlamydial pneumonia, urethritis and trachoma, mycoplasmal pneumonia, Rickettsial Rocky Mountain Spotted Fever, tooth and gum diseases, and, burn wounds.*

## Chapter 39 - Human Disease Caused by Fungi and Protozoa

### Overview

*We will not cover this chapter. You should Review it as your time permits.*