Chapter 03

Development of Infectious Diseases
Lesson 3.1

Development of Infectious Diseases

1. List the steps in the development of an infectious disease, and do the following:
   - Describe the various stages of an infectious disease and describe how each stage is involved in the spread of the disease to others.
   - Differentiate between direct, indirect, droplet, and airborne spread of disease agents.
   - List the ways microbes can enter the body and describe how the route of entry may relate to disease development.
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2. List disease-producing properties of microbes.
3. List the four mechanisms by which we defend ourselves against pathogenic microbes.
4. Define immunity, describe how it is involved in protecting against infectious diseases, how it can cause damage to the body, and differentiate between antigens and antibodies.
Causes of Disease

Diseases have several causes:

- Microorganisms
- Malfunctioning of an organ
- Nutritional deficiency
- Allergic reaction
- Abnormal growth of cells
Infectious Disease

- Occurs when microorganisms in the body multiply and cause damage to the tissues
- Two types:
  - Endogenous
  - Exogenous
Steps of Disease Development

- Exogenous infectious diseases develop through six basic steps:
  - Source of microorganism
  - Escape of microorganism from the source
  - Spread of microorganism to a new person
  - Entry of microorganism into the person
  - Infection (survival and growth of microorganism)
  - Damage to the body
Stages of an Infectious Disease

- The four stages of an infectious disease are:
  - Incubation
  - Prodromal
  - Acute
  - Convalescent

- Pathogens may be spread to others during each of these stages.
Spread of Microorganism

Once a microorganism has escaped from a patient’s mouth, it can spread to others by four basic modes of transmission:

- Direct contact
- Indirect contact
- Droplet infection
- Airborne infection
Portals of Entry

- Microorganisms that are spread to a new person frequently cause no damage unless they actually enter the body.
- Four basic routes:
  - Inhalation
  - Ingestion
  - Mucous membranes
  - Breaks in the skin
Infection and Damage to Body

- Infection is the multiplication and survival of microorganisms on or in our body.
- Infection does not always mean disease, but disease seldom results without infection.
- These final two steps of infection involve a battle between the infecting organism and the defense of the body.
Host—Microorganism Interactions

Enhancement of infection:

- Microorganisms present on or in the body multiply if the conditions are appropriate.
- The body attempts to counteract harmful microbial products.
- The result of these interactions is health or disease.
  - The accumulation of dental plaque is an example of bacterial attachment to host surfaces, which leads to dental caries.
Interference with host defenses:
- Many microorganisms are pathogenic and interfere with host defense mechanisms.

Direct damage to body:
- Bacteria can kill cells or damage tissue.
- Viruses cause damage by killing or interfering with normal cell function.
Host Defense Mechanisms

Host defense against harmful infections are grouped into two categories:

- Innate defenders
- Acquired defenders
Types of Barriers

- Innate host defenses consist of four groups of properties or activities of the body that guard against infection by contaminating microorganisms.

- Four properties:
  - Physical barriers
  - Mechanical barriers
  - Antimicrobial chemicals
  - Cellular barriers
Acquired Immunity

- Acquired immunity is the body’s natural defense against infection.
- Special host defense system directed against invading microorganism.
Long-Term Immunity

- The body remembers the invading microorganism and is capable of destroying it so that we do not get the same disease again.
Artificial Immunity

- Artificial immunity involves being immunized or vaccinated against a specific disease.
Damage to the Immune System

- Activation of the immune system by certain antigens can cause damage to the body.
- Damage usually occurs at the body site exposed to the allergen.
Questions?