I. Pathogens and Human Illness (31.1)

A. Germ theory states that microscopic ______________ particles cause certain diseases

1. Disease can be infectious or noninfectious

   a. **Infectious disease**- can be passed from person to person and are caused by __________

   b. **Noninfectious disease**- sick person __________ pass the disease (infect) a healthy person (e.g. heart disease, cancer)

2. Germ theory- Louis Pasteur helped make connection between microorganisms and __________

   a. ______________ - disease causing agents

   b. Two other scientists helped to complete acceptance of Pasteur’s germ theory

      1). **Joseph Lister**- used weak __________ to clean operating tools and reduced death of patients

      2). **Robert** __________ - experimented and concluded that certain conditions must be met to say that a certain pathogen causes a disease (Koch’s postulates)

B. There are five different types of __________

1. **Bacteria**- single __________ organisms.

   a. Cause disease by releasing ____________ that are toxic to host or destroy healthy body cells

   b. ______ _______________ is example

2. ____________ - disease causing strands of DNA or RNA surrounded by __________ coat.

   a. Viruses are very __________

   b. Viruses enter and take over a healthy cell and produce __________ viruses

   c. Cause illnesses such as **flus**, **colds**, and ______
3. __________ - multicellular or single-celled organisms.
   a. Cause disease by piercing healthy cells and taking the cell’s __________
   b. Usually occur in ______ ________ environments
   c. ______________ ________ is example

4.Protozoa- single celled organisms that prey on other __________
   a. Need healthy cells to complete ______-cycle
   b. ____________ is blood disease caused by protozoan

C. Pathogens can enter the ______ in different ways

  1. **Direct contact**- require infected person or animal to physically ________ a healthy person
  2. **Indirect contact**- pathogens can survive on nonliving surfaces or in the air (___________)
  3. ___________ - anything that carries a pathogen and transmits it into healthy cells
     a. ________ - transmit bacteria, viruses, and protozoa
     b. ___________ - rabies, hanta virus
  4. ________ - can carry bacteria (food poisoning), parasitic worms, Mad Cow disease

II. Immune System (31.2)

A. Many body ____________ protect you form pathogens

  1. **immune system**- body system that fights off ___________ and ______________
  2. **First line of defense** is your ______
     a. Physical _____________ against pathogens
     b. Also secretes _______ and ____________ that makes skin hypertonic and __________
3. Eyes, nose, ears, mouth, and excretory organs

   a. Are ________ to environment and need extra protection

      1). **Mucous membranes** use hair-like ________ to trap pathogens

      2). Stomach ________ and digestive ________________

4. If pathogens enter body you immune system then relies on ______________ system to send chemical signals to coordinate an attack

   B. **Cells** and **proteins** fight the body’s infections

   1. __________ blood cells find and kill pathogens that have gotten past body’s external barriers (6 kinds of WBC)

      a. __________________- a cell that destroys pathogens by **surrounding** and **engulfing** them

      b. __________________ (T-cells and B-cells)- white blood cells that initiate the specific immune response

   2. **Proteins**- Immune system uses three types of proteins to fight off ___________ pathogens

      a. ________________ proteins- made by white blood cells and weaken pathogen’s cell ____________

      b. ________________ - proteins made by B-cells and destroy pathogens

      c. **Interferons**- proteins produced by body cells that are infected by viruses that stimulate uninfected body cells to produce ____________ that will prevent viral infection

   C. Immunity prevents a person from getting sick from a pathogen

   1. ______________ - means that you will not get sick when that pathogen invades your body

   2. ______________ **immunity**- occurs without the body’s undergoing an immune response. Can be transferred between generations
3. **immunity** - in response to a specific pathogen that has infected or is infecting your body
   
a. Keeps you from becoming sick by particular pathogen more than ________
   
b. Destroys “___________” invaders

III. Immune Response (31.3)

A. Many body systems work to produce _____________ responses

   1. **Nonspecific defense** - happen in the __________ ____ to every pathogen

   2. **Inflammation** - characterized by _____________, redness, pain, itching, and increased ____________ at affected site
      
a. Occurs when _____________ enters the body or when tissues become damaged
      
b. **Fluids** and ____________ **blood cells** move to site of infection

   3. ____________ - Develops when chemicals released cause hypothalamus to increase body’s temperature
      
a. **Prevents** **viruses** from _______________
      
b. Low fevers speed up pathogen _____________ and high fevers can stop normal _____________ function and cause seizure, brain damage, and even death

B. Cells of the immune system produce **specific responses**

   1. Specific immune defenses lead to _____________ immunity

   2. Body must be able to tell difference between ____________ cells and _____________ cells
      
a. ____________ - protein markers on surfaces of cells and viruses that help immune system identify a foreign cell or virus
b. **Immune response** is ________________ when immune system detects a pathogen (2 types of immune response)

1). ______-mediated immunity- when lymphocytes (not antibodies) themselves defend the body.
   a). Important with _______________ pathogen
   b. ____ cells attack antigen bearing cells directly (causes pathogen to rupture and die)

2). ________________ Immunity- also called ________________-mediated immunity
   a). Is provided by antibodies present in the body’s “humors” or ________.
   b. causes lymphocytes (___ cells) to produce antibodies-(protein that helps to destroy pathogens)
   c. Antibodies attach to ___________ on pathogen surface. Can clump pathogens together in large mass (i.e. viruses)
   d. This attracts _________________ which ___________ and destroy whole mass

C. The immune system rejects foreign tissues

1. Your body must constantly decide whether your cells are your own or ____________

2. **Tissue** ________________ - occurs when recipient’s immune system makes antibodies against the protein markers on donors tissue

IV. Immunity and Technology (31.4)

A. Many methods are used to control pathogens

1. ________________ - chemicals such as soap, vinegar, and rubbing alcohol that kill pathogens
2. ________________ - target bacteria or fungi and keep them from growing or reproducing.

a. Target ___________ bacteria

b. Can develop antibiotic ___________ when bacteria ____________

B. **Vaccines** artificially produce **acquired immunity**

1. ___________ - substance that contains antigen of a pathogen

2. Causes immune system to produce ___________ cells

3. You can make **antibodies** right away if ____________

V. Overreactions of the Immune system (31.5)

A. _______________ occur when the immune system responds to harmless antigens

1. ___________ - over-sensitivity to normally harmless antigen

2. _______________ - antigens that cause an allergic reaction

   a. When **allergen** enters body cells release _______________ (chemical that causes _______________)

   b. Causes nonspecific responses such as _______________

B. In _______________ diseases, white blood cells attack the body’s healthy cells

1. Your _______________ system cannot tell difference between body’s healthy and unhealthy cells

2. Includes Type 1 Diabetes, Rheumatoid arthritis, Multiple sclerosis

VI. Diseases that weaken the Immune system (31.6)

A. _______________ is characterized by abnormal **white blood cells**
1. Cancer of the _______ **marrow**

2. **White blood cells** do not do not ___________ properly

B. _____ targets the immune system

1. **HIV-** __________ __________________________ __________

2. **Retrovirus** (contains _____) that attacks and weakens the immune system

3. Leads to “________________” infections

4. HIV is transmitted by exchange of _______ or other **body** _________

5. HIV reproduces in ____-cells (cells that trigger immune responses)

6. **HIV** leads to ______ (Acquired Immune Deficiency Syndrome)