Chapter 39
Immunity

I. Three Lines of Defense
A. Surface Barriers to Invasion

1. ________________ is an important barrier.

2. The normal ________________ of the gut, and vagina keep the growth of pathogens in check.

3. ________________ in the respiratory tract sweep out bacteria and particles.

4. Exocrine glands secrete ________________, which degrade the bacterial cell wall.
   ________________, with its low pH and flushing action, keep pathogens from the urinary tract.

II. Inflammation
A. The Roles of Phagocytes and their Kin

1. White blood cells, produced from ________________ cells in bone marrow, not only circulate in blood and plasma, but also reside in lymph nodes, spleen, liver, kidneys, etc. where they stand ready to defend.

2. ________________ kinds are swift to act but do not mount a sustained attack.
   a. ________________, the most abundant, phagocytize bacteria.
   b. ________________ secrete enzymes that punch holes in parasitic worms.
   c. ________________ secrete histamine, which sustains inflammation.

3. ________________ (formed from immature cells called monocytes) are slower to act but can engulf and digest just about any foreign agent or damaged tissue.

B. The Inflammatory Response
   1. Inflammatory response results include:
      a. ________________ and ________________ occur at the site of damage or invasion.
b. ____________ from blood vessels causing swelling and delivery of infection-fighting proteins to the tissues.

c. ____________ and ____________ engulf foreign invaders and debris.

d. ____________ mechanisms help wall off the pathogen and promote repair tissues.

The blood coagulates and forms a clot; the clot then retracts into a compact mass.

2. While other ____________ are being activated, ____________ and mast cells secrete histamine, which promotes leakage of fluid out of capillaries.

3. Macrophages will secrete ____________, which are communication signals among white blood cells but in addition can signal the brain to reset its “thermostat” to cause a fever.

III. Overview of the Immune System
A. Defining Features

1. Physical barriers and ____________ may not be enough to check the spread of an invader.

2. T and B lymphocytes
   a. Interactions among these cells are the ____________ specific immune system.
   b. This system shows immunological ____________ and memory.
   c. These cells protect us by responding to specific ____________ – any molecule that is detected by the immune system.

B. The Key Defenders

1. ____________ make blood proteins called antibodies. They do not kill antigens directly. They secrete antibodies that are specific for a particular antigen.

   Once an ____________ binds to the bacteria or virus, the antibody can then combine with other blood proteins called complement.

   The ____________ combination kills bacteria and inactivates viruses that are not yet inside cells.
C. Additional Possibilities

1. Antibodies and complements may ________________, allowing the bacteria to be engulfed by neutrophils.

   cannot bind to most bacteria directly. They will bind to one end of antibody molecules.

2. Some ________________ when bound to a pathogen will prevent the pathogen from binding to the host. In this manner, the pathogen cannot initiate disease.

D. B cells differentiate into two types

1. Some are able to bind to the antigen by producing antibodies.

2. Some are ________________ that help with later attacks by the same antigen.

E. T lymphocytes

1. Some kill infected cells ________________, while some help other immune responses.

   a. A special type of T cell called ________________ cells can directly kill cancer cells or cells infected with a virus.

2. T cells ________________ into two types in the same manner of the B lymphocytes.

   a. A group of ________________ T cells will recognize and kill it off.

   b. The second group of ________________ will be ready to make a fast response on the next exposure to the same virus.

IV. Defenses Enhanced, Misdirected, or Compromised
A. Immunization

1. ________________ involves a deliberate production of memory cells by a vaccine that is made from killed or weakened bacteria or viruses.

2. If a person has already been exposed to ________________, passive immunity can be temporarily conferred by injecting antibodies.
   
   Mother child – breast milk
B. Allergies

1. An ___________ is a secondary immune response to a normally harmless substance, an allergen such as pollen or certain foods.

2. Exposure triggers production of a special type of ___________ called IgE.

3. IgE binds to cells called ___________ cells which trigger an explosive release of histamines. Mast cells are cells of the immune system.

4. A local inflammatory response results; death can even occur due to ___________ shock, a condition in which air passages leading to the lungs constrict, fluid escapes too rapidly from capillaries, and blood pressure drops.

C. Autoimmune Disorders

1. In autoimmune disorders, ________________ turn against the body’s own cells.

2. ________________ is an inflammation of the joints caused by antibody that treats the body’s own collagen molecules as if they were antigens.

D. Deficient Immune Response

1. When cell-mediated immunity is ________________, infections that would normally not be serious become life threatening.

2. In ________________(AIDS), the cause is the human immunodeficiency virus (HIV).

E. Immunological Memory
A. A person is not born with immunity to specific antigens, rather the person has the ability to acquire it.

1. Each ________________ or ____________ cell is able to synthesize a unique receptor for only one specific antigen. The whole population of T and B cells thus contains cells that can bind to millions of different antigens. Even before being infected by a particular type of virus, a person has a small number of lymphocytes that can bind to that particular virus.