WBC
3 Lines of Defense

B-cells
- Phagocytic Response
  - Granulocyte
    - Neutrophils
    - Basophils
    - Eosinophil
  - Monocyte
    (Macrophages)
  - Role in Inflammation
  - Mast cells injured
  - Release cytokine
  - Cytokines are messengers
  - Stimulation Immune Response
    - Granules Discharged
    - Histamine
    - Bradykinin
  - Arterioles in injured area
    - Dilate-hyperemia, warm, swollen

- Humoral Response
  - Bone Marrow Mature
  - Blood – become
  - Plasma Cells
  - Manufacture Antibodies
  - Produce Immunoglobin
    - IgG, IgM, IgE, IgA
  - Complements
  - Proteins that circulate in the inactive form. Activation of one by inflammation or immune response activates
  - Opsonize bacteria
  - Roughen surfaces
  - clump them for
  - Phagocytosis

T-cells
- Cellular Immune Response
  - Cell Mediated
  - T-cell
  - Bone Marrow Mature
  - Thymus
  - Helper T4
  - Cytotoxic T
  - Memory T
  - Suppressor T8
1. The bone marrow is the production site of the WBC involved in immunity.

2. The T-lymphocytes (T-cells) and B-lymphocytes (B-cells) mature in the bone marrow.

3. Two types immunity:
   A. Acquired I. - Specific immunity - developed at birth
      1. Two types of acquired
         a. Active A - developed by the person's body through exposure.
         b. Passive A - Temporary immunity from another source.
            Examples: Gamma-globulin, immunizations and antiserum.
   B. Natural I. - nonspecific present at birth

4. WBC or Leukocytes participate in both acquired and natural
   A. Granulocytes
      1. Neutrophils - first to arrive
      2. Basophils - Allergic >
      3. Eosinophils - Stress reaction turns off IgE
   B. Monocytes - Fixed and mobile changes to macrophages
   C. Lymphocytes
   D. Neutrophils and monocytes are phagocytic - cell Macrophages engulf a larger number of foreign bodies or toxins
   E. WBC fight foreign bodies and toxin by releasing cell mediators -
      a. Histamines
      b. Bradykinins
      c. Prostaglandins
   F. Lymphocytes consist of T-cells and B-cells which play a major roles in humoral and cell-mediated immune responses
4. **WBC or Leukocytes (Continue)...**

G. B - cells
   1. Return to lymph nodes with antigens message
   2. Produce clones
   3. Differentiate into plasma cells capable of specific antibody production
   4. Produce clones with memory for antigens

H. Types of T - lymphocytes
   A. Helper T - cells (CD- 4 cells) - normal count
      1. Recognize antigens
      2. Activate immune response
      3. Secrete cytokine which attract and activate B cells
   
   B. Cytotoxic T - cells
      1. Killer cell attack antigens directly causing cells lysis
      2. Lymphokines (cytokine) activates other lymphocytes and WBC
   
   C. Suppressor T- cells
      1. Limits B cells production
      2. Keep immune responses compatible with Health (Benign)
   
   D. Memory T - cells
      1. Recognizes antigens from previous exposure

I. Compliments
   
   1. Circulating plasma proteins
   2. Alter cell membrane of antigen - antibody complex causing cell lysis

5. Body's line of defense:
   A. First line of defense is Phagocytic immune response
      1. Granulocytes
      2. Monocytes (macrophages)
   
   B. Second line of defense is humoral immune response.
      1. B - cells transform to plasma cells which manufacture antibodies
      2. Antibodies are a highly specific protein in the blood stream which I attempts to disable invaders.
   
   C. The third line of defense is the cellular immune response.
      1. T - lymphocytes - which turn into cytotoxic cells (killer cells) and attack the pathogen
      2. Antigen (marker) on the surface of the microorganism stimulates antibody production
HIV is a retrovirus containing RNA and an enzyme, reverse transcriptase which allows the viral RNA to be transcribed to DNA within host cell. HIV targets CD4 (Helper T) cells or macrophages.

**Definition:**

1. H.I.V. = infected with virus
2. A.I.D.S = CD – count 200 or less
   Normal CD-4 =800-1200

How long does it take before HIV virus can be detected? **Two weeks and + six weeks for antigen-antibodies develop**

Symptoms with serum conversion? **Flu like symptoms – malaise, fever, rash, diarrhea and lymphadenopathy**

What is the incubation period? **Up to 10 years.**

Length of time depends on health practices:

1. Good nutrition
2. Exercise
3. Life style-ETOH, smoking, sex, etc.
4. good health practices

What are opportunistic infection? **Pneumonia, TB, influenza, cancer, kaposis sarcoma**

**Prevention and Treatment**

1. Educational programs
2. Reduction high-risk sexual practice and intravenous drug use
3. Standard precautions for health practitioners