

# Chapter 40-2: The Immune System

## Essential Questions:

- What are the body's ***non-specific defenses*** against invading pathogens?
  - What is ***immunity***?
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- Non-specific defenses

- Like fortress walls – keep everything out

- First line of defense

- Skin – most important

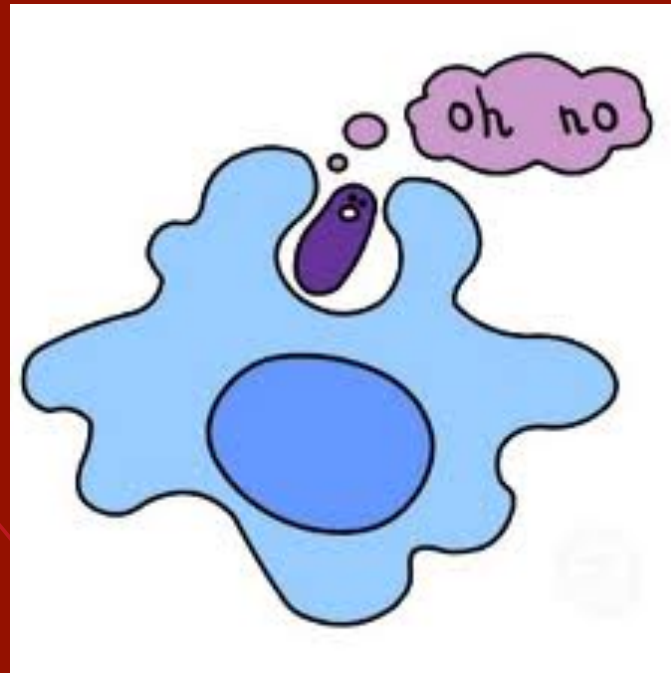
- Mucus

- Sweat

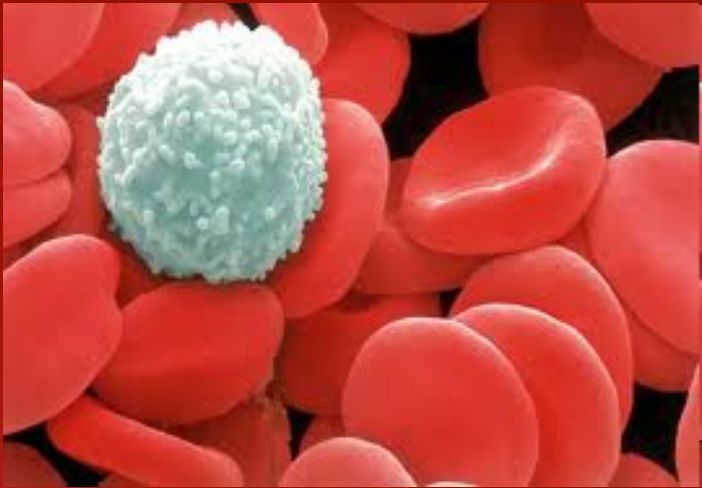
- Tears



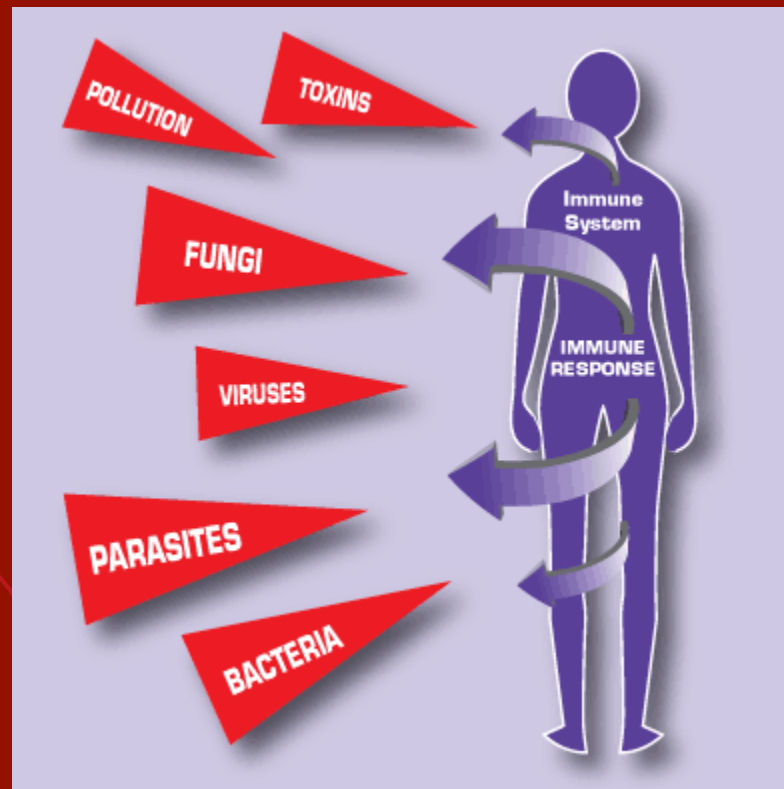
- Second line of defense
  - Inflammatory response
    - Reaction to tissue damage due to injury/infection
    - White blood cells go to affected tissues
      - Phagocytes – “eat” bacteria



- White blood cells (WBC) produced when pathogens detected
  - So, high WBC count = infection
- Fever
  - Kills pathogens & helps WBC' s
- Interferon
  - Proteins that resist viral infection



- Specific defenses (immune response)
  - Like security guard – deals with specific invaders
  - *Antigen*: subst. that triggers specific immune response

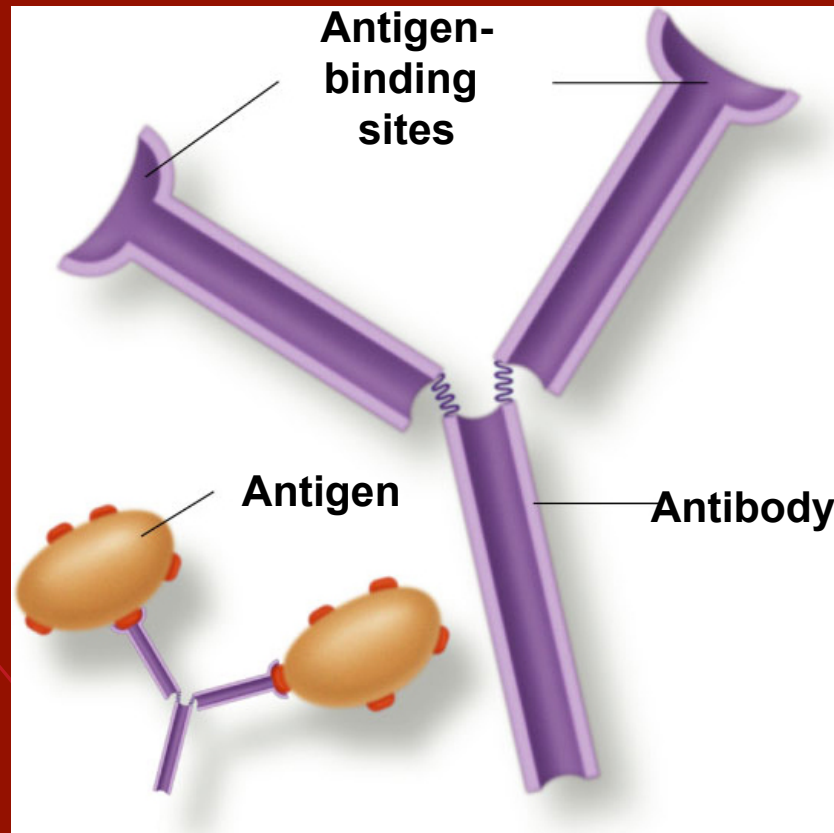


- Humoral immunity – in body fluids
  - B cells produce *antibodies* – protein that destroys pathogens
    - Each B cell capable of producing slightly different antibody
    - Pathogen recognized by small % of B cells, but then those divide rapidly to fight infection
    - T cells (helper cells) help to activate B cells



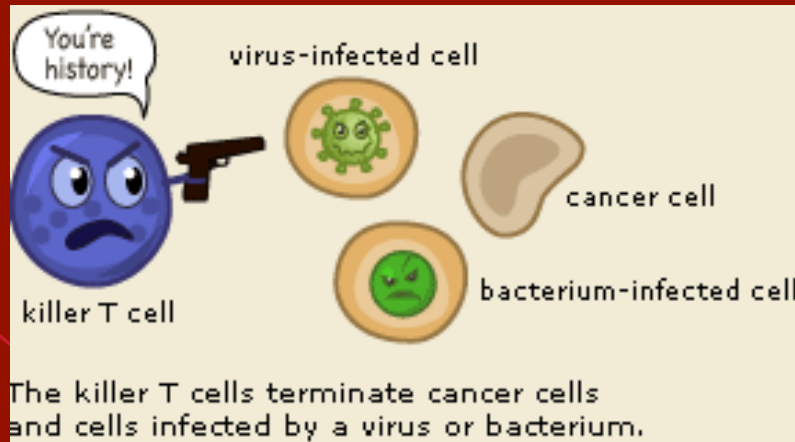
# Figure 40–8 Structure of an Antibody

Section 40-2





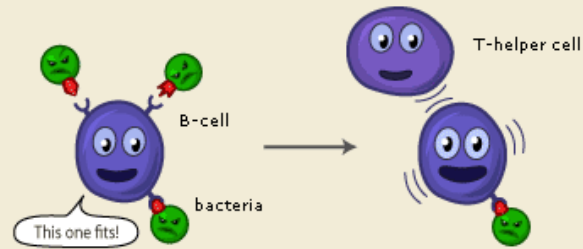
- Cell-mediated immunity – w/out antibodies
  - “killer T” cells hunt and kill pathogens
  - Marker proteins allow T cells to recognize body cells
    - Makes organ transplants difficult





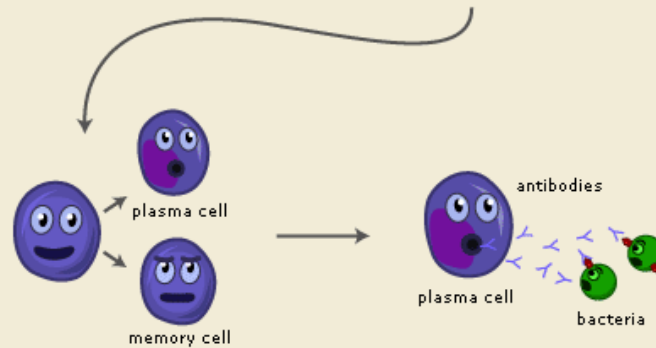
- Permanent immunity
  - *Memory B & T cells* remain able to produce specific antibodies to that pathogen after surviving disease





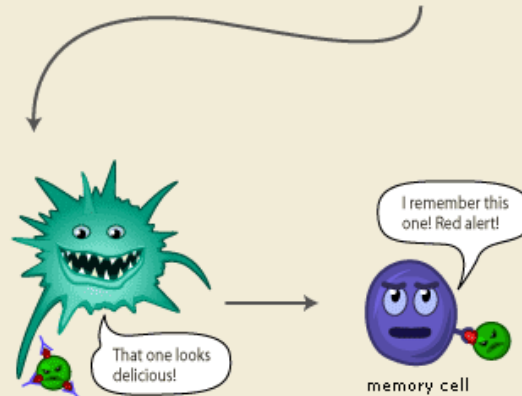
1. The B-cell finds an antigen which matches its receptors.

2. It waits until it is activated by a T-helper cell.



3. Then the B-cell divides to produce plasma and memory cells.

4. Plasma cells produce antibodies that attach to the current type of invader.



5. "Eater cells," prefer intruders marked with antibodies and "eats" loads of them.

6. If the same intruder invades again, memory cells help to activate the immune system to activate much faster.

- Active immunity

- *Vaccination*: weakened or mild form of pathogen

- Stimulates immune syst. to produce cells to fight that pathogen



- Passive immunity

- Antibodies for pathogen from other animals put into bloodstream

- Only last a short time until body destroys them

- Maternal immunity

