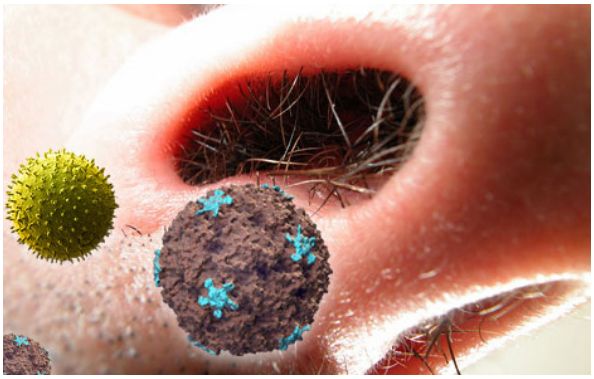
CONCEPT: INNATE IMMUNITY

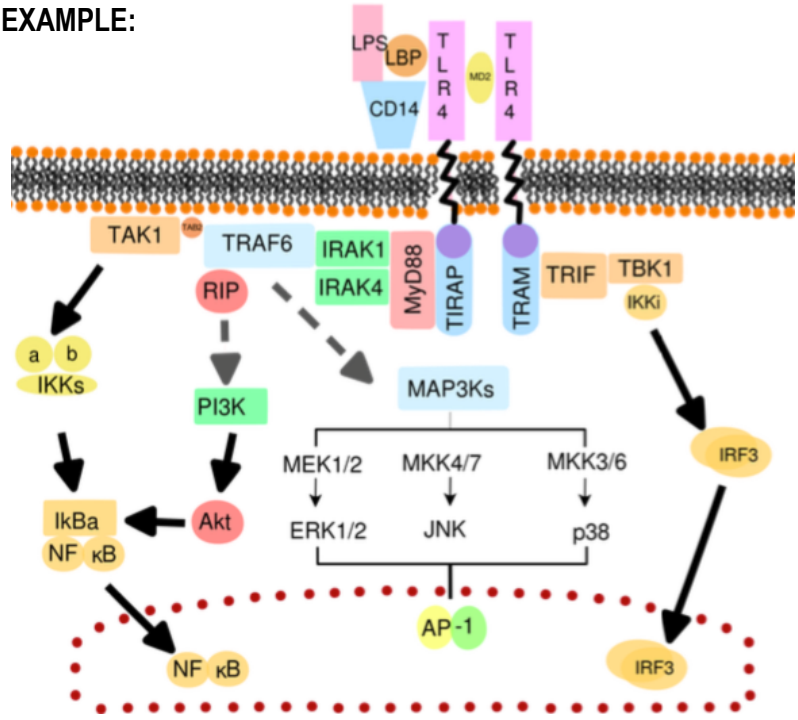
- ***Innate immune system*** – nonspecific mechanisms that defend against pathogens
    - □ Skin provides barrier protecting the inside of the body
    - □ ***Mucus*** – slimy secretion that traps foreign invaders, contains antimicrobial enzymes
    - □ ***Lysozymes*** – enzymes that break down bacterial cell walls

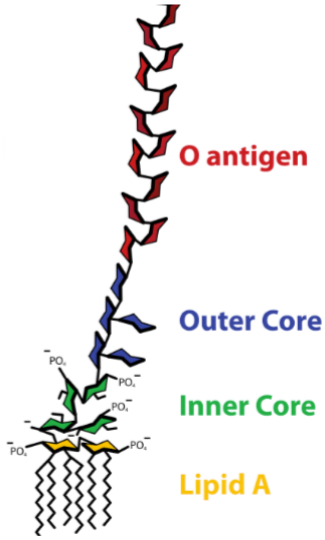
EXAMPLE:



- ***Innate immune response*** – first response to invading pathogens, initiated by leukocytes
- ***Pathogen-associated molecular patters*** (PAMPs) – molecules commonly displayed by pathogens, not by human cells
- ***Pattern-recognition receptors*** (PRR) – membrane receptors on immune cells that identify PAMPs
    - □ ***Toll-like receptors*** (***TLRs***) – type of PRR found on some immune cells that initiate a signaling cascade
        - TLR4 – recognizes lipopolysaccharides from bacteria, leads to the release of cytokines
        - ***Cytokines*** – signaling molecules that attract immune cells

EXAMPLE:

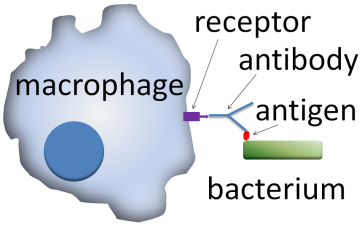


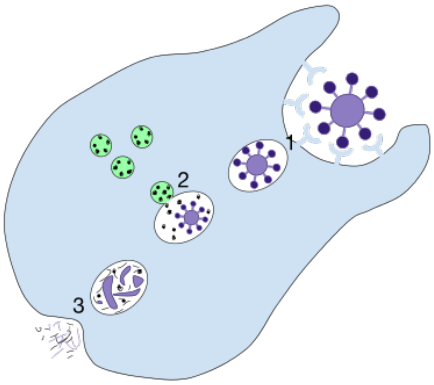


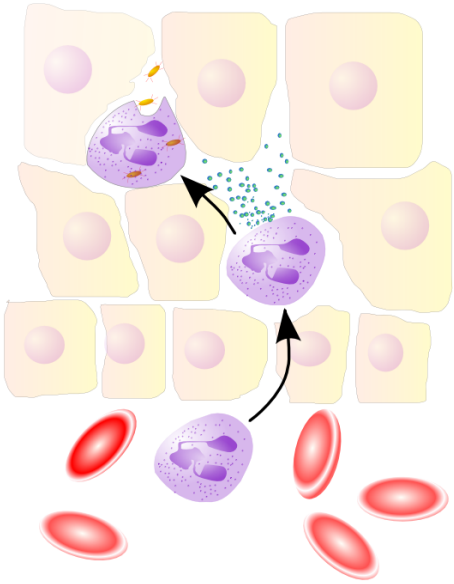
CONCEPT: INNATE IMMUNITY

- Phagocytosis of pathogens is triggered after detection by immune system
  - □ ***Neutrophils*** – phagocytes that circulate in the blood and are attracted to infected tissues by cytokines
  - □ ***Macrophages*** – phagocytes that reside in tissues and organs that frequently encounter pathogens
  - □ ***Dendritic cells*** – engulf pathogens to stimulate adaptive immunity
    - Macrophages and dendritic cells are found in and around the lymphatic system, especially lymph nodes

EXAMPLE:

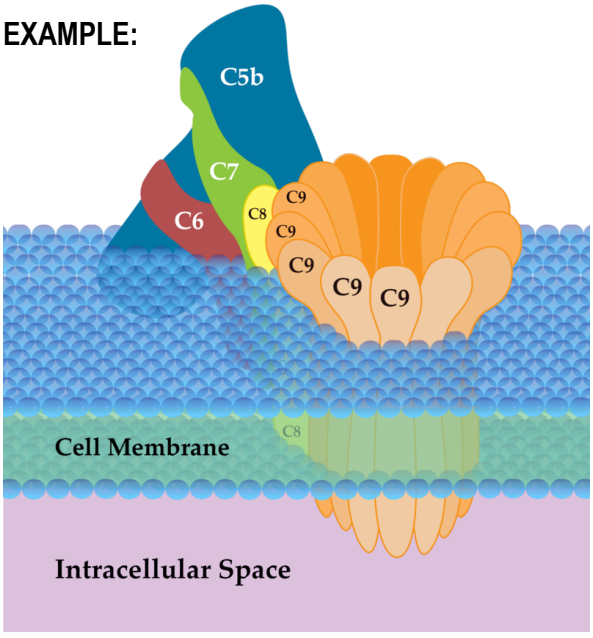


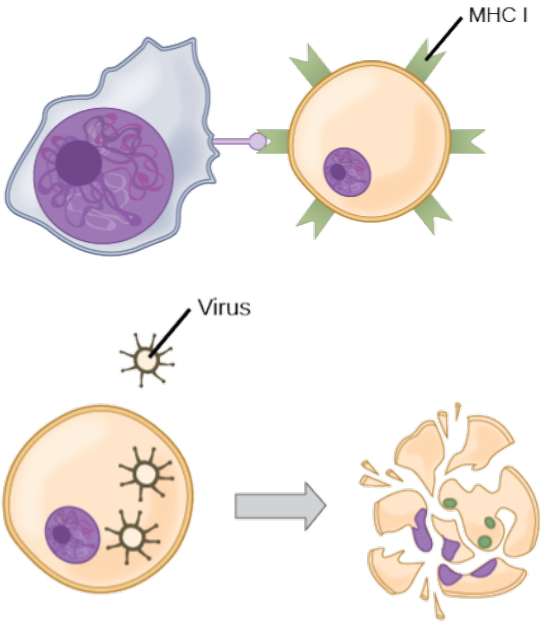




- Eosinophils – defend against multicellular parasites
- ***Natural killer cells*** – circulate the body to identify and destroy viruses by secreting chemicals to induce apoptosis
- ***Interferons*** – cytokines that induce cells to interfere with viral replication
- ***Compliment system*** – group of proteins found in blood, activated by PAMPs and antibodies
  - □ Lead to lysis of pathogens by boring holes in their membranes

EXAMPLE:





CONCEPT: INNATE IMMUNITY

- ***Inflammatory response*** – type of innate immune response that results in local swelling
    - □ Following injury, platelets form clots to seal off site and prevent blood loss
    - □ Wounded tissues and macrophages release chemokines, cytokines that recruit cells to infection site
    - □ Mast cells release histamine, chemical signal that constricts blood vessels, reducing blood flow and loss
        - Mast cells signal blood vessels peripheral to infection site to dilate
    - □ Neutrophils, signaled by the blood vessel dilation and chemokines, move to infection site
    - □ Macrophages are recruited to infection site and release cytokines

EXAMPLE: