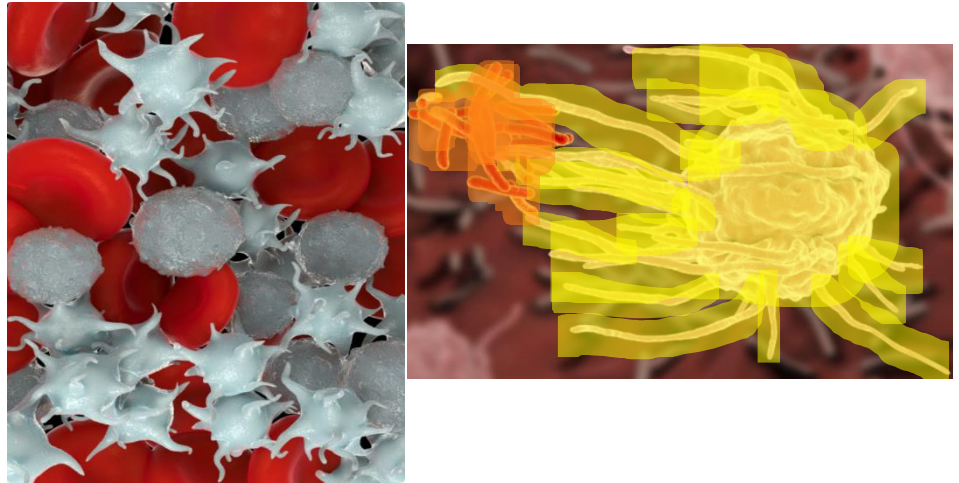


## CONCEPT: IMMUNE SYSTEM

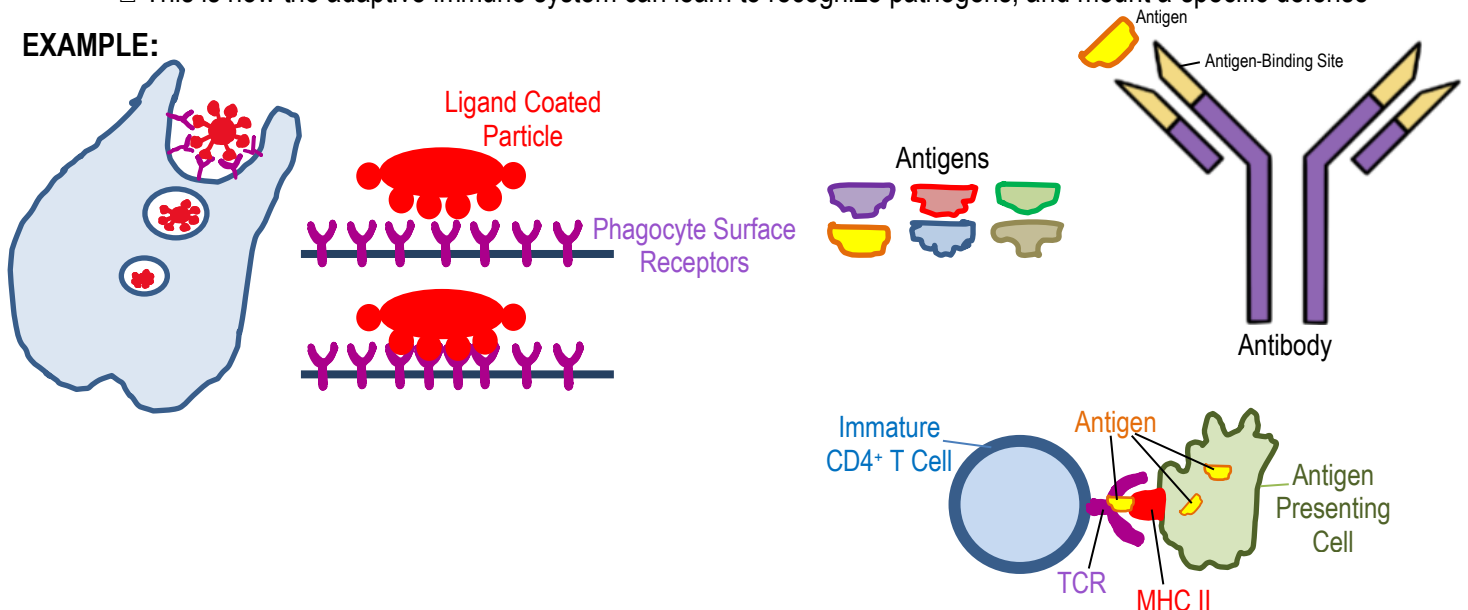
- **Pathogen** – bacteria, virus, or other microorganism that causes disease
- **Immune system** – defense system of animals against pathogens, comprised of many cells and various tissues
  - **Innate immunity** – nonspecific defense that mounts generic response to pathogens
  - **Adaptive immunity** – acquired, specific defense against specific pathogens, confers long-term immunity

### EXAMPLE:



- **Phagocytosis** – cell engulfs particle and sucks it into internal compartment called phagosome
  - Cells of the immune system recognize pathogens and remove them by phagocytosis
- **Cytokines** – signaling molecules release by immune cells that recruit other immune cells to mount response
- **Antigen presentation** – immune cells present pieces of pathogens membrane that contain recognizable proteins
  - **Antigens** – molecule that induces an immune response
  - **Antibodies** – produced by the immune system to recognize antigens
  - This is how the adaptive immune system can learn to recognize pathogens, and mount a specific defense

### EXAMPLE:



**CONCEPT: IMMUNE SYSTEM**