EXCRETORY SYSTEM
Objectives

- Describe the functions of the kidneys
- Identify the functional unit of the kidneys
- Describe the role of the liver in the excretory system
- Identify the two phases of blood purification
Function of the Excretory System

- Removes metabolic wastes from the body
- Metabolic wastes include:
  - Salts
  - Carbon dioxide
  - Urea – toxic compound produced when amino acids are used for energy
Organs of the Excretory System

- **Skin**
  - Excretes excess water, salts, and some urea in sweat

- **Lungs**
  - Excretes CO₂

- **Liver**
  - Converts amino acids into useful compounds
  - Converts nitrogen wastes into urea
Organs of the Excretory System

- Kidneys
  - Main organ of excretory system
  - Remove waste products from blood (filters blood)
  - Maintain blood pH
  - Regulate water content of blood (blood volume)
Organs of the Excretory System

- **Ureter**
  - Carries urine to urinary bladder

- **Urinary bladder**
  - Stores urine until it is excreted

- **Urethra**
  - Tube where urine is released
Kidneys

- 3 main parts:
  - Cortex
    - Outermost portion
  - Medulla
    - Inner portion
  - Renal pelvis
    - Funnel-shaped portion in the center
The functional units of the kidney are called **nephrons**
- Located in the cortex
- Each nephron has its own blood supply
  - Arteioles, venules, and capillaries
- Removes toxins, urea, salts, and water to form urine
- Wastes are released into collecting ducts that lead to the ureter
- Purified blood exits the nephron through the venule
Kidneys

- Blood purification occurs in 2 phases
  - Filtration
  - Reabsorption
Filtration of Blood

- Takes place in the glomerulus
  - **Glomerulus** – small network of capillaries at the top of nephrons enclosed in the Bowman’s capsule
  - **Bowman’s capsule** – cup-shaped structure in the upper end of a nephron that encases the glomerulus
- Blood pressure forces small molecules (wastes mostly) out of the capillaries
Reabsorption

- Kidneys filter all the body’s blood every 45 min.
- Most materials removed by Bowman’s capsule makes its way back into blood
- Almost 99% of water is reabsorbed into blood by osmosis
- Glucose and other nutrients are reabsorbed by active transport
Urine Formation

- Materials not reabsorbed is emptied into a collecting duct
  - Called urine
- Urine is concentrated in the loop of Henle
  - **Loop of Henle** – section of nephron tubule in which water is conserved and the volume of urine is minimized
- Urine is stored in the urinary bladder until it is released through the urethra
Control of Kidney Function

- Activity of kidneys is controlled by the composition of blood
  - Some regulatory hormones are also involved
  - Ex: the more water that you drink, the less that is reabsorbed, and the excess is excreted in urine
  - Ex: the more salty foods you eat, the less that is reabsorbed into the blood, and the excess is excreted in urine
Describe the functions of the kidneys
- Remove waste products from blood (filters blood)
- Maintain blood pH
- Regulate water content of blood
Identify the functional unit of the kidneys

Nephrons are the functional units of kidneys.
Describe the role of the liver in the excretory system

- Converts amino acids into useful compounds
- Converts nitrogen wastes into urea
Identify the two phases of blood purification

- The two phases of blood purification are filtration and reabsorption.