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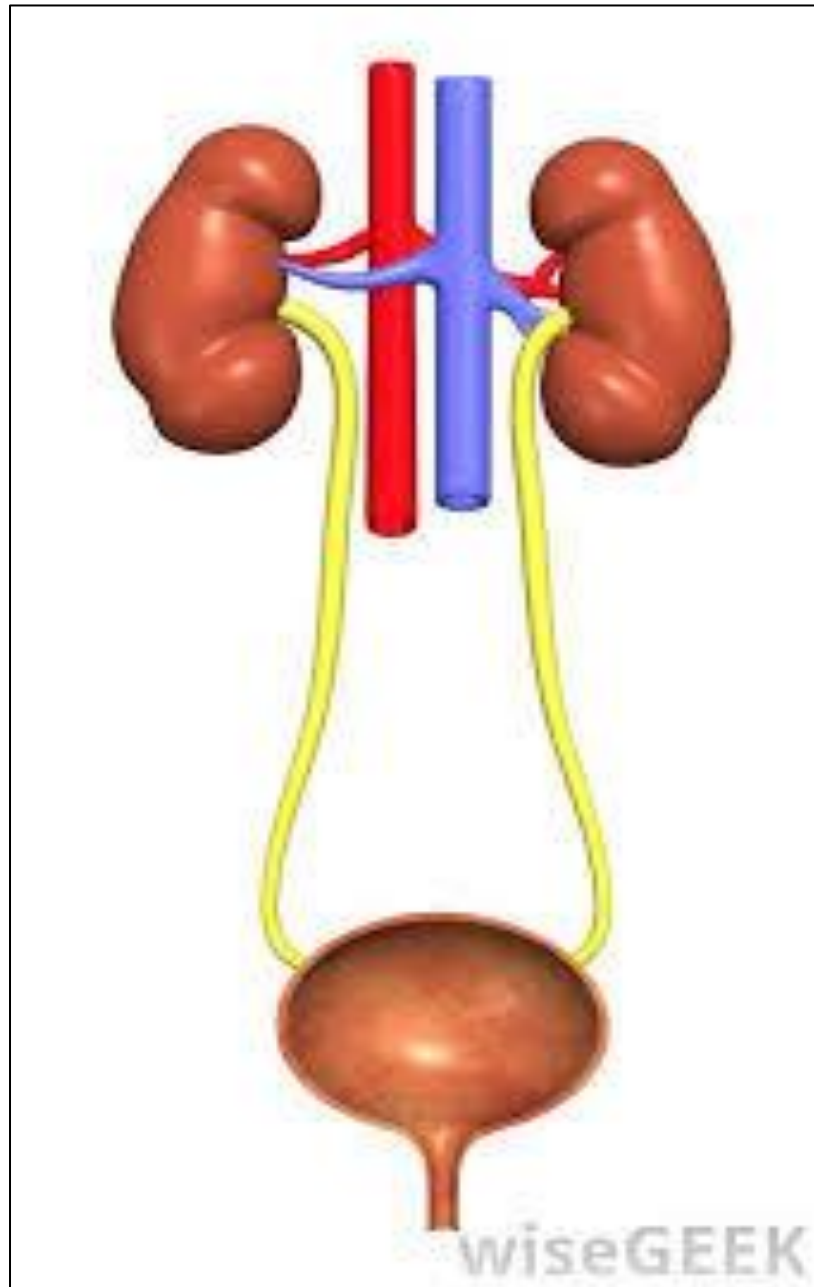
## **Lec.3**

# **The Urinary System**

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# The Urinary System

The urinary system is responsible for removing waste products generated from metabolism and maintaining the balance of fluids and electrolytes in the body. It consists of several components that work together to perform these functions.



## **Main Organs:**

### **1. Kidneys:**

- The primary organs of the urinary system.
- Located on either side of the spine.

#### **Functions include:**

1. Filtering the blood to remove waste products (e.g., urea, creatinine).
2. Regulating fluid and electrolyte balance.
3. Secreting hormones like erythropoietin, which stimulates red blood cell production.

### **2. Ureters:**

- Two tubes that transport urine from the kidneys to the bladder.
- Contain smooth muscles that propel urine through peristaltic movements.

### **3. Urinary Bladder:**

- A muscular, expandable organ that temporarily stores urine.
- Contains sensory receptors that signal the need to urinate when full.

### **4. Urethra:**

- The tube that carries urine from the bladder out of the body.
- Length differs between males and females:

## **Key Terminology:**

1. **Nephron:** The functional unit of the kidney.
2. **Glomerulus:** A network of capillaries within the nephron.
3. **Bowman's Capsule:** A structure that surrounds the glomerulus.
4. **Renal Tubule:** A tubular structure where reabsorption and secretion occur.
5. **Urine:** The liquid waste product formed after blood filtration.

## **Physiological Processes:**

### **Glomerular Filtration:**

- Occurs in the kidneys within the nephron.
- Filters plasma to remove waste and excess water.

### **Reabsorption:**

- Reclaims essential substances like glucose, amino acids, and most water from the filtrate back into the blood.

### **Tubular Secretion:**

- Adds additional substances (e.g., drugs, certain ions) from the blood to the filtrate.

### **Micturition (Urination):**

- The process of expelling urine from the body.
- Controlled by the central and peripheral nervous systems.

## **Common Disorders:**

1. **Kidney Stones:**  
Hard mineral deposits that form in the kidneys.
2. **Urinary Tract Infections (UTIs):**  
Infections affecting the ureters, bladder, or kidneys.
3. **Kidney Failure:**  
The inability of the kidneys to perform their functions effectively.
4. **Proteinuria:**  
The presence of protein in urine, often indicating kidney damage.