



AL-mustaqbal university  
College Of Health and Medical Techniques  
Department of kidney dialysis techniques



## **Lec.6**

### **The Endocrine System and Hormones**

Artificial kidney first stage

MSc. Zainab ali al-khafaji  
zainab.ali.mohsen@uomus.edu.iq

# The Endocrine System and Hormones

## Definition of the Endocrine System:

The endocrine system is a network of glands responsible for producing and releasing hormones directly into the bloodstream. These hormones act as chemical messengers that regulate various functions in the body, such as growth, metabolism, reproduction, and internal balance.

## Major Endocrine Glands:

### 1. Pituitary Gland ("Master Gland")

- **Location:** At the base of the brain, below the hypothalamus.
- **Function:**
  - Regulates other endocrine glands.
  - Secretes hormones like growth hormone (GH), thyroid-stimulating hormone (TSH), and gonadotropins (FSH and LH).

### 2. Thyroid Gland

- **Location:** In the neck, wrapped around the trachea, below the Adam's apple.
- **Function:**
  - Controls metabolism by secreting thyroxine (T4) and triiodothyronine (T3).
  - Regulates energy usage, heat production, and weight.

### 3. Parathyroid Glands

- **Location:** Four small glands located behind the thyroid gland.
- **Function:**
  - Regulate calcium and phosphorus levels in the blood.
  - Secrete parathyroid hormone (PTH).

### 4. Adrenal Glands

- **Location:** On top of each kidney.
- **Function:**
  - **Cortex:** Produces cortisol (stress response) and aldosterone (regulates salt and water balance).
  - **Medulla:** Produces adrenaline (epinephrine) and noradrenaline for the fight-or-flight response.

## 5. Pancreas

- **Location:** In the abdomen, behind the stomach.
- **Function:**
  - Regulates blood sugar levels.
  - Secretes insulin (lowers blood sugar) and glucagon (raises blood sugar).

## 6. Pineal Gland

- **Location:** Deep in the brain, between the two hemispheres, in a groove where the two halves of the thalamus join.
- **Function:**
  - Produces melatonin, which regulates sleep-wake cycles.

## 7. Gonads (Reproductive Glands):

- **Ovaries (Females):**
  - **Location:** On either side of the uterus in the pelvic cavity.
  - **Function:** Produce estrogen and progesterone, regulating the menstrual cycle and supporting pregnancy.
- **Testes (Males):**
  - **Location:** In the scrotum.
  - **Function:** Produce testosterone, which regulates sperm production and male secondary sexual characteristics.

## 8. Hypothalamus (Part of the Brain, Not a Gland)

- **Location:** Below the thalamus, in the brain.
- **Function:**

- Connects the nervous system to the endocrine system via the pituitary gland.
- Regulates body temperature, hunger, thirst, and circadian rhythms

## **Hormones: Definition and Role**

- **Definition:** Hormones are chemical substances secreted by endocrine glands and carried through the blood to target organs.
- **Role:**
  - Regulate growth and development.
  - Control chemical balance and fluid levels in the body.
  - Influence mood and emotional responses.
  - Manage reproductive processes.

## **Disorders of the Endocrine System:**

1. **Common Disorders:**
  - **Hypothyroidism:** Underactive thyroid gland, leading to a slower metabolism.
  - **Hyperthyroidism:** Overactive thyroid gland, causing increased heart rate and weight loss.
  - **Diabetes Mellitus:** Impaired production or response to insulin.
  - **Cushing's Syndrome:** Excess cortisol production.
2. **Causes of Disorders:**
  - Genetic factors.
  - Nutritional deficiencies.
  - Chronic stress.
  - Environmental toxins.

## **Caring for the Endocrine System:**

1. Maintain a balanced diet rich in essential vitamins and minerals.
2. Engage in regular physical activity.

3. Keep a healthy weight.
  4. Manage stress effectively using relaxation techniques.
  5. Ensure adequate sleep to support melatonin regulation.
- 

**References:**

- Book: *Endocrinology* by Mac E. Hadley.