

**Al-mustaqbal university
collage**

College of Dentistry

Second stage

2Lap:

The Endocrine system

By

MSC: Ali Talib Ahmed Al aaraji



جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

The Endocrine System

- Second messenger system of the body
- Uses chemical messages (hormones) that are released into the blood
- Hormones control several major processes
 - Reproduction
 - Growth and development
 - Mobilization of body defenses
 - Maintenance of much of homeostasis
 - Regulation of metabolism

The Chemistry of Hormones

- Amino acid-based hormones
 - Proteins
 - Peptides
 - Amines
- Steroids – made from cholesterol
- Prostaglandins – made from highly active lipids

Mechanisms of Hormone Action

- Hormones affect only certain tissues or organs (target cells or organs)
- Target cells must have specific protein receptors
- Hormone binding influences the working of the cells

Endocrine Organs

- **Cells forming endocrine organs**

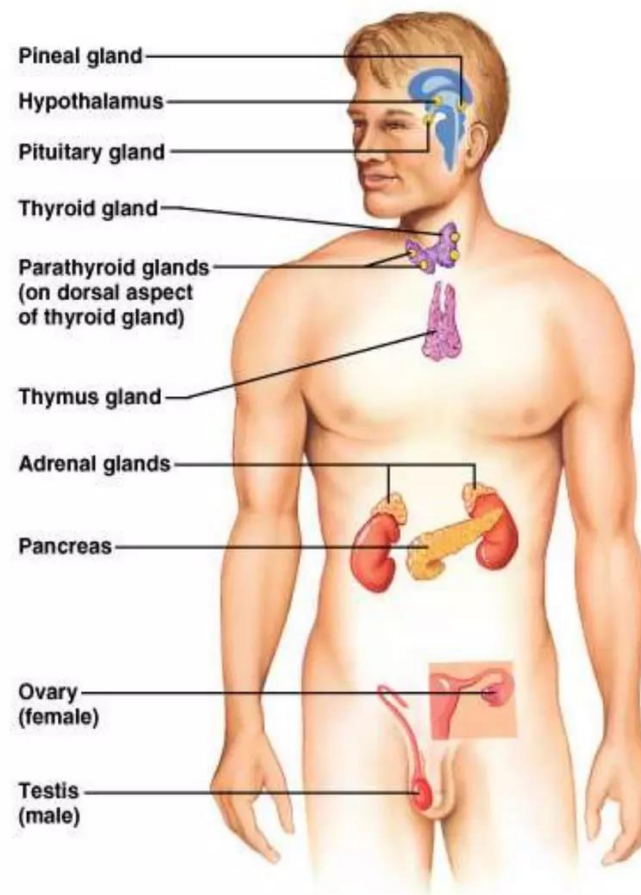
- Pituitary gland
- Thyroid gland
- Parathyroid glands
- Adrenal: 2 glands Cortex
 Medulla

-Pineal gland

- **Endocrine cells in other organs**

- Pancreas
- Thymus
- Gonads
- Hypothalamus

- **Isolated endocrine cells**-APUD cell system



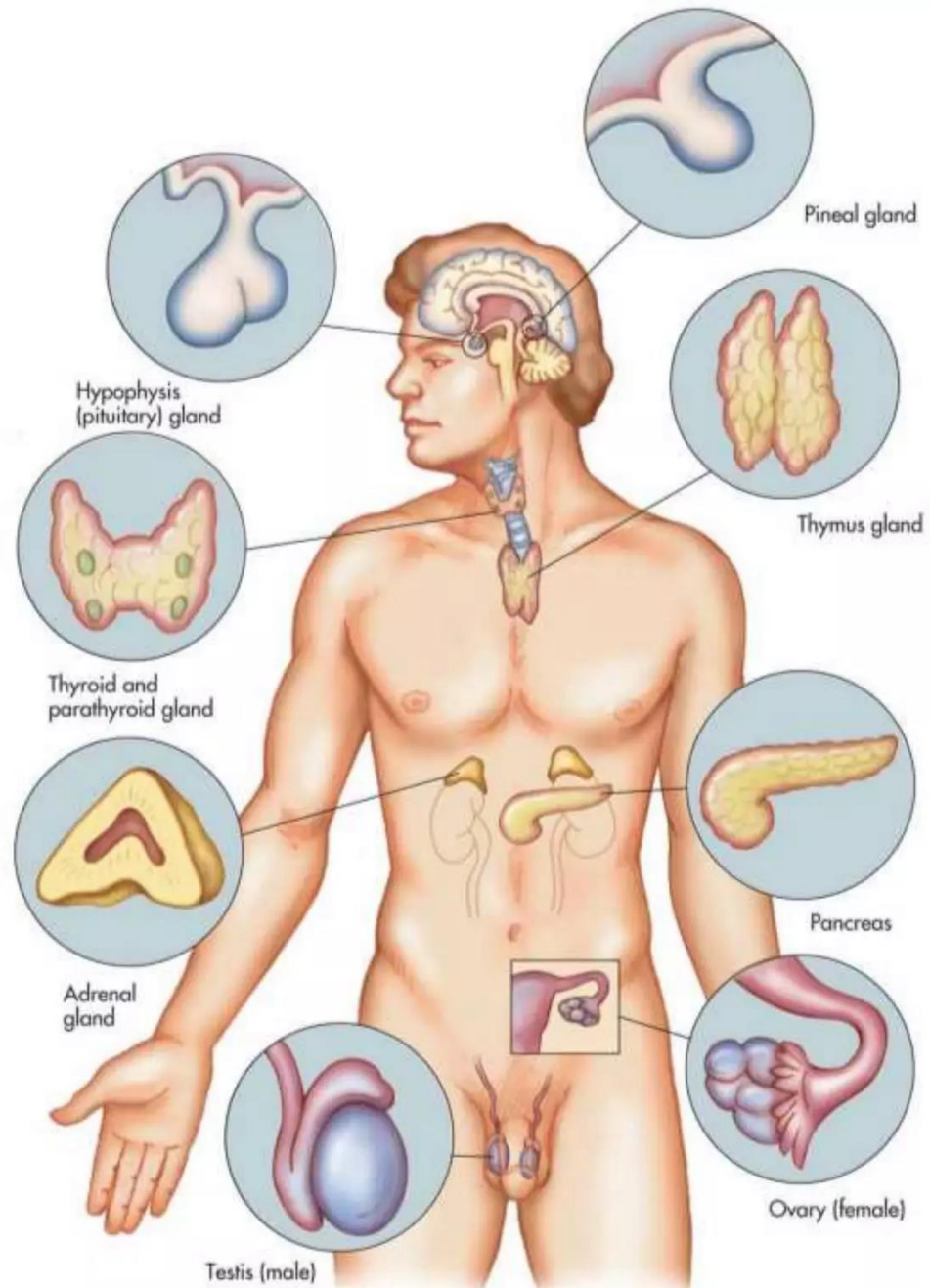
Endocrine Glands

- Ductless glands:
 - Secretory pole of an endocrine cell is **towards capillary** (or sinusoid)
 - Release the hormones **first into interstitial fluid**
 - Than **enter the bloodstream** through capillaries and reach target organs
 - Acts on cells that bear specific receptors for it & produces hormone specific responses
 - **Some hormones** act only on **one organ / one type of cell**, while **other** may have **widespread effects**

Distributions of Endocrine Cells

Distributed in three ways:

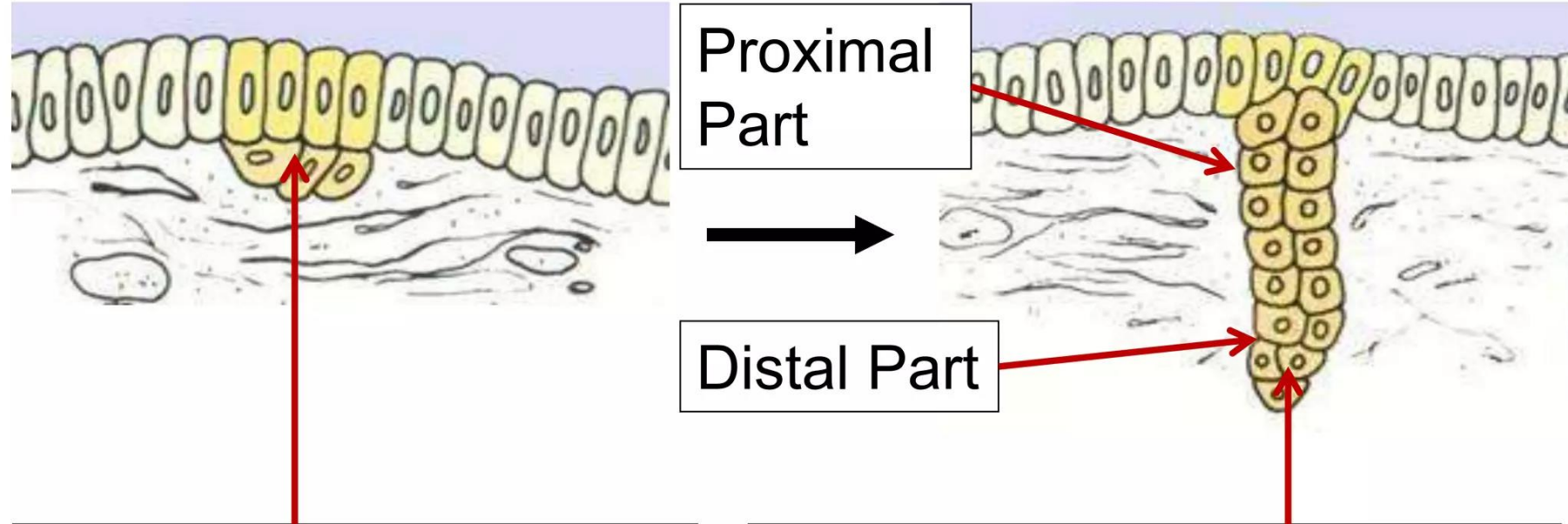
- **Major Endocrine glands**
 - Hypophysis Cereberi, Thyroid, Parathyroid, Suprarenal, Pineal
- **Organs contain group of endocrine cells**
 - Islets of Pancreas, Testes ,Ovary, Placenta, Kidney
- **Isolated endocrine cells / APUD / Neuroendocrine system**
 - Lining epithelium of GIT, Respiratory tract



Endocrine Glands

- **Hormones**: **4 main types** based on chemical structure
 1. **Amino acid derivatives**: Adrenalin, Noradrenalin & Thyroxine
 2. **Small peptides**: Enkephalin, Vasopressin & Thyroid Releasing Hormone
 3. **Proteins**: Insulin, Parathormone & Thyroid Stimulating Hormone
 4. **Steroids**: Progesterone, Oestrogens, Testosterone & Cortisol

Development of Glands



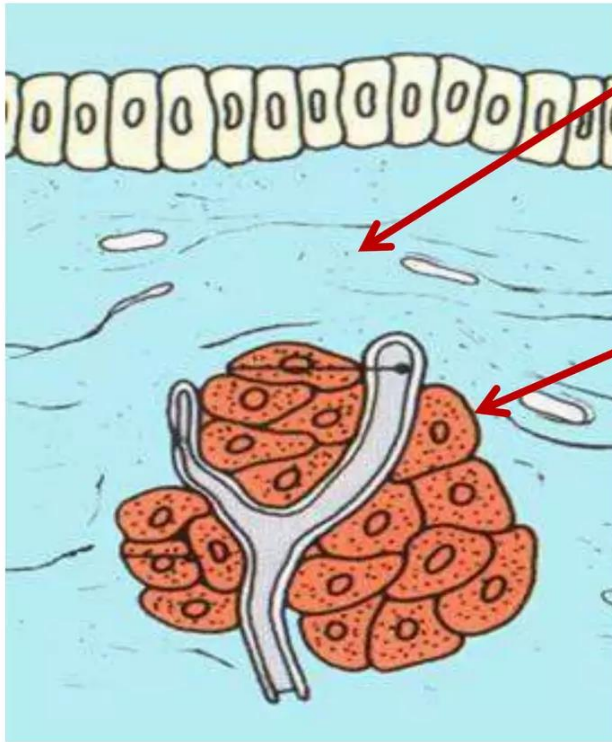
Developed as **cords** of epithelial cells from the surface of membrane

Invaginates in to underlying Connective tissue & Form 2 parts

Endocrine Glands

Development of Glands

Ductless Gland *



Proximal Part

Disappear

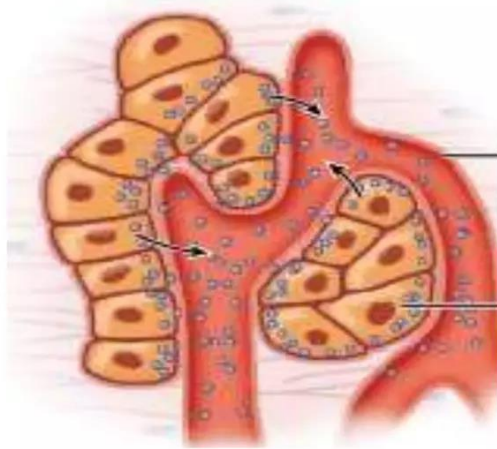
Distal Part

Form islands of the secretory cells permeated / surrounded by the **blood capillaries**

Pours their secretion in to directly in to blood
through the blood capillaries

Types of Endocrine Glands

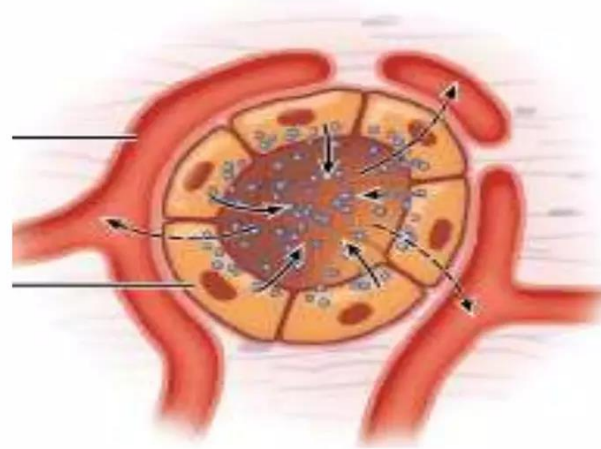
Cord & Clump Type



Cells arranged in irregular
Cords / clumps **permeated**
by capillaries

Secretions directly delivered
outward in capillaries

Follicular Type

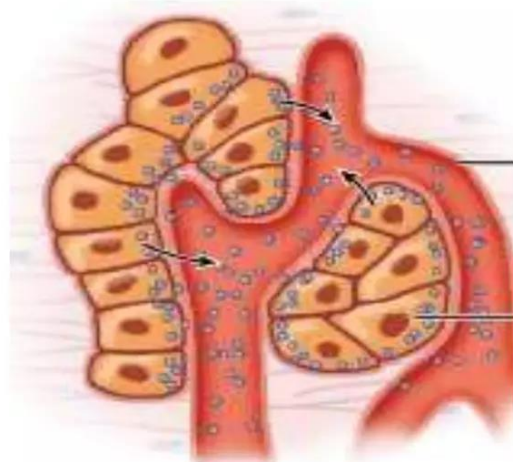


Cells arranged in follicles
surrounded by capillaries

Secretions first delivered
inward inside the follicles

Endocrine Glands

Cord & Clump Type

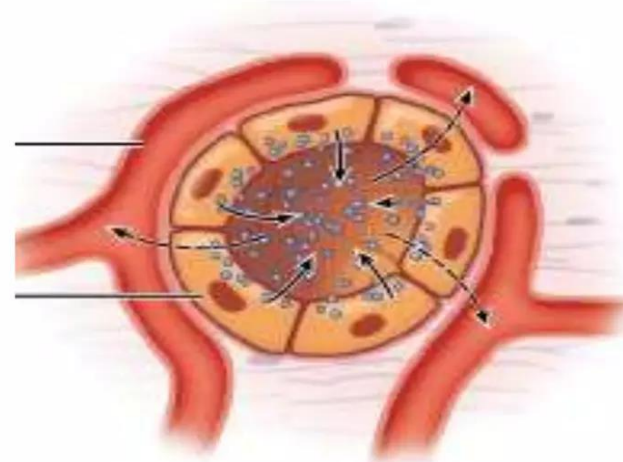


Secretions stored inside
the cells

“Intra-cellular method”

E.g. Most endocrine glands
**Pituitary, Adrenal,
Parathyroid, Pineal**

Follicular Type



Secretions stored outside
the cells, inside the follicles

“Extra-cellular method”

E.g.
Thyroid Gland

Major Endocrine Glands

- Pituitary / hypophysis cerebri
- Hypothalamus
- Thyroid & Parathyroids
- Adrenals
- Pineal

