

BASICS OF ENDOCRINE GLANDS

General considerations..1

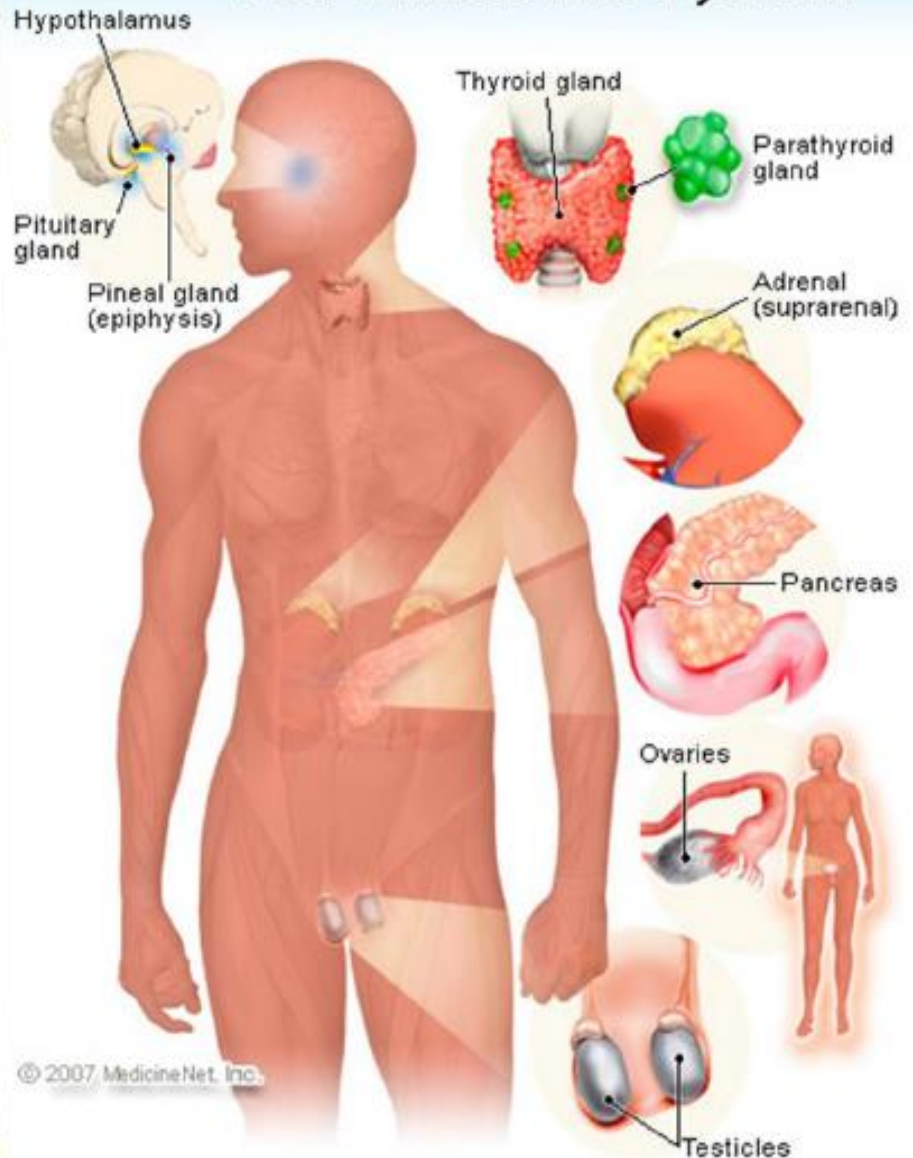
Histologically, the endocrine cells are epithelial cells performing special functions.

Endocrine glands may be:

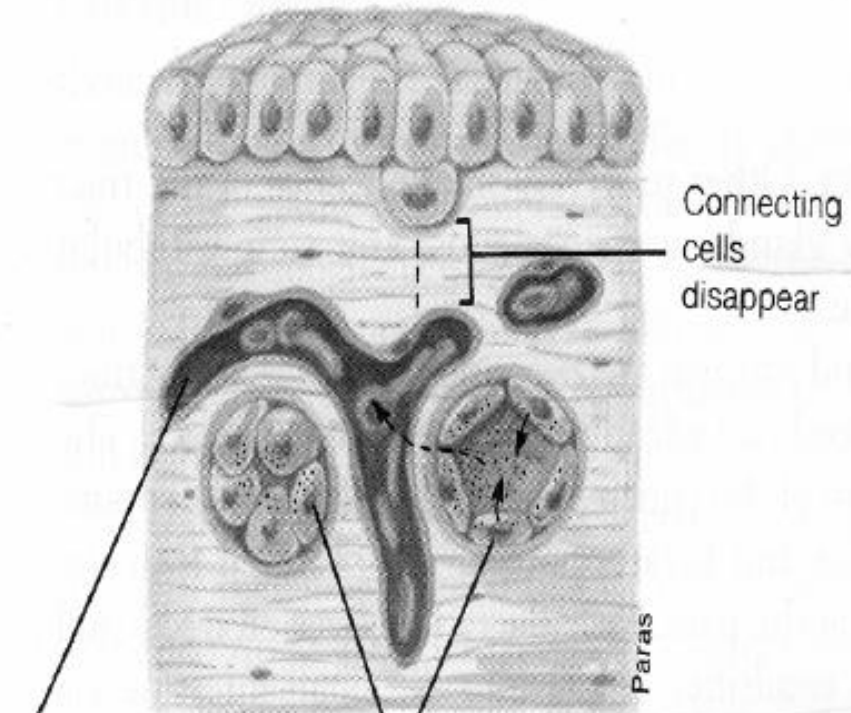
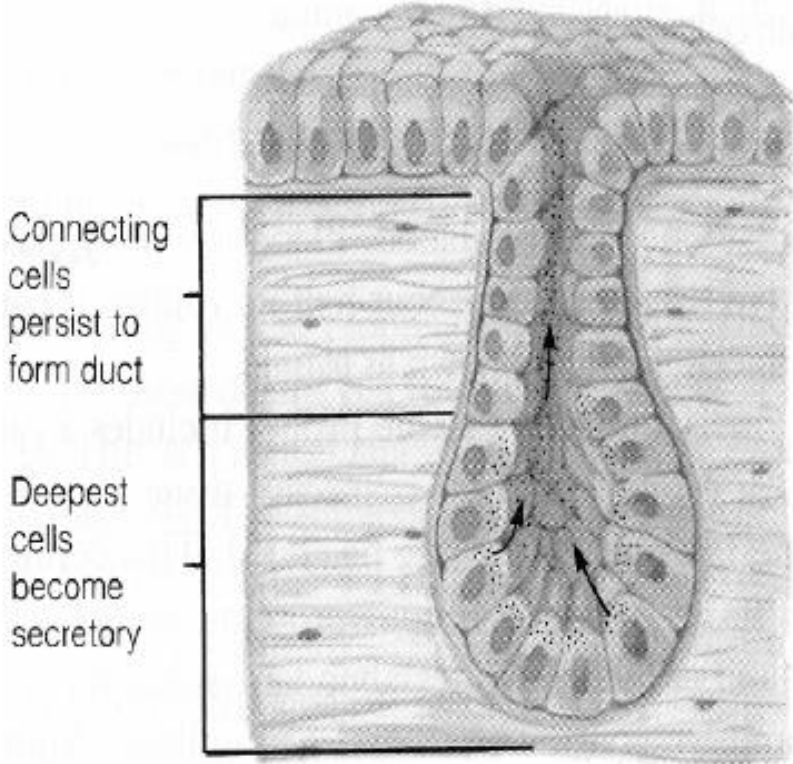
- Unicellular (DNES = APUD)
- Multicellular (thyroid, adrenal.....)

Each endocrine gland has two different embryological origins.

The Endocrine System



Exocrine and Endocrine Glands



Exocrine Glands and Endocrine glands

Exocrine Glands: **Secrete into a duct and to the outside of a body surface**

Examples: **sweat, tear, saliva**

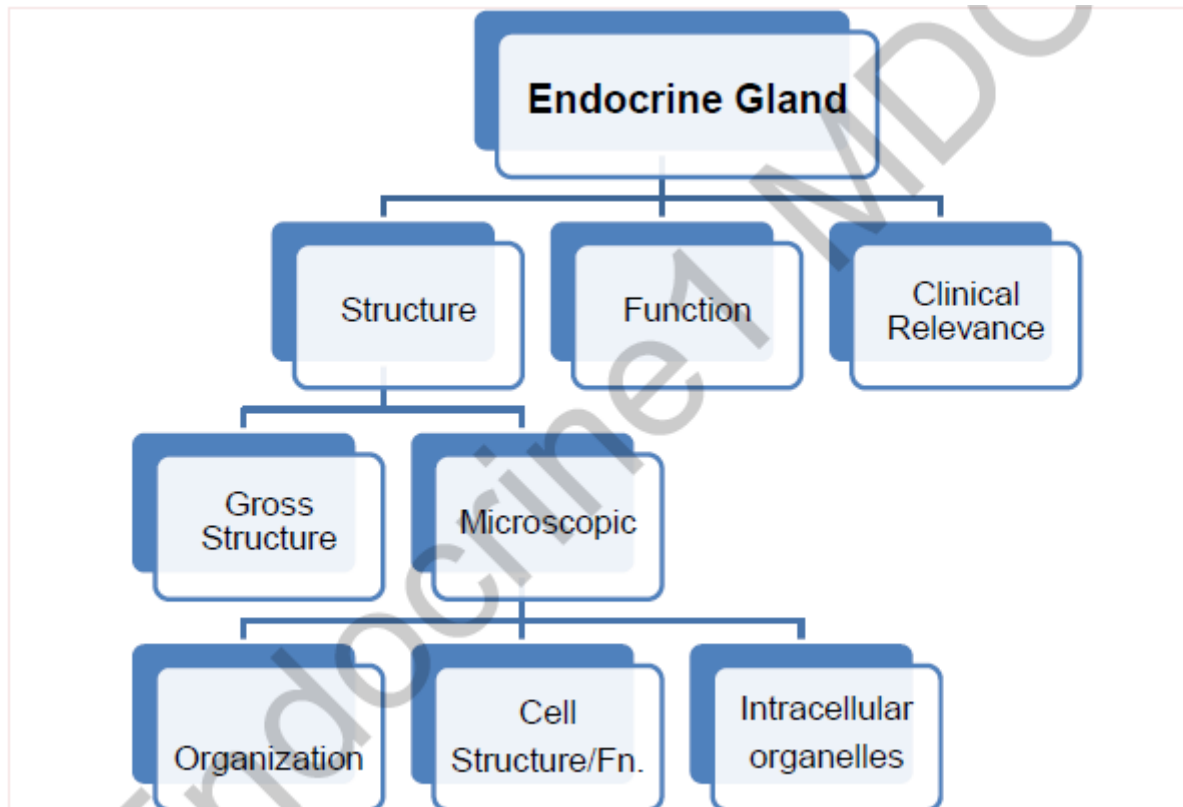
Endocrine Glands: **Secrete (hormone) into the blood**
Hormone circulates in blood and acts at target organs where hormone receptor is expressed

Examples: **insulin**

Exocrine and Endocrine glands:

	Endocrine	Exocrine
Liver:	IGF	Bile
Pancreas	Pancreatic juice	insulin, glucagon, PP

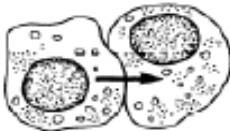



Study of Endocrine Glands



Intercellular signaling is the way by which a cell exerts its effects on another cell (or on itself) and it subdivided into the following classifications:

- 1) **Intracrine signals are produced within the target cell.**
- 2) **Autocrine signals target the cell itself.**
- 3) **Juxtacrine signals target adjacent (touching) cells.**
- 4) **Paracrine signals target cells in the vicinity of the emitting cell (e.g. neurotransmitters)**
- 5) **Endocrine signals target distant cells by producing hormones that travel through the blood to reach all parts of the body.**

Intercellular communication

	GAP JUNCTIONS	SYNAPTIC	PARACRINE AND AUTOCRINE	ENDOCRINE
				
Message transmission	Directly from cell to cell	Across synaptic cleft	By diffusion in interstitial fluid	By circulating body fluids
Local or general	Local	Local	Locally diffuse	General
Specificity depends on	Anatomic location	Anatomic location and receptors	Receptors	Receptors

- **Communication between cells**
 - **Direct electrical coupling**
 - Synaptic or anatomical junction
 - **Chemical substances**
 - hormones or neurotransmitters

Homeostasis & Endocrine

Homeostasis

(physiological state in which the physical and chemical conditions of the internal environment are being maintained)

Most organ systems contribute to homeostasis

Nervous System

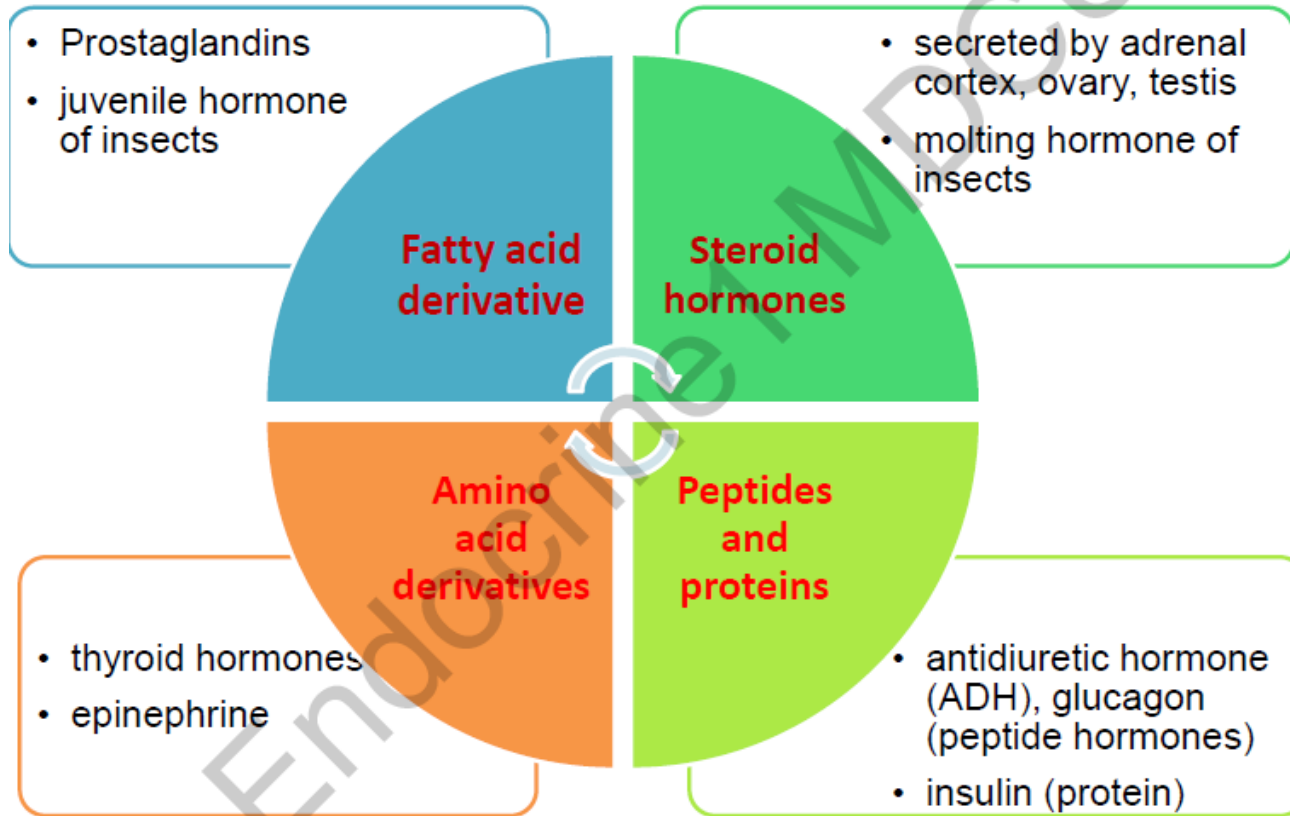
Endocrine System

Endocrine vs. Nervous System

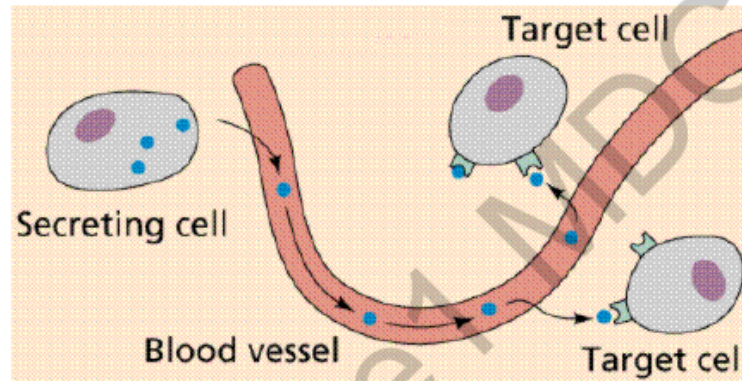
	Nervous Systems	Endocrine Systems
Means of communication	Electrical (±chemical)	Chemical
Speed and persistence of response	reacts faster stops quicker	reacts slower continue ~ weeks
Adaptation to long-term stimuli	adapts quickly and response declines	more persistent responses
Area of effect	targeted and specific	widespread effects on many organs

Nature of Hormones

Chemical Hormone Groups



Components of Endocrine System



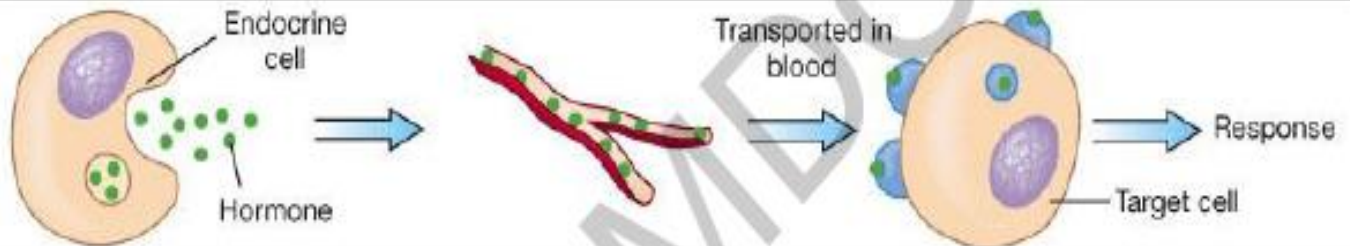
- Secreting cell
- Hormone
 - chemical messenger secreted into bloodstream, stimulates response in another tissue or organ
- Target cells : have receptors for hormone

Endocrine system

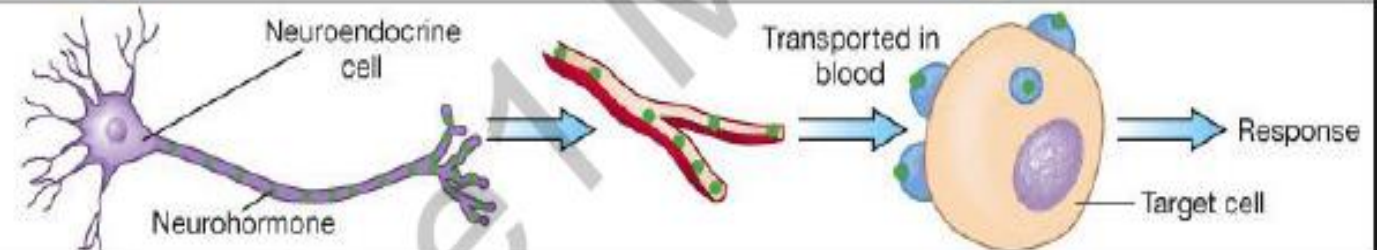
includes hormone producing cells in organs
e.g. brain, heart and GI

Types of Endocrine Signaling

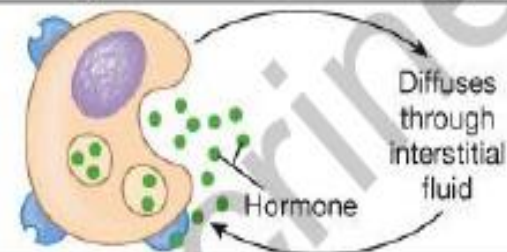
(a) Classical endocrine signaling. Endocrine cells release hormones that are transported to target cells by the blood.



(b) Neuroendocrine signaling. Neurons release neurohormones, which are transported by blood or diffuse through interstitial fluid.



(c) Autocrine signaling. A hormone acts on the very cells that produce it.



(d) Paracrine signaling. A hormone diffuses through interstitial fluid and acts on nearby target cells.

