

## **The Endocrine System**

This system is also called ductless system which means that the secretion of this system from the hormones is pouring directly to the blood stream without passing to the ducts.

The glands of this system are:

1. Pituitary gland
2. Thyroid gland
3. Para thyroid gland
4. Adrenal gland
5. Pancreas gland

These glands are encapsulated by the C-T "capsule" and its parenchyma is containing the cells which secrete the hormones.

Some endocrine tissues are located within other tissues which are not endocrine like pancreas, ovary and testis.

Also, there is individual cells are present and secretes its hormones without arranged in the form of glands as organs, these cells are present in the mucosa of stomach, duodenum, which secrete gastrin and cholecystochinine.

### **The Pituitary Gland:**

Is present in the floor of the brain which called Diencephalon.

The gland is formed by three lobes:

- A. Anterior lobe
- B. Posterior lobe
- C. Inter median lobe

The Anterior Lobe: is also called pars distalis or glandular lobe, it is containing cords of cells which secrete many hormones like TSH, LH, FSH, ACTH and growth hormone GH. The cells of this lobe is classified into:

- a. Chromophils
- b. Chromophobes

- **Chromophils:** are staining either by red stain or blue stain, so, if its cytoplasm stained red is called esinophilic or acidophilic cells.
- If the cytoplasm stained blue, so it is called basophilic cells.
- **Chromophobes:** these cells are with cytoplasm which is not stained by any dyes.
- In between both types of cells, there are many sinusoidal capillaries for draining the secretion of hormones for these cells.

**The posterior lobe:** is called sometimes nervous lobe, which is associated with the hypothalamus of the brain, this lobe have no secretory cells like that of the anterior lobe, but it have axons of nerve cells coming from hypothalamus, these cells are in the paraventricular and supra optic nuclei of hypothalamus and the cells secrete the antidiuretic hormone and oxytocin which pass these hormones through the axons of these cells to the end of these axons in the posterior lobe to be preserve by sacs called hering bodies and released to the blood at time of its demand, also there is in this lobe cells called pituocytes as supporting cells.

**The intermedian lobe:** is small and containing epithelial cells arranged in the form of follicles responsible for releasing of MSH melanocyte stimulating hormonal directed to the skin for releasing a melanin pigments, and this lobe is active in the reptiles and amphibians.

**The Thyroid gland:**

Is lobulated gland, formed by two lobes connected by isthmus, located in the neck, each lobe is formed by many follicles responsible for production and releasing of Thyroxin. Each follicle is lined by epithelial cells, simple cuboidal, columnar resting on basement membrane, and the lumen of each follicle has a colloidal material which have the thyroxin for preservation and releasing of this Thyroxin. The cells of follicle called follicular cells. There is another type of cells in between the follicles, in the interstitial C-T called para follicular cells or called C-cells, responsible for secretion of calcitonin hormone and responsible for deposition of calcium in the bones from the blood.

**Para thyroid gland:**

Is present in the tissue of the thyroid gland, these are two parts, each part is formed by many cells, responsible for secretion of parathromone which remove the

calcium from the bone to the blood, and the cells in this gland is called main cells or chief cells, in between there are many sinusoidal capillaries and there is another type of cells called oxynatic cells (unknown function).

#### **Adrenal gland:**

Is present nearby the kidney, and this gland is formed by cortex and medulla covered by capsules. The cortex is arranged in three zones which are:

- A. Zona glomerulosa**
- B. Zona fasciculata**
- C. Zona reticularis**

The medulla is formed by the groups of cells called adrenaline and non-adrenaline cells.

#### **The zones of cortex:**

- A. Zona glomerulosa:** the cells in this zone arranged in the form of oval or spherical groups and in between there are many blood sinusoids, this zone is responsible for reabsorption of water from D-C-T of kidney and balance of sodium ions and potassium ions in kidney.
- B. Zona fasciculate:** the cells are larger in part of the first zone and in between there is sinusoidal capillaries, the cells in this zone arranged in the form of columns. This zone secretes glucocorticoids which are produce the cortisone and hydrocortisone.
- C. Zona reticularis:** is the narrowest zone, near by the medulla, it is responsible for secretion of small quantities of the sex hormones in both sexes e.g. produce testosterone "Androgen" in the female and Estrogen in the male. The cells of this zone are small and arranged as a network, in between, there is sinusoidal capillaries.

#### **The medulla:**

Is containing a group of large cells, either Adrenaline or non-adrenaline secreting cells, and in between, there are many sinusoidal capillaries, with the presence of the medullary or central vein to drain the different hormones of the gland.



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