

- **Adrenal Glands**

-Are paired located above (or attached to) the upper part of the kidney.

-Each one is pyramidal in shape and weighs ~ 4 g.

Each gland is covered by a dense connective tissue capsule that sends thin septa (trabeculae).

Its stroma is a network of reticular fibers that support the secretory cells.

It is composed of two layers :

1- Cortex 2- Medulla

The cortex, peripheral layer, of the adrenal about(80-90%) of the gland. It is glandular tissue derived from embryonic mesoderm .

The medulla, a central layer of the adrenal, (10-20%)– formed from neural ectoderm, can be considered a modified sympathetic ganglion .

Both cortex and medulla are grouped in cords along capillaries. The adrenal cortex is essential to life, but the adrenal medulla is not essential to life.

Histology of the Adrenal Cortex :

The adrenal cortex consists of three different regions. Each region produces a different type of hormone. The adrenal cortical hormones are all steroids.

From the external side of the gland to the deeper are:

1-Zona glomerulosa

2- Zona fasciculata

3- Zona reticularis.

**Zona glomerulosa** is Outermost region of the adrenal cortex .

- Are columnar in shape and arranged in irregular cords.
- It secretes mineralocorticoids .

The aldosterone, is the main mineralocorticoid that works on the kidney to conserve sodium ions and water in the body.

**The zona fasciculata:** is the middle and largest of the three zones in the cortex

- Its cells are polyhedral and usually have a foamy appearance due to abundant lipid droplets. They are arranged in straight cords .
- It secretes glucocorticoids which is Cortisol is the principal glucocorticoid which increases blood glucose levels.

**The zona reticularis:** are composed of cells arranged in cords , project in many different directions and anastomose with one another.

Cells are smaller than those of z. fasciculata, have eosinophilic cytoplasm; few lipid droplets.

Secretes small quantities of sex hormones (androgens) plus glucocorticoids).

- **Adrenal Medulla** : Is composed of :

**The chromaffin cell** : large, polyhedral cells arranged in cords or clumps and supported by a reticular fiber network.

Arise from neural crest, so they can be considered modified sympathetic postganglionic neurons, lacking axons and dendrites and specialized as secretory cells.

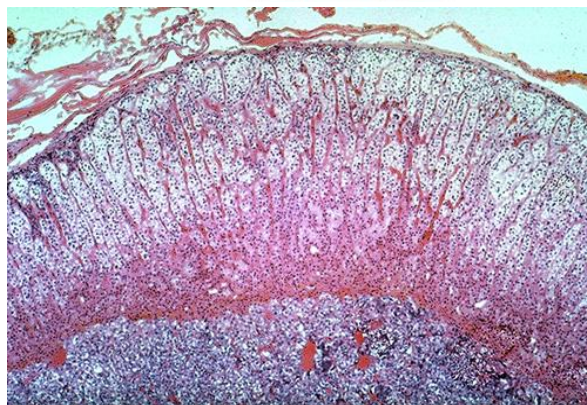
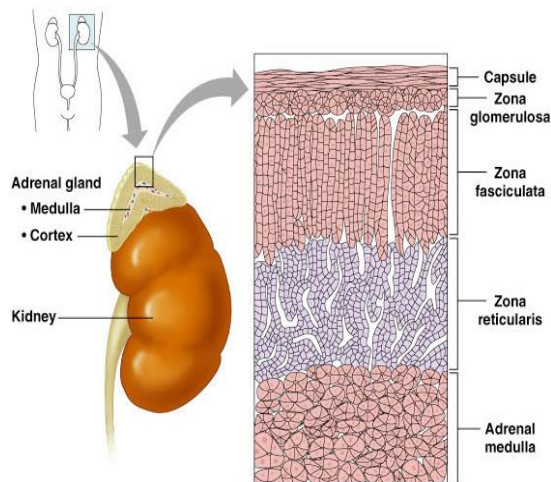
The name of the chromaffin cell ,derives from the fixative solution containing chromium salts, and cells have brownish appearance due to oxidation of catecholamines to melanin.

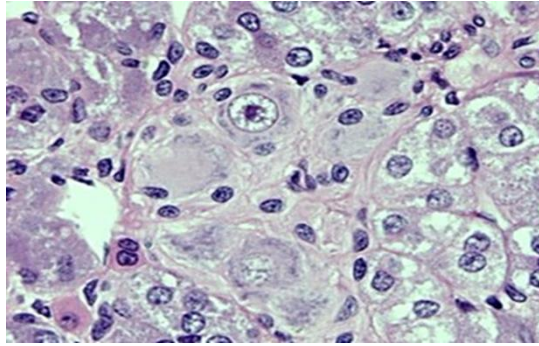
**Sympathetic ganglion cells** is found. They are round or polygonal with prominent nuclei.

hormone storage and the secretion is catecholamines, epinephrine or norepinephrine

Cortex	1- zona glomerulosa	mineralocorticoids (aldosterone)
	2- zona fasciculata	glucocorticoids (cortisol)
	3- zona reticularis	sex steroids (androgens)

**Medulla = catecholamines (epinephrine and norepinephrine)**





This figure is medulla

### PINEAL BODY

- The pineal body is a flattened, cone-shaped organ attached to the roof of the third ventricle.
- It is surrounded by pia mater, which is a capsule of gland and sends connective tissue septa into the gland subdividing it into lobules.

The parenchyma of the gland is homogeneous.

- A few blood vessels are visible through the gland which has two cell types:

**Pinealocytes** (about 95% of the cells) large, light and round nuclei.

These cells produce melatonin, a low molecular-weight tryptophan derivative.

**Astrocytes** (glial cells; dark, elongated nuclei).

- A characteristic feature of the pineal gland is the presence of **brain sand** which is concretions of calcium and magnesium salts of different sizes
- Such concretions appear during childhood and gradually increase in number and size with age.
- The most prominent secretory product of the pinealocytes is melatonin. The substances released by the secretory activity in the pineal gland which is stimulated by darkness and inhibited by light. Via the effects of pineal hormones on the adenohypophysis and sex hormones; they may decrease secretory activity in most other endocrine glands and they may "delay" puberty .

