

Mustansiriyah University

College of science

Biology Dept.

Zoology

4<sup>th</sup> class

D

ENOCRINOLOGY LAB.

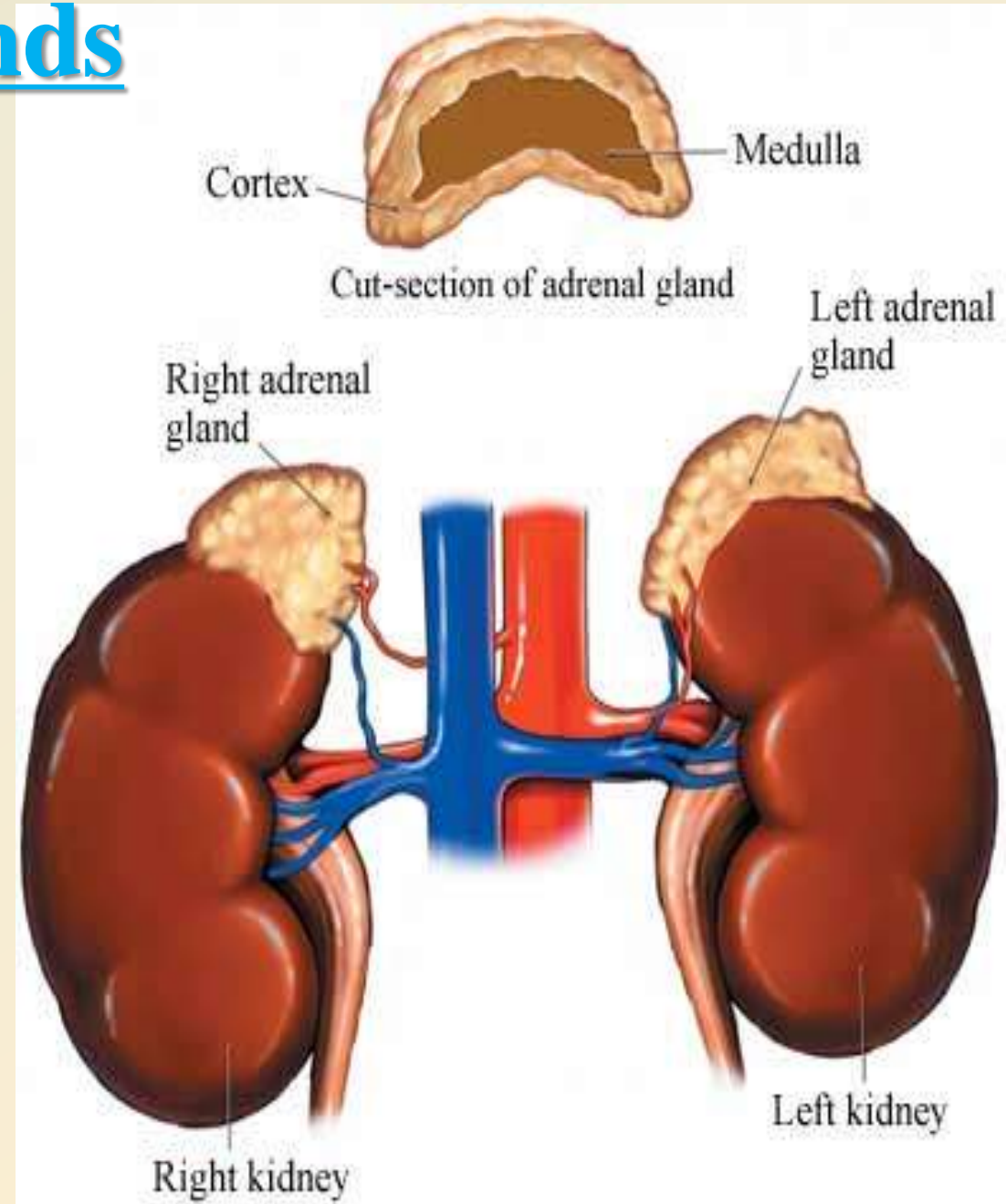
(6)

NAME :

# Adrenal glands

**The adrenals** are orange-colored glands that sit on top of the kidneys near the spine, just underneath the last rib and extending down about an inch.

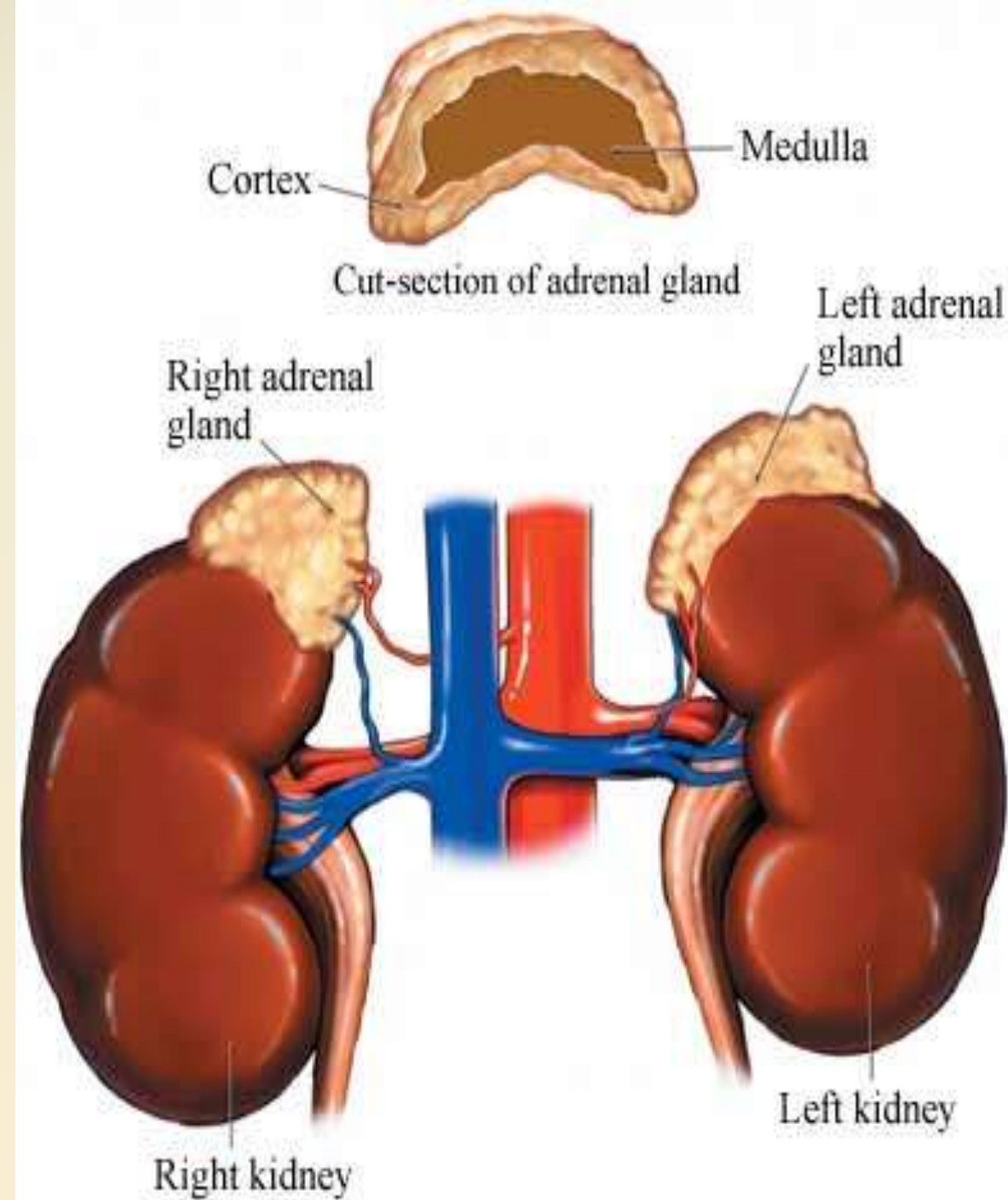
**The right** adrenal is shaped something like a **pyramid**, whereas **the left** is shaped more like a **half moon**.



Each adrenal gland is composed of two endocrine components:

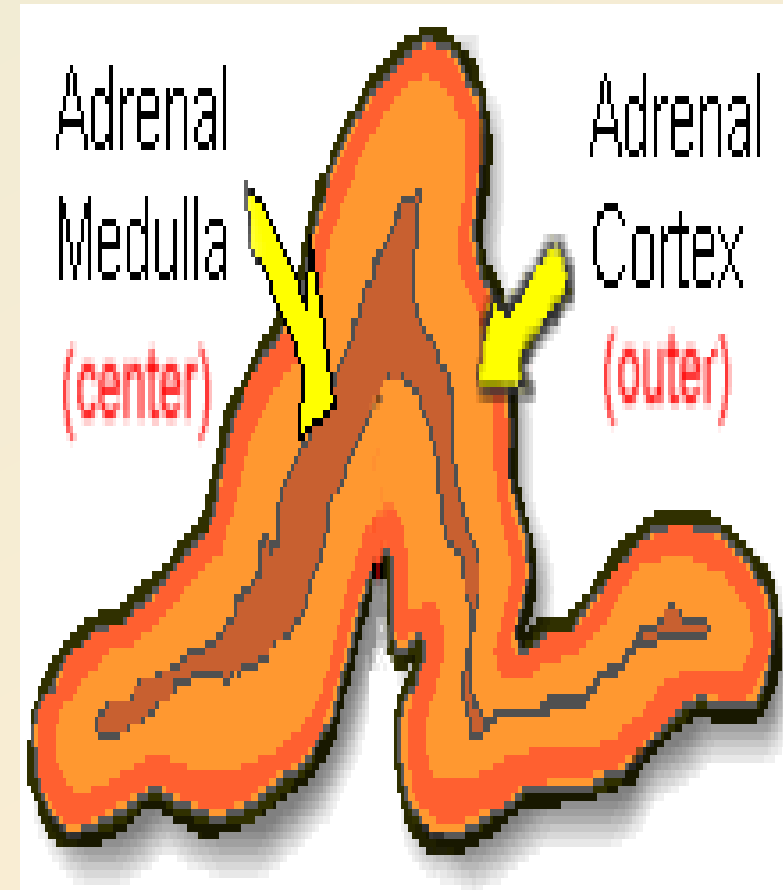
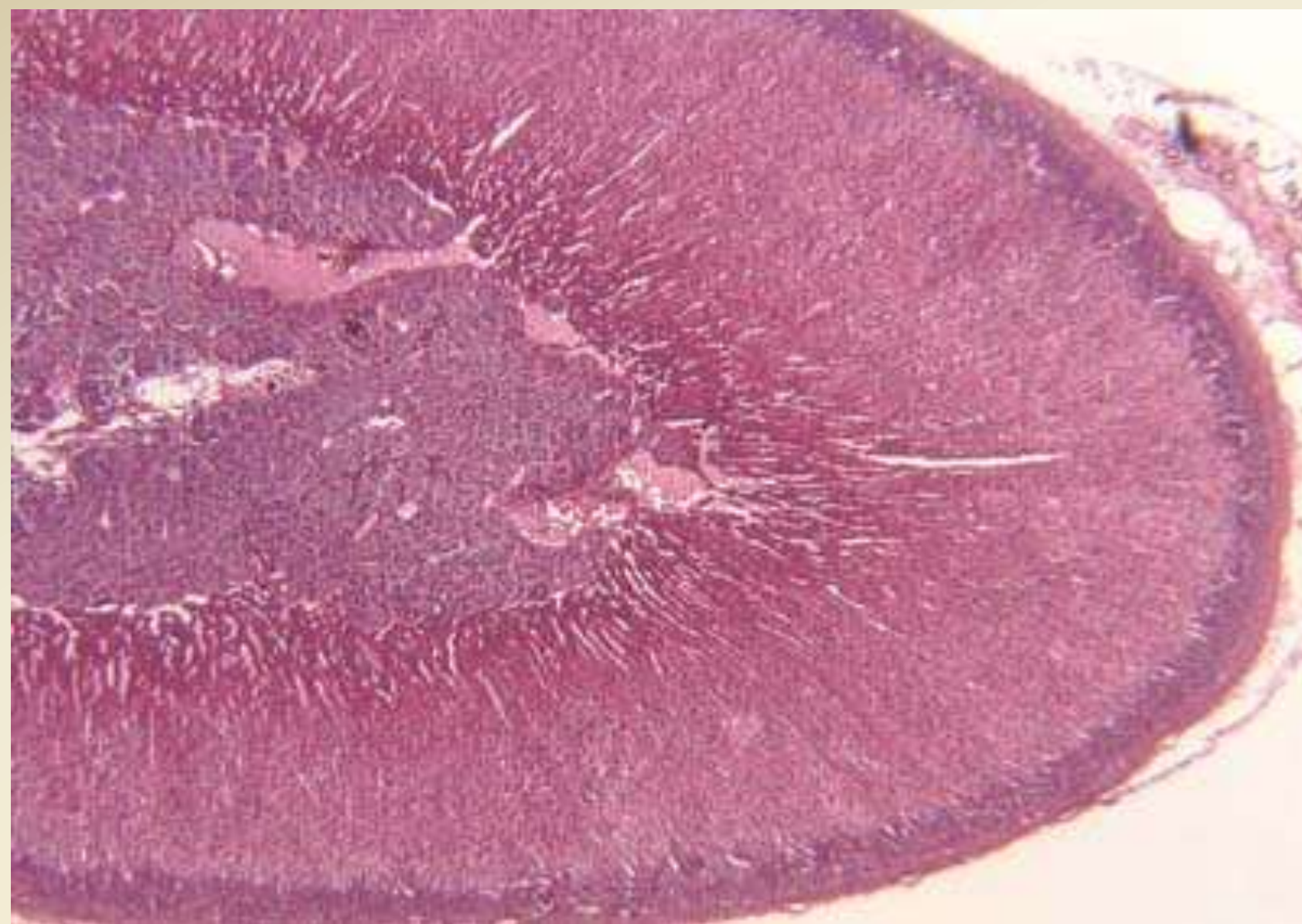
1. **medulla** (inner part) that constitutes 20% of the gland
2. **cortex** (outer part) that constitutes the remaining 80%. The cortex consists of three zones.

The medulla and each of the zones in the cortex each produce different hormones that serve a variety of functions in your body.

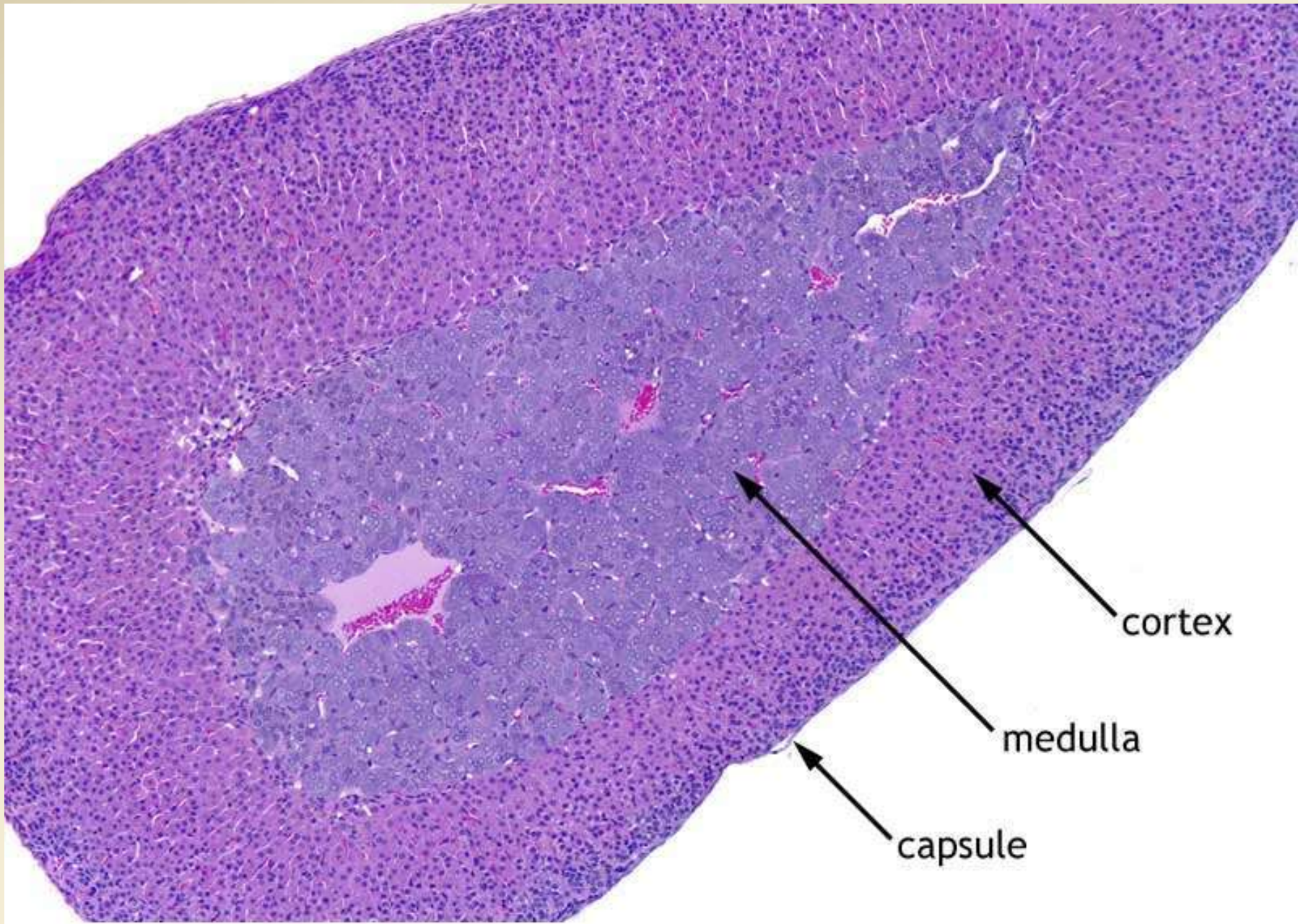




# Adrenal Glands





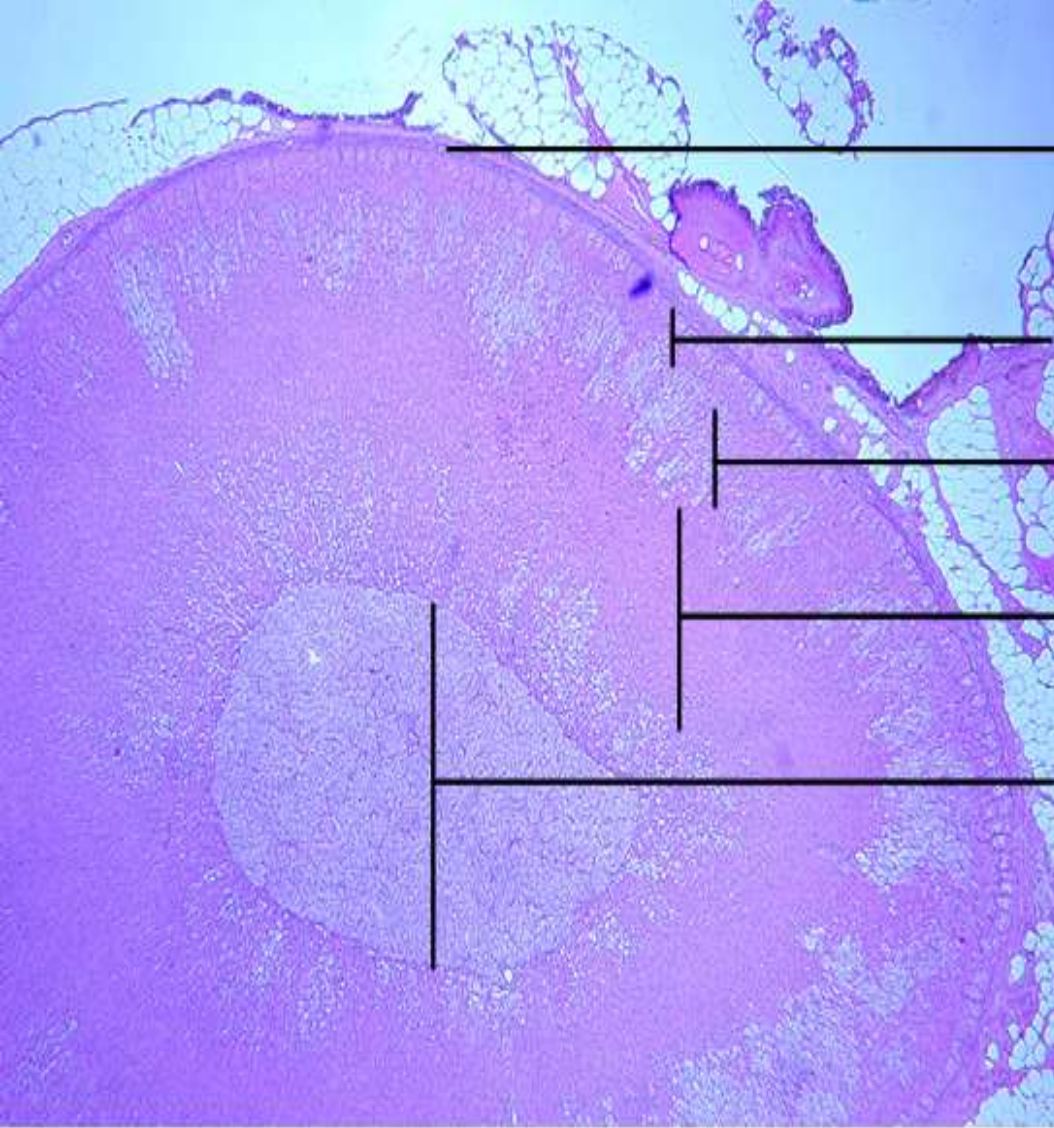


cortex

medulla

capsule





Adrenal Gland (40x)

Capsule

Zona Glomerulosa

Zona Fasciculata

Zona Reticularis

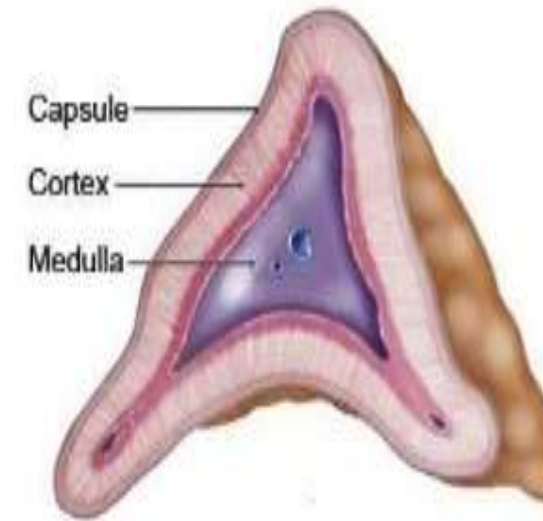
Adrenal Medulla

## Cortex

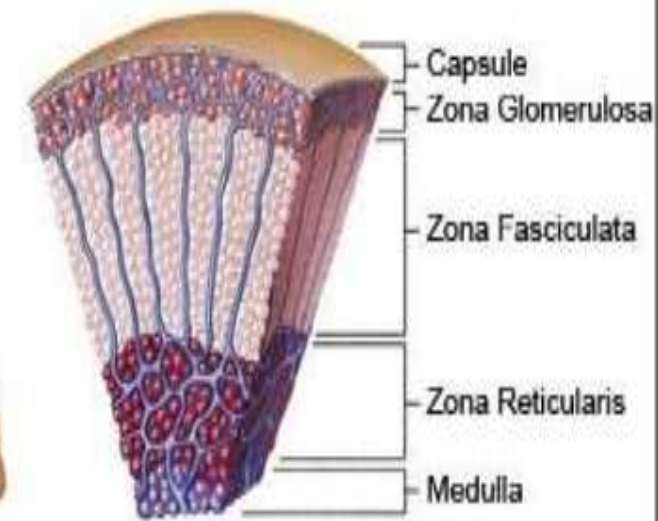
The adrenal cortex is devoted to production of corticosteroid (aldosterone, cortisol) and androgen hormones.

## Adrenal Gland Cross Sections

### Transverse Section



### Microscopic Section

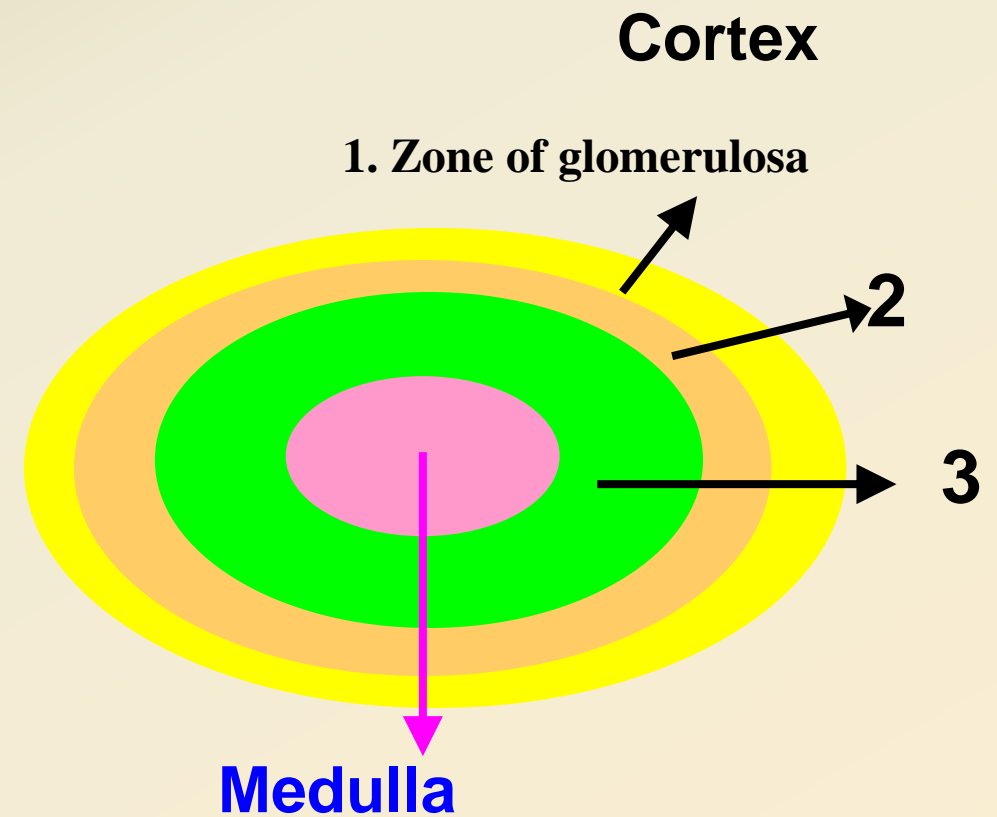


# The Adrenal Cortex

The adrenal cortex is divided into three zones which each secrete different hormones that carry out specific functions throughout your body.

## 1. Zone of glomerulosa

**Aldosterone** is secreted from this zone which is the major hormone controlling the sodium and potassium levels, and thus fluid balance, within your bloodstream, cells and interstitial fluids.



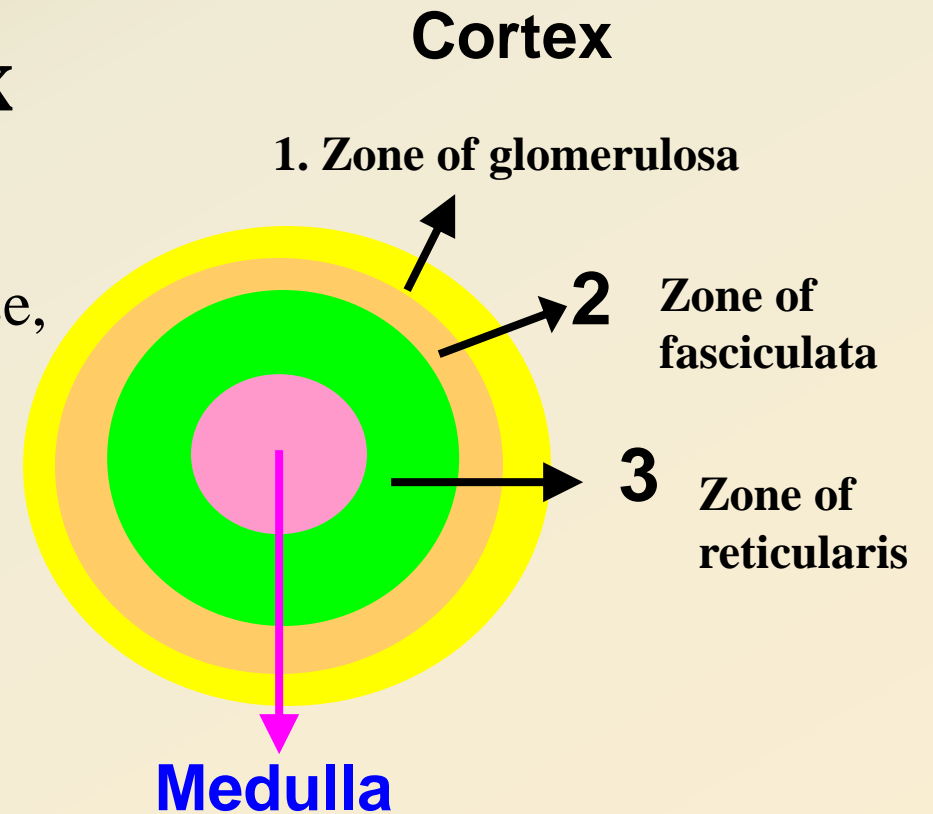
# The Adrenal Cortex

## 2. Zone of fasciculata

Coritsol (hydrocortisone) is produced, affects glucose, amino acid and fat metabolism, which is called glucocorticoids.

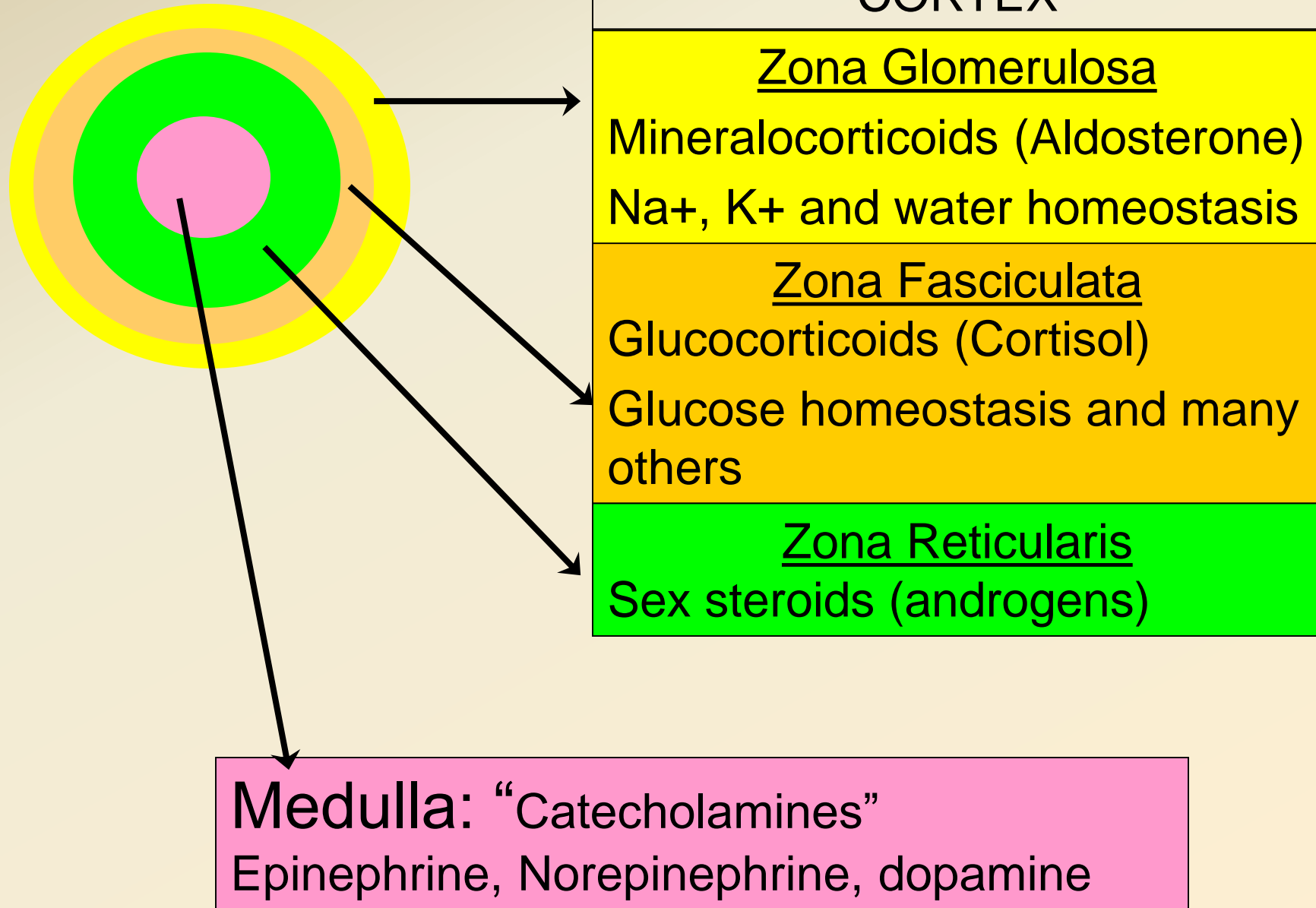
## 3. Zone of reticularis

Dehydroepiandrosterone (DHEA)- This zona manufactures an ancillary portion of sex hormones for each sex and also produces male hormones in women and female hormones in men to keep the effects of the dominant sex hormones in balance .





# Adrenals



Endocrine gland	Hormone	Function	Secretion control is made by
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**Adrenal**

**Cortex**

**Medula**

Glucocorticoids	Raises glucose levels in the blood, stimulates glucose production by cells, reduce the inflammatory response	Raised blood glucose levels
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Mineralocorticoids	Acts on the distal convoluted tubules of the renal nephrons; regulates uptake of sodium and acid/base balance	Low blood glucose levels
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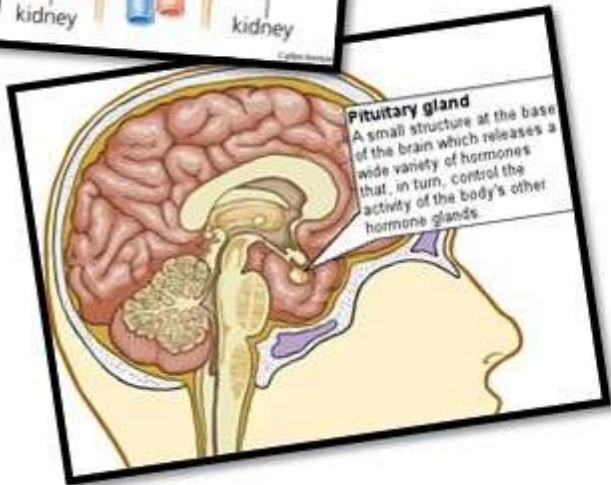
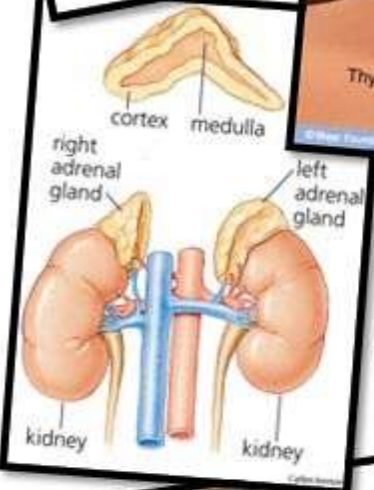
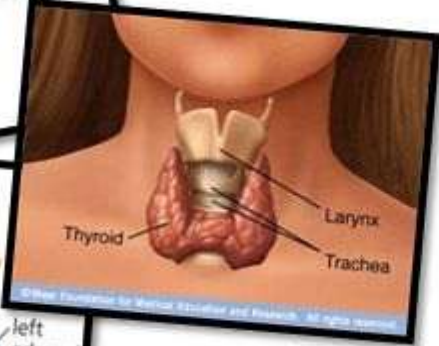
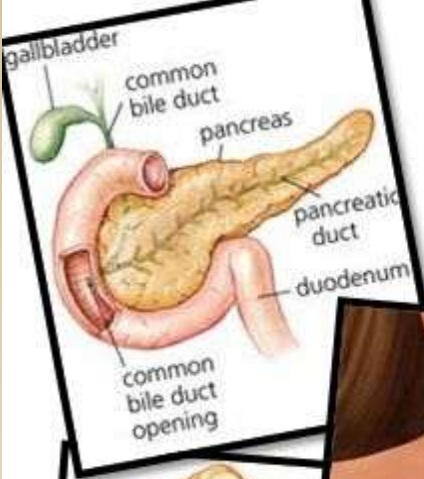
Sex hormones	(Very small quantities)	_____
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Adrenaline and Noradrenaline	Fear, fight, fright syndrome	Sympathetic nervous system
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# Adrenal Cortex Disorders

- **Addison's Disease** (hyposecretion of adrenal cortex hormones)
- **Cushing's Syndrome** (hypersecretion of cortisol)
- **Congenital Adrenal Hyperplasia (CAH)**: genetic disorder (don't make cortisol)
- **PTSD** – stress hormones produced after traumatic event (i.e. cortisol)



# Damage/Malfunction of Gland

- **Cushing Syndrome**

- Too much cortisol is produced.
- Symptoms vary, but most people have upper body obesity, rounded faces, increased fat around neck, and thinning arms and legs.
- Weakening of the bones and easy bruising of the skin is also common.
- Cushing Syndrome is caused by either an abnormality in the adrenal cortex such as a tumor, or because the pituitary gland is producing too much ACTH (the hormone that causes the adrenal cortex to produce cortisol).



# Addison Disease

- Occurs when adrenal cortex does not produce enough cortisol.
- Symptoms include weight loss, muscle weakness, fatigue, low blood pressure, and sometimes darkening of the skin.
- This could be caused again by adrenal cortex abnormalities or inadequate secretion of ACTH.
- If symptoms worsen suddenly due to a stressful event (addisonian crisis) it can be fatal