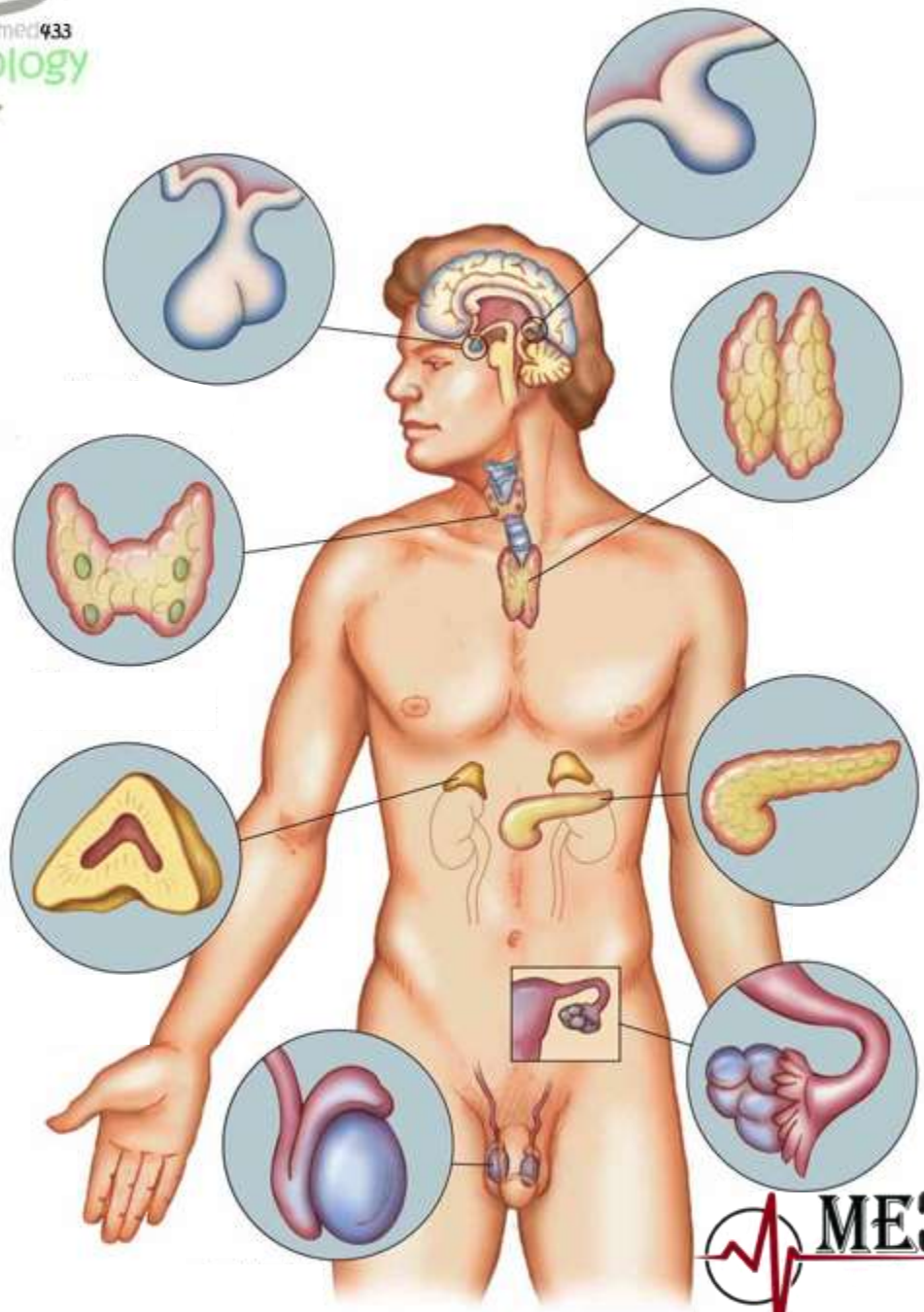
Anatomy Team 433

med433 Embryology

L1 Adrenal (Suprarenal) glands

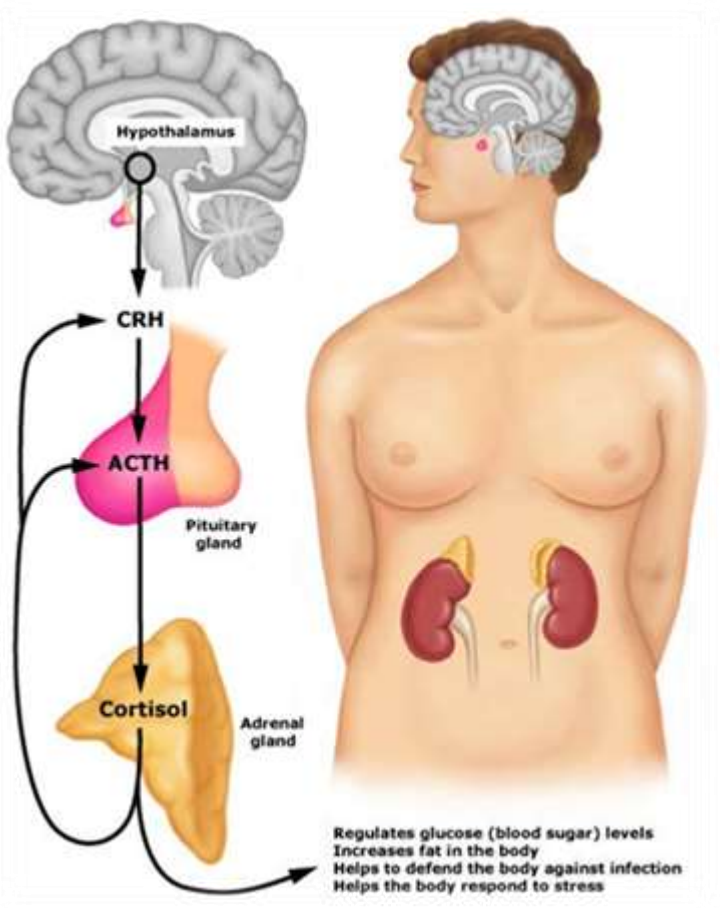


MED 433 Team

Suprarenal glands

-The **suprarenal (adrenal) gland** is a component of the ***hypothalamic-pituitary-suprarenal axis.***

-Responsible for coordinating **stress response** and **metabolism**.

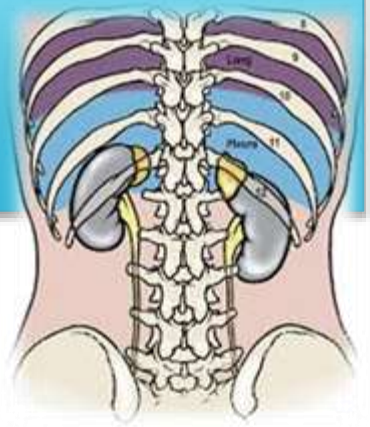


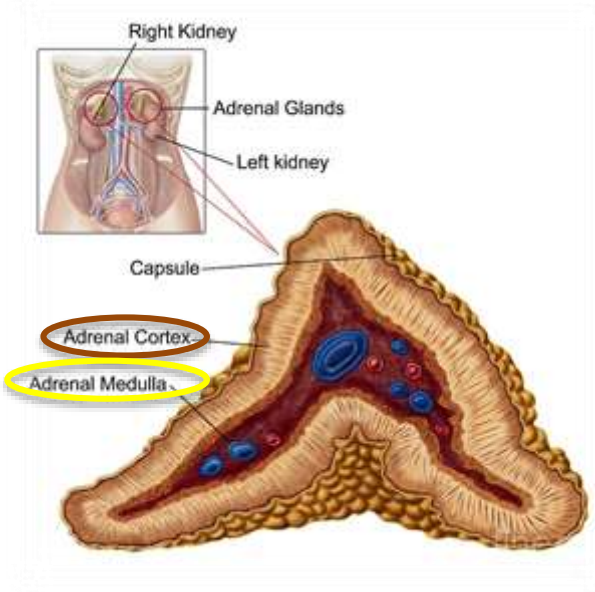
-They are yellowish retroperitoneal organs that lie on the upper poles of the kidneys,

-At the level of the last thoracic vertebra (T12).

-Each gland has an outer yellow cortex .

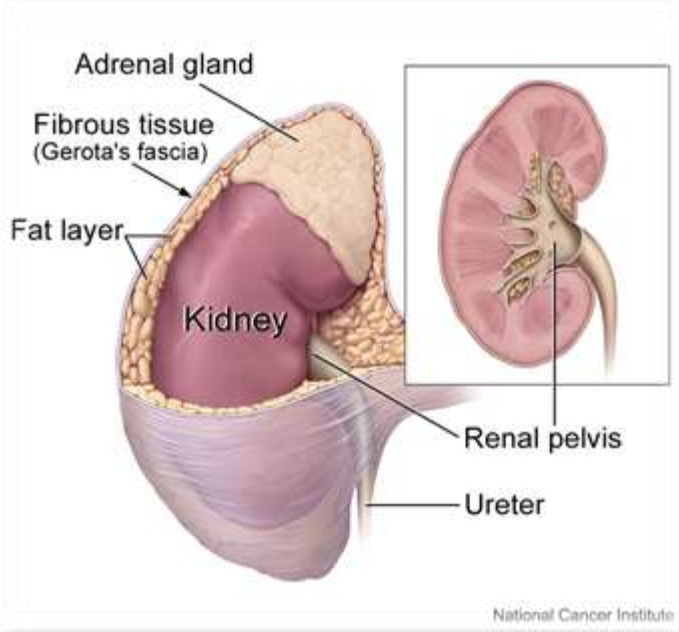
-Inner dark brown medulla.





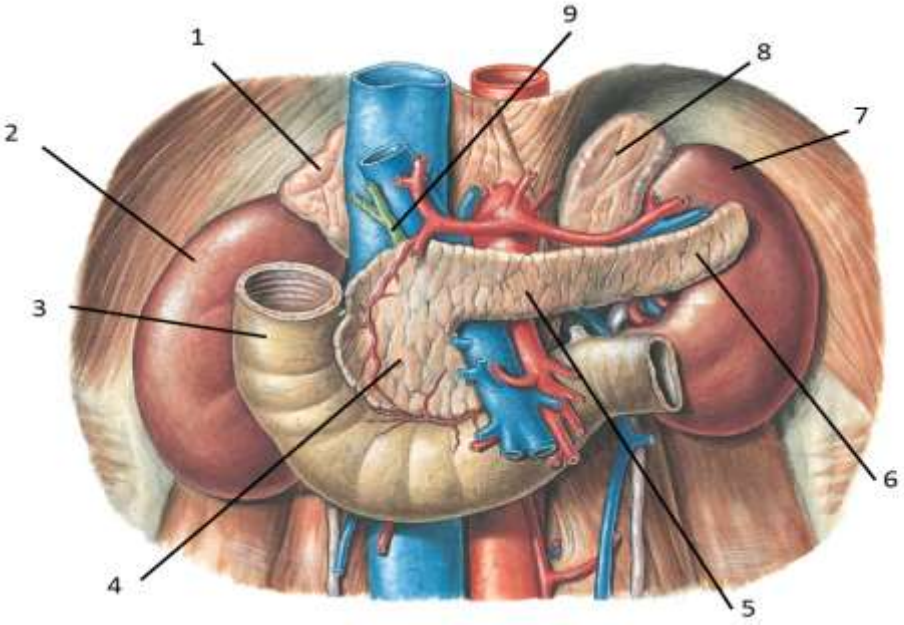
-The suprarenal gland is enclosed within the renal fascia with the kidney but in a separate compartment, that allow the two organs to be separated easily during surgery.

-It is separated from the kidney by the perirenal fat.



Relations

	right suprarenal gland(1)	left suprarenal gland(8)
Characteristics	▪pyramidal in shape. ▪Caps the upper pole of the right kidney(2).	▪ Crescentic (semi-lunar) in shape ▪ Extends along the medial border of the left kidney(7) from the upper pole to the hilus.
Anterior	Right lobe of the liver(anterolateral) &inferior vena cava.(anteromedial)	Pancreas, lesser sac, and stomach Spleen(in some resources)
Posterior	Diaphragm.(right crus)	Diaphragm. (left crus)
Medial	Celiac plexus and ganglia	Celiac plexus and ganglia



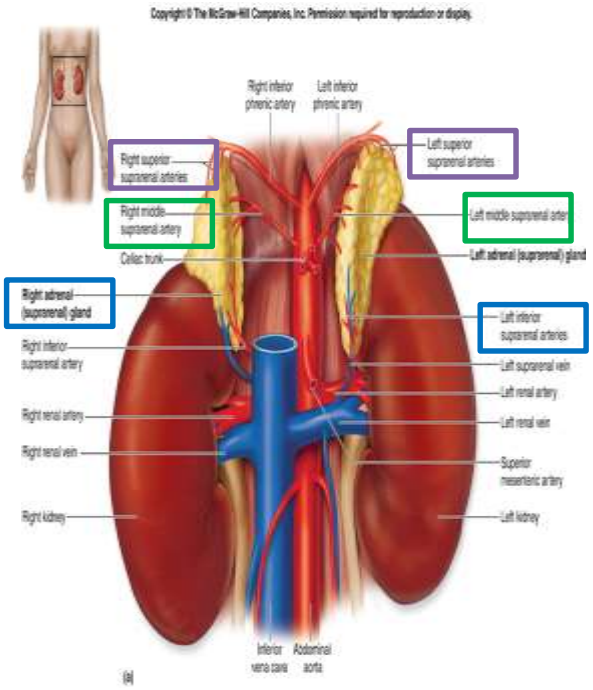
Blood supply

The arteries supplying each gland are **three** in number.

1-Superior suprarenal artery from **inferior phrenic artery**

2-Middle suprarenal artery from **abdominal aorta**

3-Inferior suprarenal artery from **renal artery**



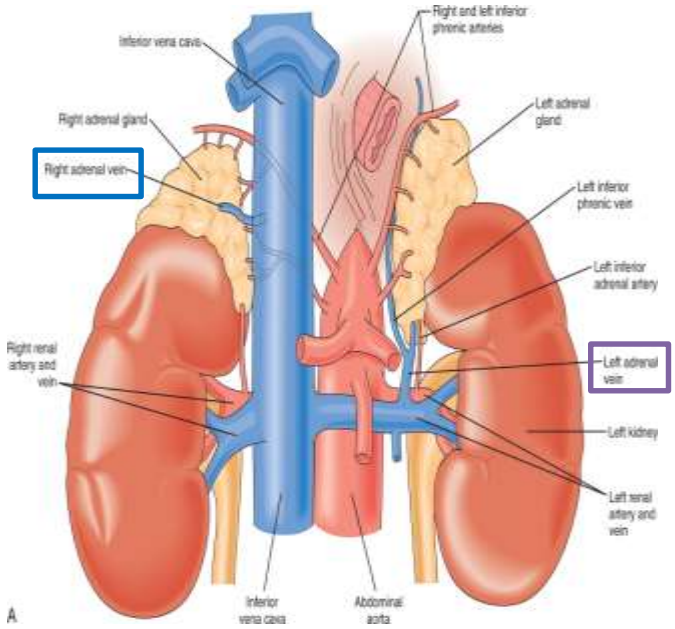
Each gland supply by 3 arteries & drain into 1 vein

Venous drainage

A **single vein** emerges from the hilum of each gland.

Right adrenal vein drainages into **inferior vena cava**

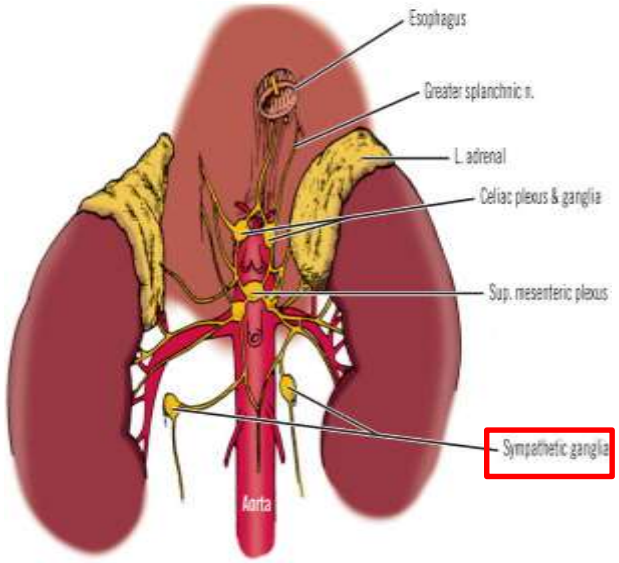
Left Adrenal vein drainages into **renal vein**



Nerve supply

- **Preganglionic sympathetic fibers** derived from the **splanchnic nerves** supply the glands.
- Most of the nerves end in the **medulla** of the gland.

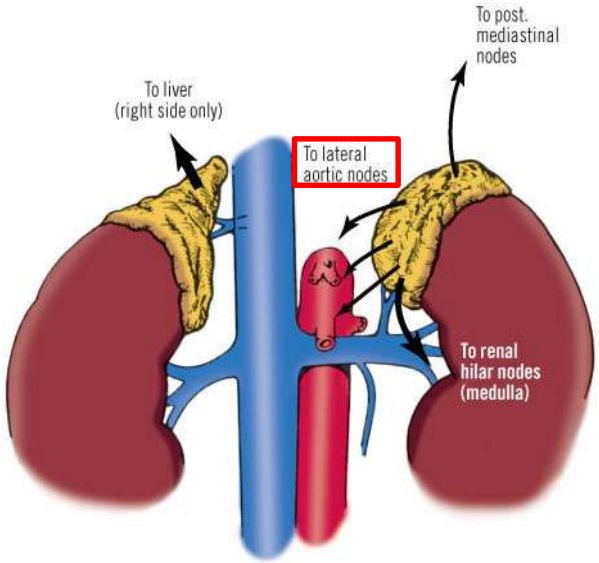
Note: the medulla is considered a modified sympathetic ganglion



lymph drainage

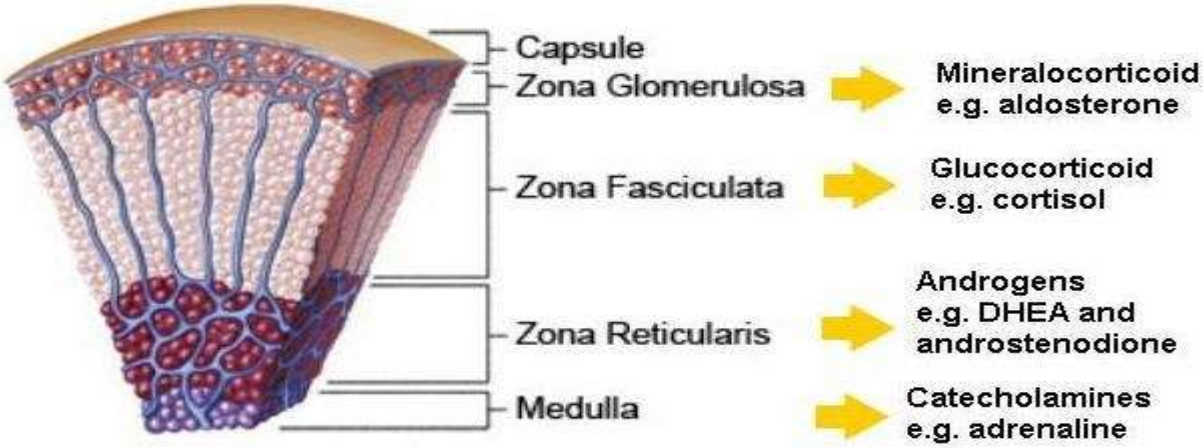
- The lymph drains into the **lateral aortic lymph nodes.**

(also known as para aortic or lumber aortic)



Function of adrenal gland

Cortex	**Mineral corticoids** which are concerned with the **control of fluid and electrolyte balance.**
	Glucocorticoids which are concerned with the control of the **metabolism** of carbohydrates, fats, and proteins.
	Small amounts of **Sex hormones** which probably play a role in the **prepubertal development of the sex organs.**
Medulla	**Catecholamines: epinephrine and norepinephrine.**



DEVELOPMENT OF THE ADRENAL GLAND

CORTEX

***Is Mesodermal in origin.**

*Develops from the celomic epithelium of the posterior abdominal wall.

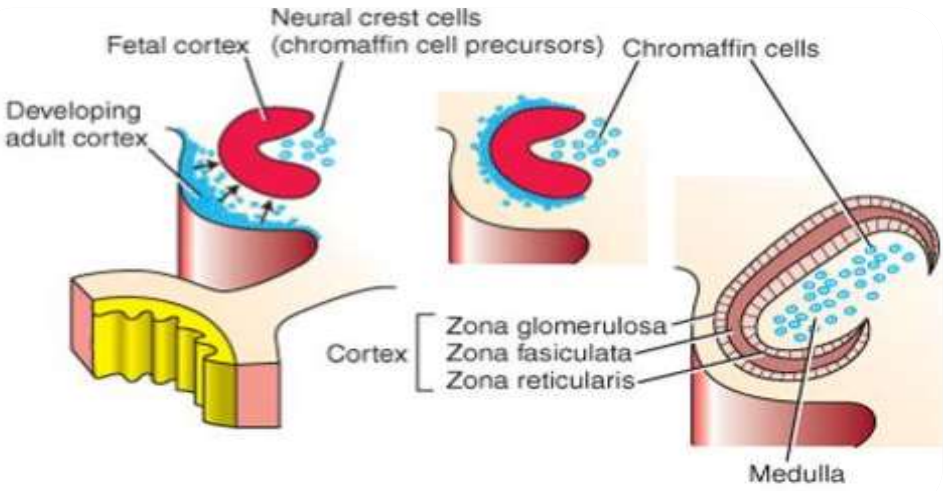
During the 6th week of development, by aggregation of the mesenchymal cells, between dorsal mesentery and developing gonads. This fetal cortex is derived from the mesothelium lining the posterior abdominal wall.

MEDULLA

***Is Ectodermal in origin.**

*develops from the adjacent Sympathetic ganglion; derived from Neural crest cells.

It forms a mass medial to the fetal cortex.



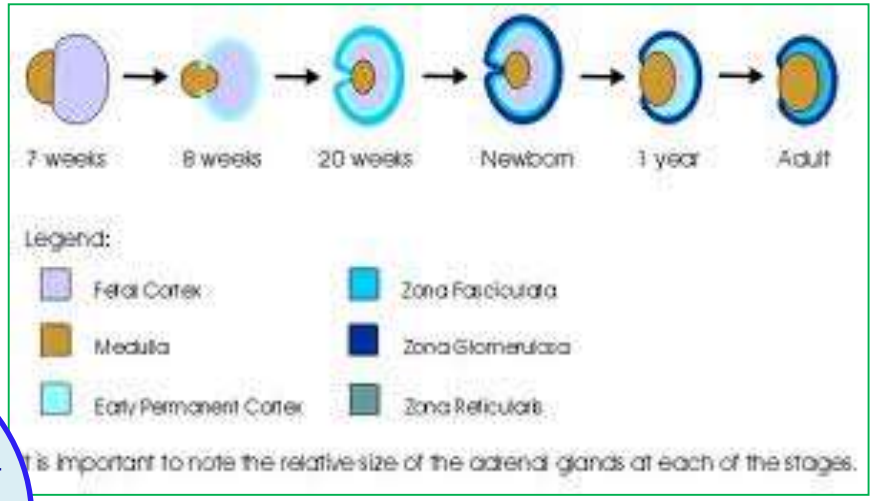
https://embryology.med.unsw.edu.au/embryology/images/0/08/Adrenal_medulla.mp4

PERMANENT CORTEX

A **second** wave of mesenchymal cells arise from the **mesothelium**, enclose the fetal cortex. forms a thinner definitive (permanent) cortex.

So, the adrenal gland at the end has 2 cortices inner (fetal) and outer (permanent) . Both are mesodermal in origin.

Differentiation of the characteristic suprarenal cortical zones begins during the late fetal period.



Zona glomerulosa & zona fasciculata Are present at birth, But zona reticularis

Is not recognizable until the end of third year.

CLINICAL NOTES

The suprarenal gland is separate from the kidney but enclosed within the renal fascia.

The suprarenal gland of the fetus is 10-20 times larger than the adult glands relative to the body weight, and are large compared with the kidneys. This is because of the extensive size of the fetal cortex. The medulla remains relatively small until after birth.

The suprarenal glands rapidly become smaller during the first 2-3 weeks after birth, due to the rapid regression of the fetal cortex. (بسبب ضمور القشرة الداخلية)

Its involution(الضمور) is largely completed in the first year of life.

During the process of involution, the cortex is friable and susceptible to trauma at birth leading to severe hemorrhage.

Congenital adrenal hyperplasia (CAH):

*An abnormal increase in the cortical cells results in excessive androgen production; during the fetal period.

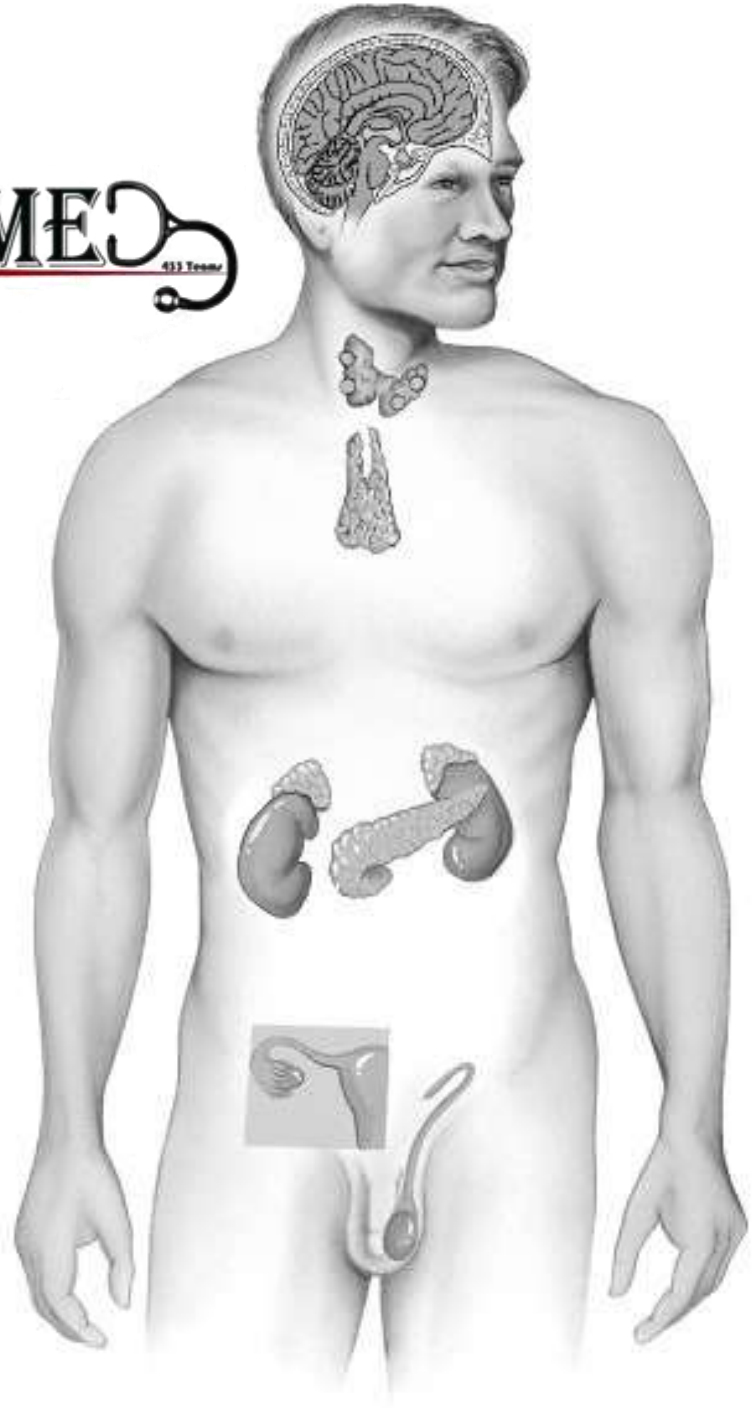
*In females, it may lead to musculization of external genitalia and enlargement of clitoris.

*In males, it may remain undetected in early infancy.

*Later in childhood, in both sexes, androgen excess may lead to rapid growth and accelerated skeletal maturation.

SUMMARY

ADRENAL (SUPRARENAL) GLAND		
	Left adrenal gland	Right adrenal gland
General information	Yellowish retroperitoneal organs that lie on the upper poles of the kidneys, At the level of (T12).	
Shape	Crescentic	Pyramidal
Location	Extends along the medial border of the left kidney from the upper pole to the hilus.	Caps the upper pole of the right kidney.
Relation: Anterior	Pancreas, lesser sac, and stomach	Right lobe of the liver and inferior vena cava
Relation: Posterior	Diaphragm.	
Relation: medial	Celiac plexus and ganglia	
Arterial supply	Superior suprarenal from inferior phrenic artery. Middle suprarenal from abdominal aorta Inferior suprarenal from renal artery.	
Venous Drainage	Drain into left renal vein	Drain into inferior vena cava
Nerve Supply	Preganglionic sympathetic fibers derived from the splanchnic nerves	
Lymph Drainage	Lateral aortic lymph nodes.	



GOOD LUCK

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