MED439
KING SAUD UNIVERSITY

Revised & Approved

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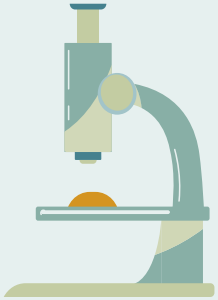


Histology Team
439

Adrenal Gland

Color index:

Slides

Important

Doctors notes

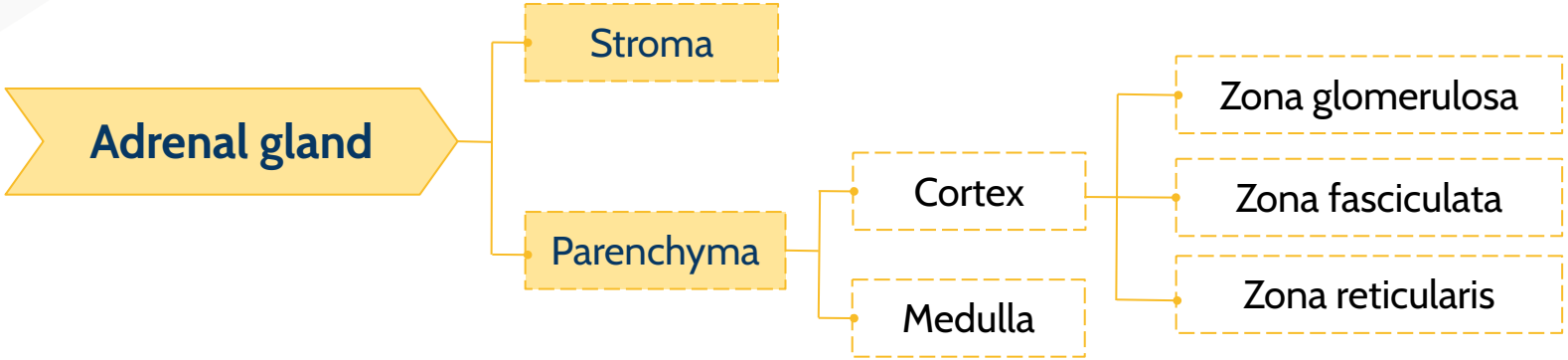
Extra

Editing file

Objectives:

By the end of this lecture, the student should be able to:

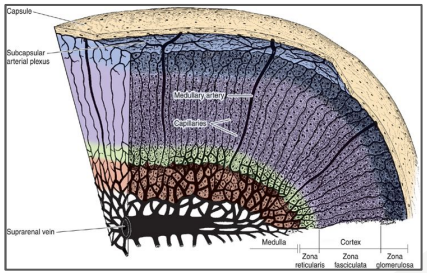
1. Differentiate between adrenal cortex and medulla.
2. Identify the histological features of each cortical zone and its cells.
3. Identify the histological features of the medullary cells.

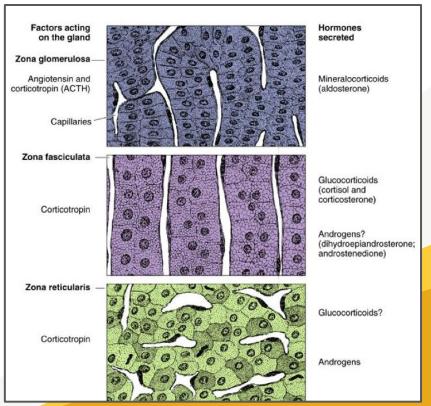


Adrenal cortex

Microscopic features of steroids hormone secreting cells:

1- Acidophilic cytoplasm (bcs it's rich of smooth ER)
2- Abundant SER (main site for lipid synthesis)
3- Numerous mitochondria
4- Mitochondrial cristae is tubular
5- Fat droplets



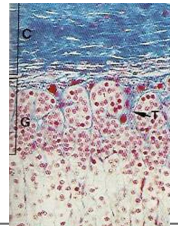
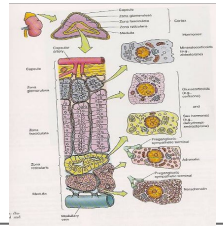


Parenchyma of Adrenal gland

Adrenal cortex

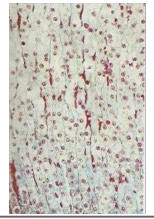
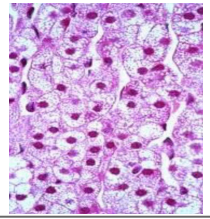
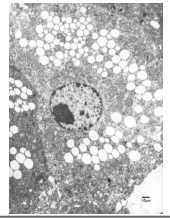
Zona glomerulosa

- formed of clusters of small columnar cells that are rich in SER and mitochondria.
- Produces **mineralocorticoids** e.g. aldosterone hormone (Reabsorb all the remaining sodium, and passively the chloride, from the lumen of the distal renal tubules into the renal interstitium. In addition, potassium and hydrogen ions are actively secreted into the lumen).

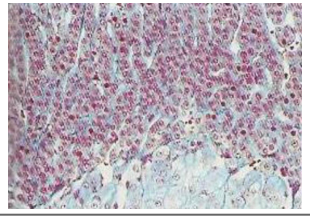
Zona fasciculata (spongiocytes)

- It is the intermediate and the largest layer of the cortex.
- It is formed of columns of large polyhedral cells that are separated by longitudinal sinusoidal capillaries.
- Its cells are rich in lipids, so they appear empty in sections (spongiocytes).
- Its cells are rich in mitochondria (with tubular cristae),SER and lipofuscin pigments.
- Its cells secrete **glucocorticoids**.
- It is regulated by ACTH of pituitary.

Zona reticularis

- It is the innermost layer of adrenal cortex.
- It is formed of anastomosing cords of deep acidophilic cells.
- Its cells contains few lipofuscin and lipid droplets.
- cells secrete **androgens**.



Adrenal medulla

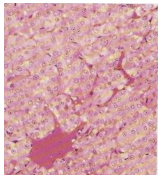
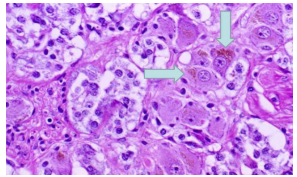
- it is the central portion of the adrenal gland.
- It is completely invested with adrenal cortex (not separated from it by CT. septa)
- It contains:

1. Chromaffin cells (Pheochromocytes):

- Contains granules of catecholamine as that of sympathetic nervous system.
- **They produce epinephrine and norepinephrine.**
- They stain **deep brown** with chromic salt

2. Sympathetic ganglion cells :

- Relay on chromaffin cells.
- Are sympathetic nerve cells.

Neurons in adrenal medulla

Doctor's notes (female)

Slide 3

- There no connective tissue or barrier between the cortex & the medulla.
- The cortex is thicker than the medulla.
- The cortex is formed of three zones (from outside to inside):
    1- Zona glomerulosa: named glomerulosa because it looks like the glomerulus of the kidney under the microscope.
    2- Zona fasciculata: (fasciculus=bundles) it's the thickest zone in cortex & it's arranged to form plates of cords separated by loose vascular C.T.
    3- Zona reticularis: the cells form cords connecting and anastomosing with each other > يكونون شبكة.

- The medulla: the most prominent structure in the medulla is rich dilated venous plexuses (very characteristic to the medulla).
- The nature of hormones secreted from medulla and cortex varies:
    - The **cortex**: secretes **steroid** hormones.
    - The **medulla**: secretes **polypeptide** hormones.
- Polypeptide hormones need rough ER and ribosomes .
- Steroid hormones need smooth ER.
- Spongiocytes & tubular cristae are unique for zona fasciculata.
- Zona fasciculata is named spongiocyte because its cytoplasm has empty spaces of areas rich in lipid.
- Sympathetic ganglion cells in the adrenal medulla are: neuronal cell bodies outside the CNS.

Doctor's notes (male)

Adrenal Cortex :

- There is no separation between the innermost layer of cortex (zona reticularis) and medulla
- Zona glomerulosa (**thin**nest layer) 2- Zona fasciculata (**Thickest layer**)
- Zona Fasciculata : their cells arranged in the form of columns , so they are parallel with cells of Zona glomerulosa And perpendicular with the surface
- YOU have to know that Adrenal **cortex** is essential for the life while Adrenal medulla is important but not essential For the life
- Acidophilic cytoplasm Is due to numerous mitochondria , abundant smooth endoplasmic reticulum and minimal amounts of ribosomes either free ribosomes or Rough endoplasmic reticulum
- Zona fasciculata : their cytoplasm it appears foamy (pale stained) because it contains numerous fat droplets that dissolved in the cytoplasm and that's why we call their cells spongiocytes
- Spongiocytes : these cells polygonal in shape they decree **cortisol** (glucocorticoid)

Adrenal Medulla

- There is 2 types of cells
  1- chromaffin cells : high affinity to be stained by chromic acid or chromic salts , they secrete epinephrine(**80%**) And norepinephrine (**20%**)
  2- sympathetic ganglion cells
  3-supporting cells : Dr : It's ok to be forgot it

MCQs

Q1) Which of the following is the innermost layer of adrenal cortex?
A- Zona glomerulosa
B- Zona fasciculata
C- Zona reticularis
D- Chromaffin cells

Q2) Which of the following is a feature of steroid hormone secreting cells?
A- Basophilic cytoplasm
B- Abundant SER
C- Abundant RER
D- few mitochondria

Q3) Spongiocytes are cells of?
A- Zona glomerulosa
B- Zona fasciculata
C- Zona reticularis
D- None of the above

Q4) Which of the following is the largest layer of the cortex?
A- Zona glomerulosa
B- Zona fasciculata
C- Zona reticularis
D- Adrenal medulla

Q5) Which of the following is true about zona reticularis?
A- It's the outermost layer
B- It secretes aldosterone
C- it contains numerous of lipid droplets.
D- formed of cords of deep acidophilic cells.

Q6) Which of the following is true about the adrenal medulla?
A- they secrete androgen
B- contain parasympathetic ganglion
C- They stain deep brown with chromic salt
D- chromaffin cells contain granules of glucocorticoids

Q1: C
Q2: B
Q3: B
Q4 B:
Q5: D
Q6: C

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