Histology of Endocrine Glands II

Prof. Dr. Diyaa Aljaza

Anatomy Department

Thi-Qar Medical School

Objective of Lecture

At the end of this lecture the students must be able to:

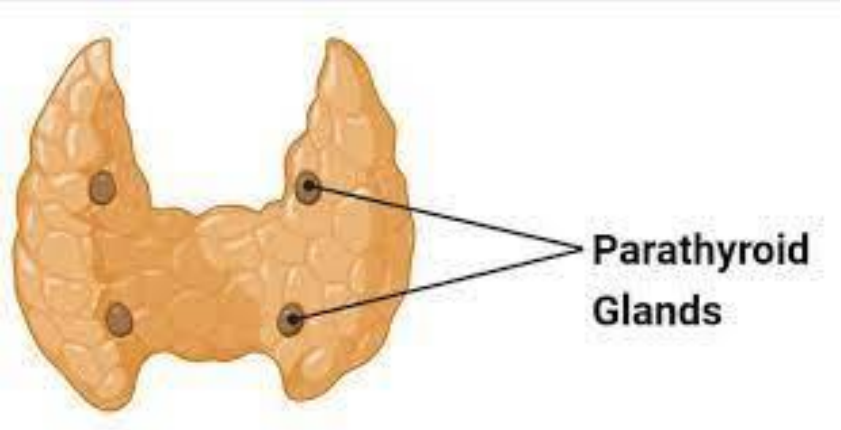
- Understand the anatomical location of parathyroid and Adrenal glands.
- Identify the different cells and histology structure of the parathyroid and adrenal glands.
- The actions of parathyroid hormone and the regulation of its secretion.

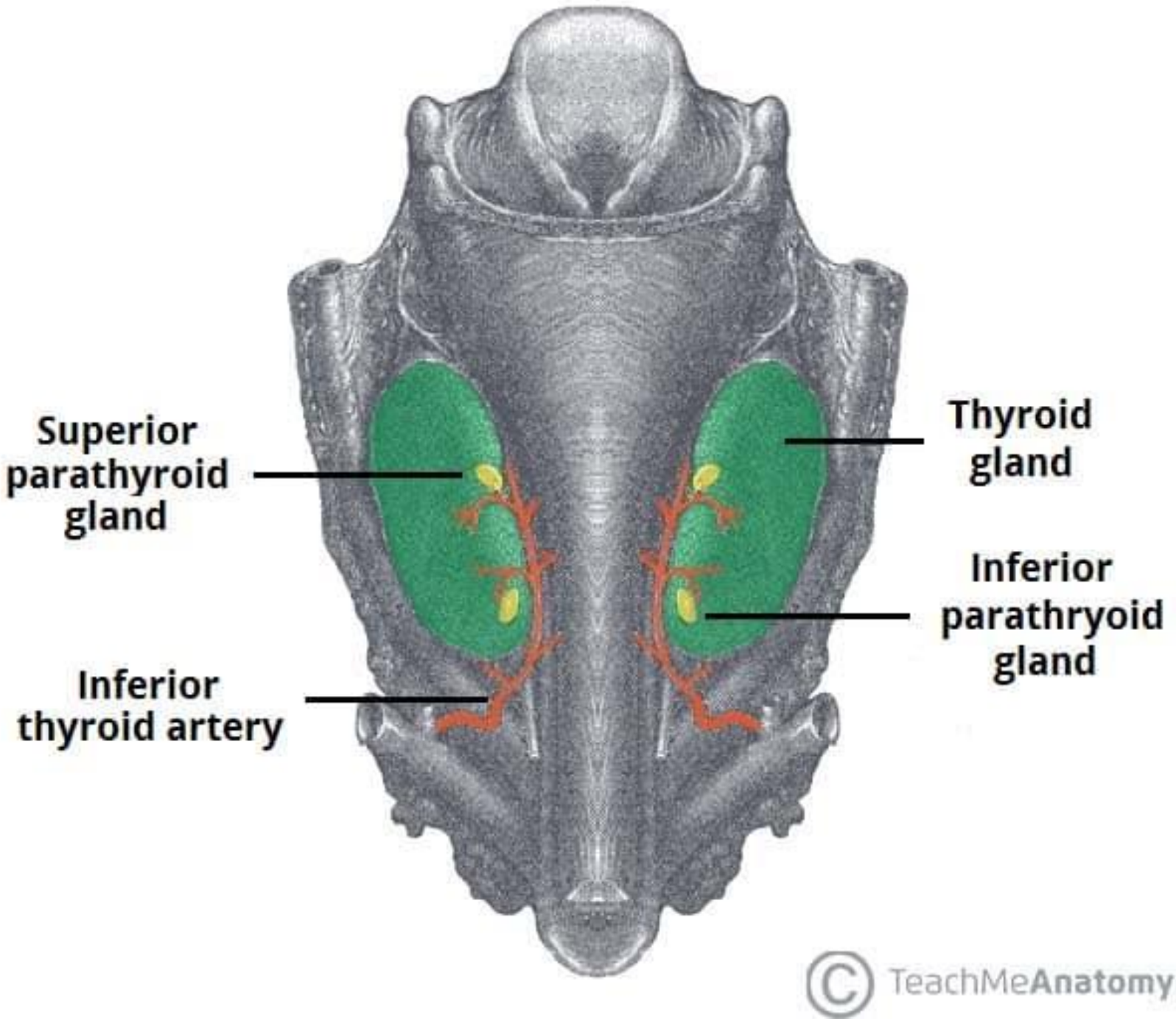
Parathyroid Gland (Introduction)

Anatomically:

- The parathyroid glands are small endocrine glands located in the anterior neck.
- They are responsible for the production of **parathyroid hormone (PTH)**.
- The parathyroid glands are located on the posterior, medial aspect of each lobe of the thyroid gland.
- Anatomically, the glands can be divided into two pairs:

  - **Superior parathyroid glands**
  - **Inferior parathyroid glands**




Superior parathyroid gland
Thyroid gland
Inferior parathryoid gland
Inferior thyroid artery
© TeachMeAnatomy

Histological Structure of Parathyroid gland:

- The parathyroid glands are separated from the thyroid by a thin capsule of fibrous connective tissue.

- The parenchyma consists of densely packed, highly folded, branching cords or clusters of polygonal cells separated by a delicate stroma of reticular and collagen fibers with occasional fibrocytes.

- There are two types of cells within the parathyroid gland, the chief cells and the oxyphil cells.

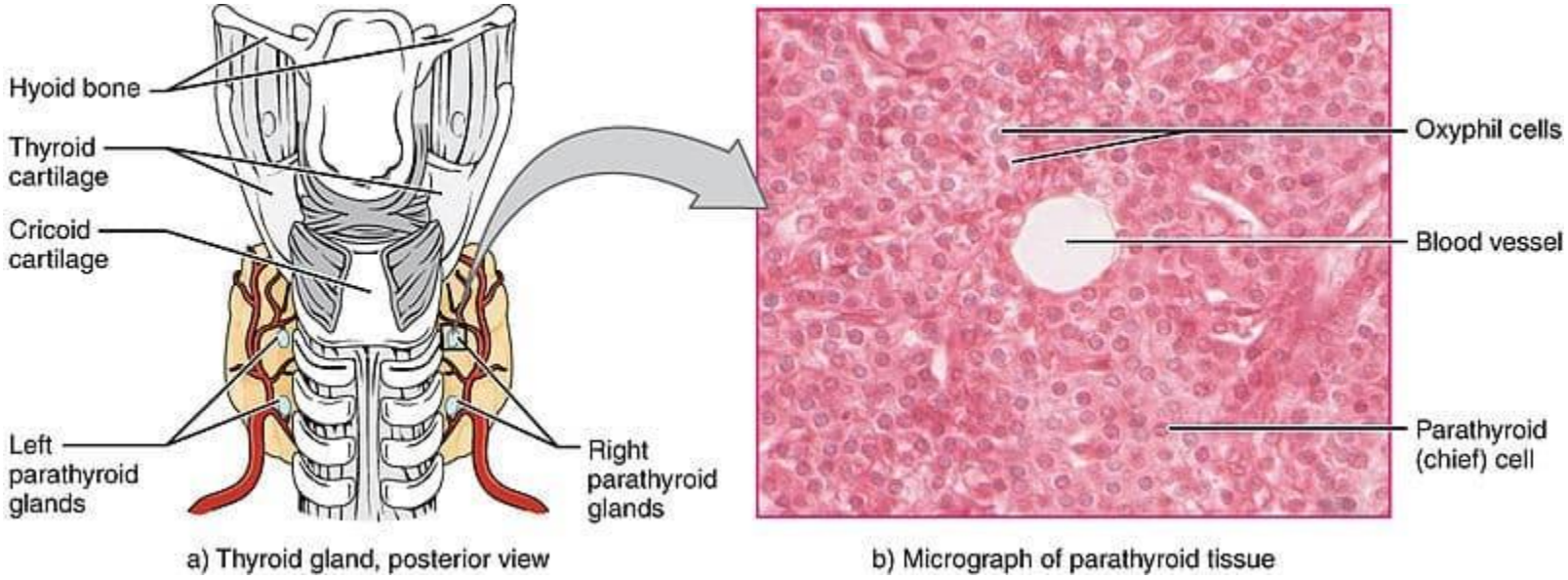
Chief cells:

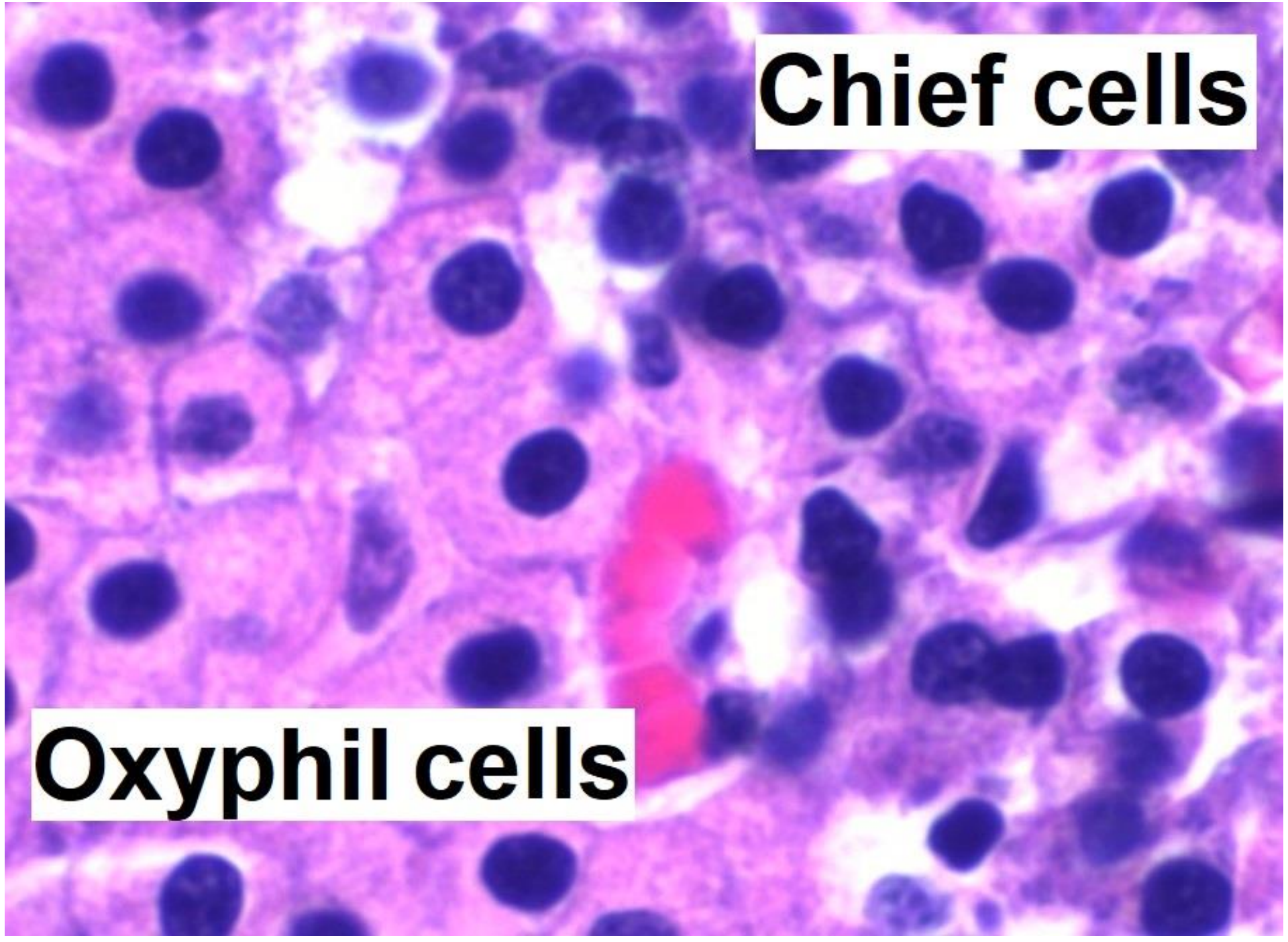
- The role of this cell type is to secrete **parathyroid hormone**.
- They contain prominent Golgi apparatus and endoplasmic reticulum to allow for the synthesis and secretion of parathyroid hormone.
- The chief cells are the smaller of the two cell types, however, they are more abundant.

Oxyphil cells:

- These cells are much larger but less abundant than chief cells.
- Their purpose is unknown.
- It is interesting to note however that the number of oxyphil cells increases with age and few are seen before puberty.

Histologically fat cells (**adipose cells**) are also seen within the parathyroid gland.




Chief cells
Oxyphil cells

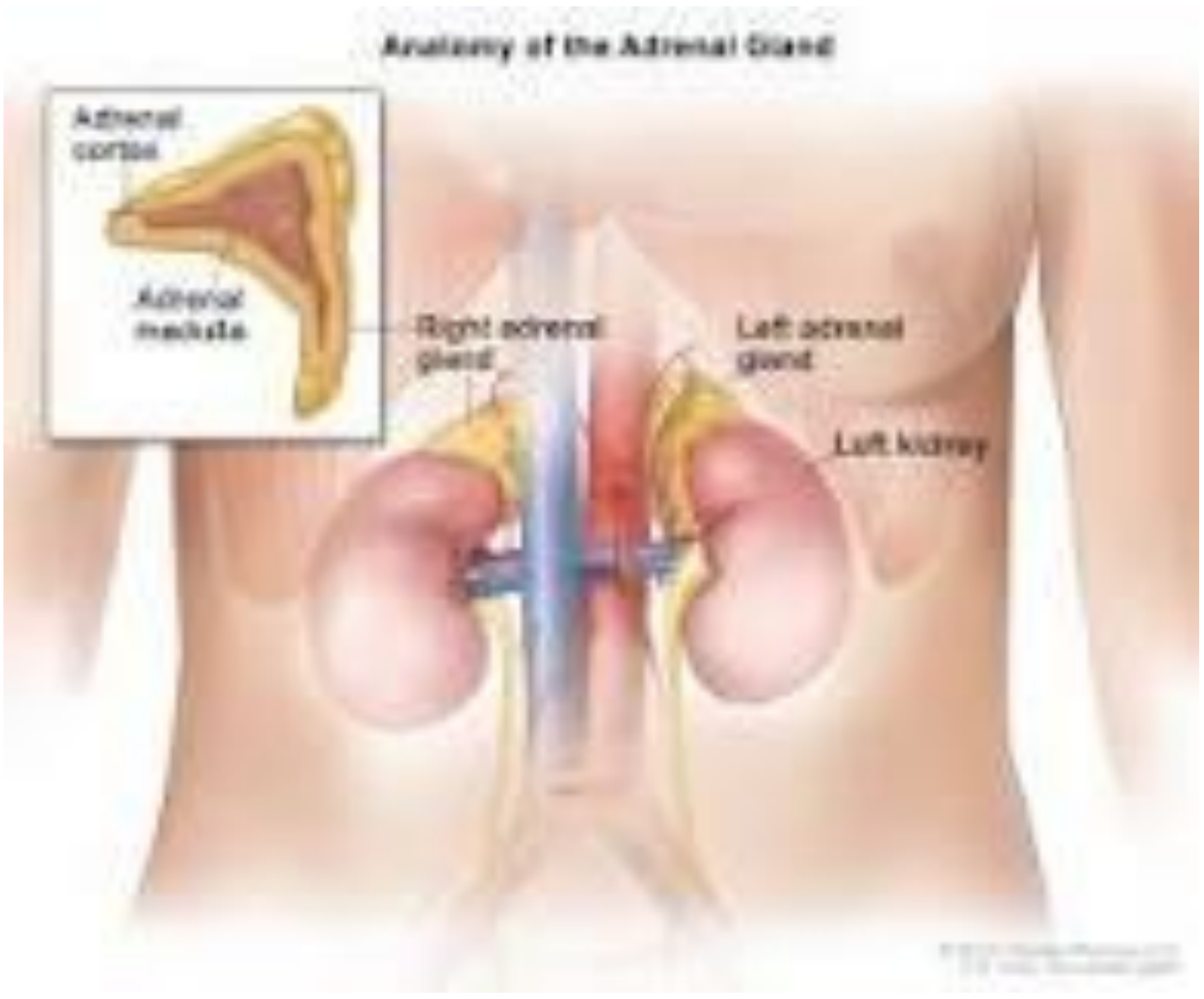
Adrenal Glands (Introduction)

Anatomically:

- The adrenal gland is a small, triangular-shaped organ that lies on the upper pole of the kidneys and in their fatty capsule.

- It has two parts:

  The cortex and the medulla.


Anatomy of the Adrenal Gland
Adrenal cortex
Adrenal medulla
Right adrenal gland
Left adrenal gland
Left kidney

Histological structure of Adrenal gland:

The cortex can be divided into three layers:

- The zona glomerulosa.
- The zona fasciculata
- The zona reticularis.

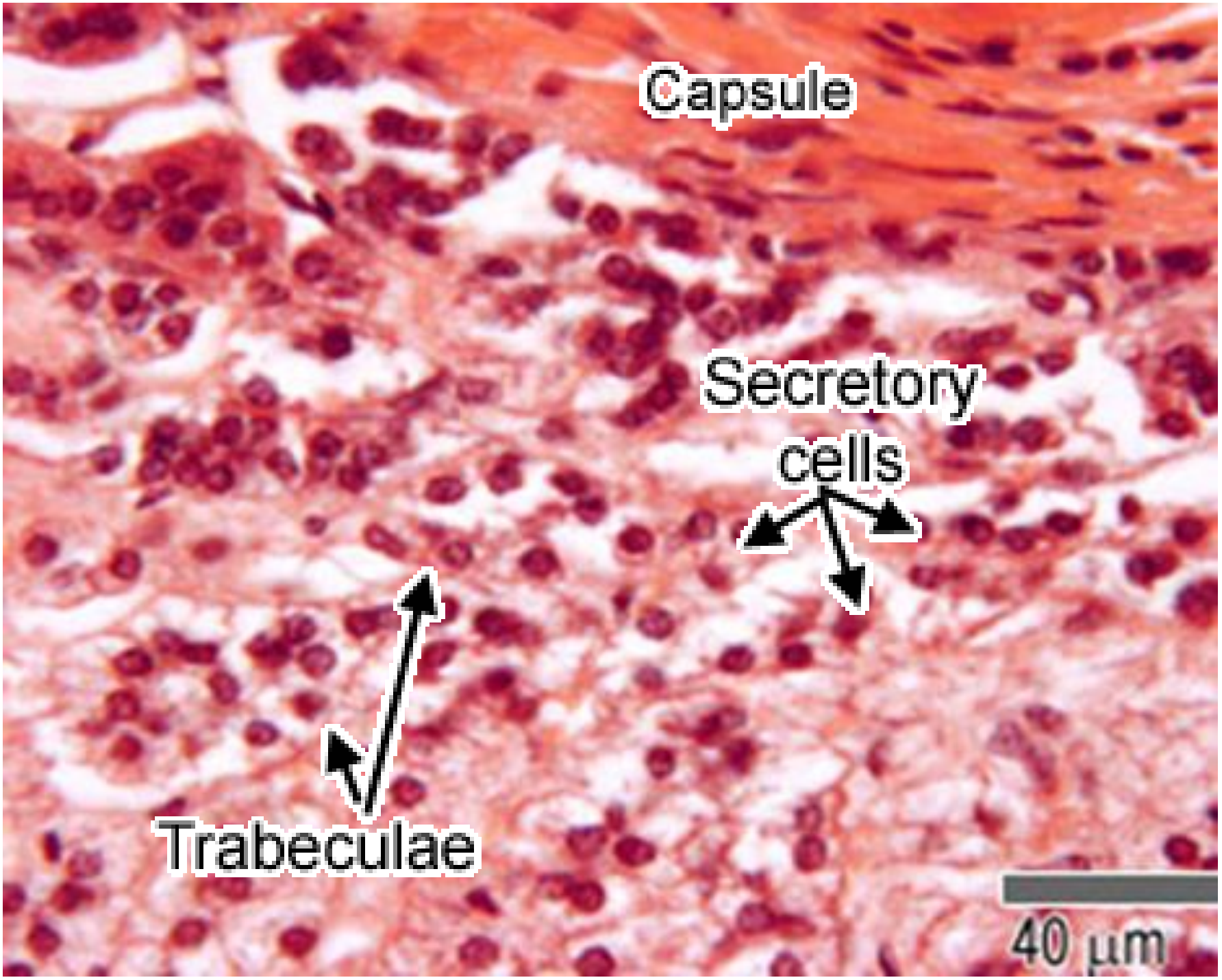
The medulla contains sympathetic nerve cells that release:

- Adrenaline (epinephrine)
- Anoradrenaline (norepinephrine) into the bloodstream.

Adrenal Cortex:

Zona glomerulosa:

- The outermost zone of the adrenal cortex.
- Secretes **mineralcorticoids**.
- The secretory cells are arranged in irregular ovoid clusters that are surrounded by trabeculae which contain capillaries.
- The nuclei stain strongly, and the cytoplasm is less pale than that of the next zone, the zona fasciculata, as there are fewer lipid droplets in these cells.

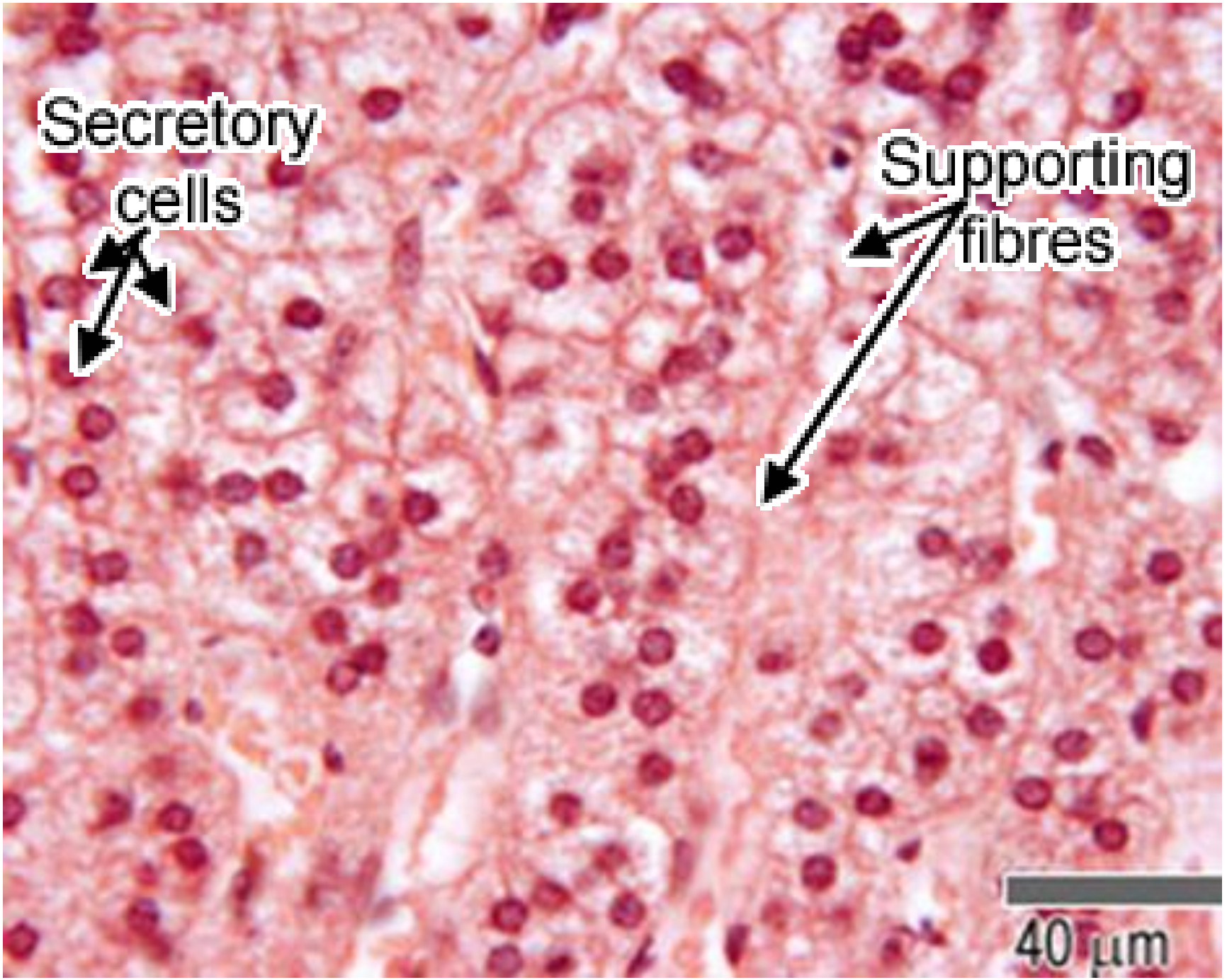

Capsule
Secretory cells
Trabeculae
40 µm

Zona fasciculata:

- The middle zone of the adrenal cortex secretes glucocorticoids which are important for carbohydrate, protein and lipid metabolism.

- The secretory cells are arranged in cords, often one cell thick, surrounded by fine strands of supporting tissue.

- The nuclei of these cells stain strongly, and the cytoplasm is rich in sER, mitochondria and lipid droplets. The cytoplasm looks pale and 'foamy' due to the presence of lipid droplets.

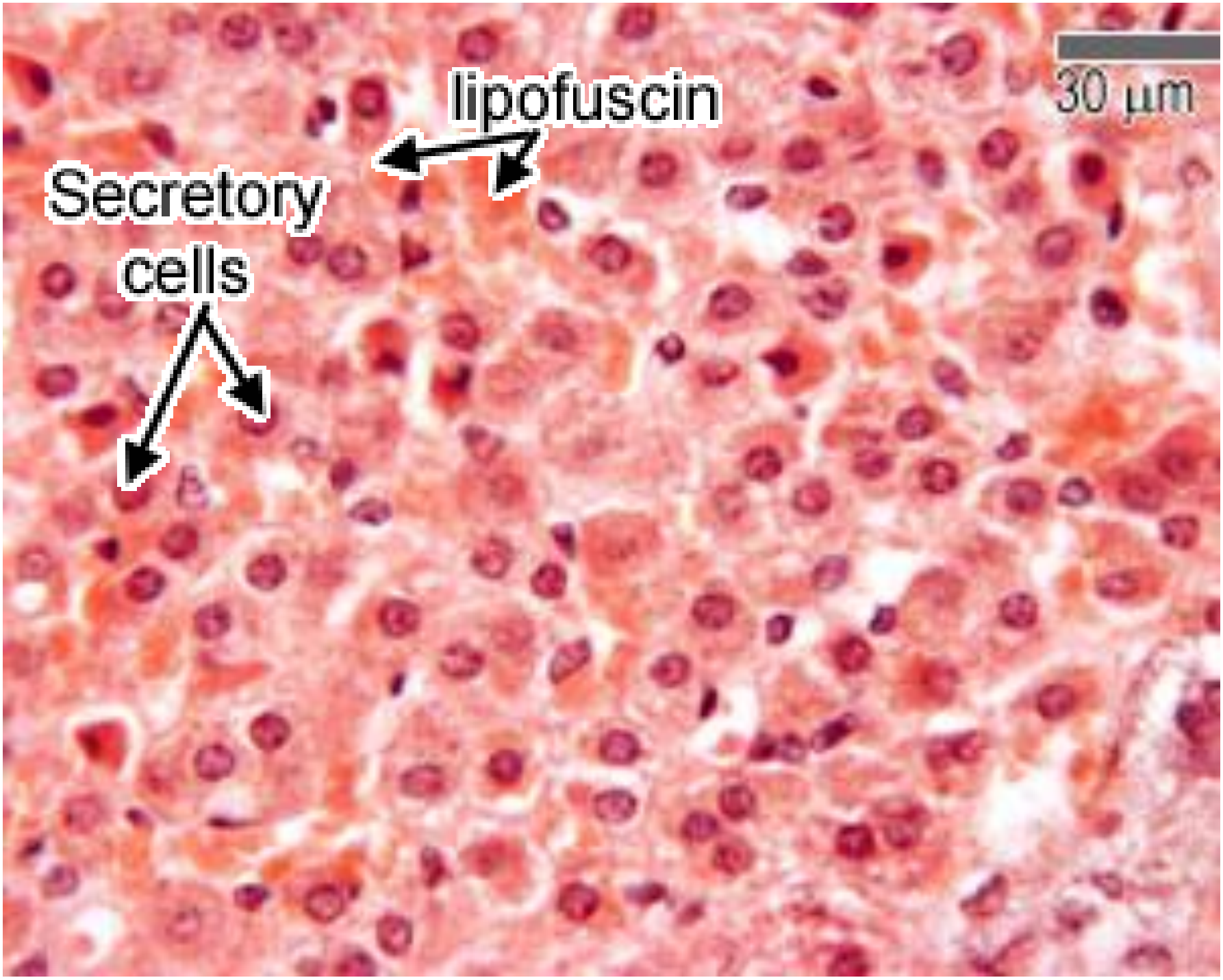

Secretory cells
Supporting fibres
40 µm

Zona reticularis:

- The innermost layer of the cortex, secretes sex hormones (androgens). and small amounts of glucocorticoids. These hormones are secreted by the inner zone of the cortex, which is called the zona reticularis.

- Some brown pigment is seen in some of these cells - this is lipofuscin, probably an insoluble degradation product of organelle turnover - an 'age' pigment.

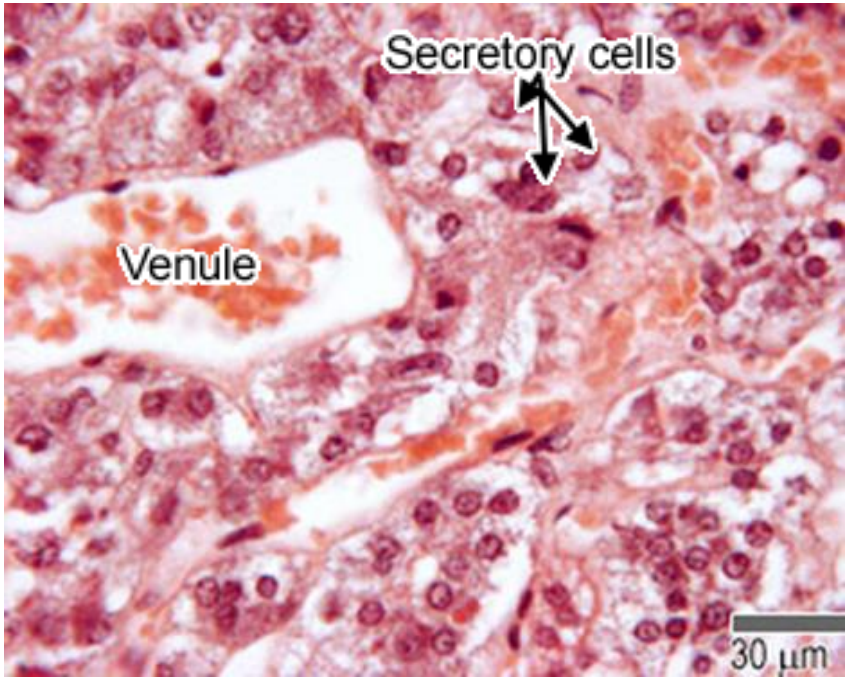
- The cytoplasm of the cells in this region stains more darkly, and contains fewer lipid droplets.


lipofuscin
Secretory cells
30 µm

Adrenal Medulla:

- This region of the adrenal glands contains basophilic staining cells, with a granular cytoplasm and no stored lipid.

- It also contains many venous channels which drain blood from the sinusoids of the cortex, pass through the medulla, and drain into the medullary vein.



Thank you for your attention