
بسم الله الرحمن الرحيم

THE ENDOCRINE SYSTEM

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The Thyroid gland

It is the only endocrine gland whose secretory product is stored in great quantity and occurs extra-cellularly.

Structure:

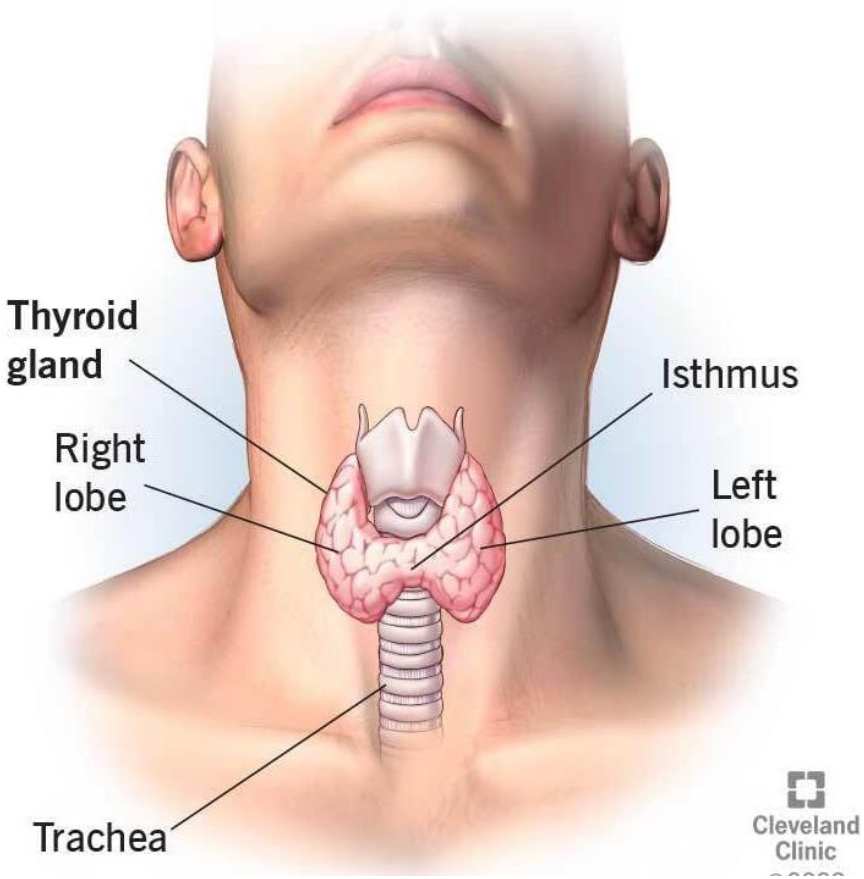
- The thyroid gland consists of stroma and parenchyma.

I- The stroma:

1. The gland is covered by **two capsules**
2. Fine fibrous **septa** extend from the capsule and divide the gland into incomplete lobules.
3. **Reticular fibres**.

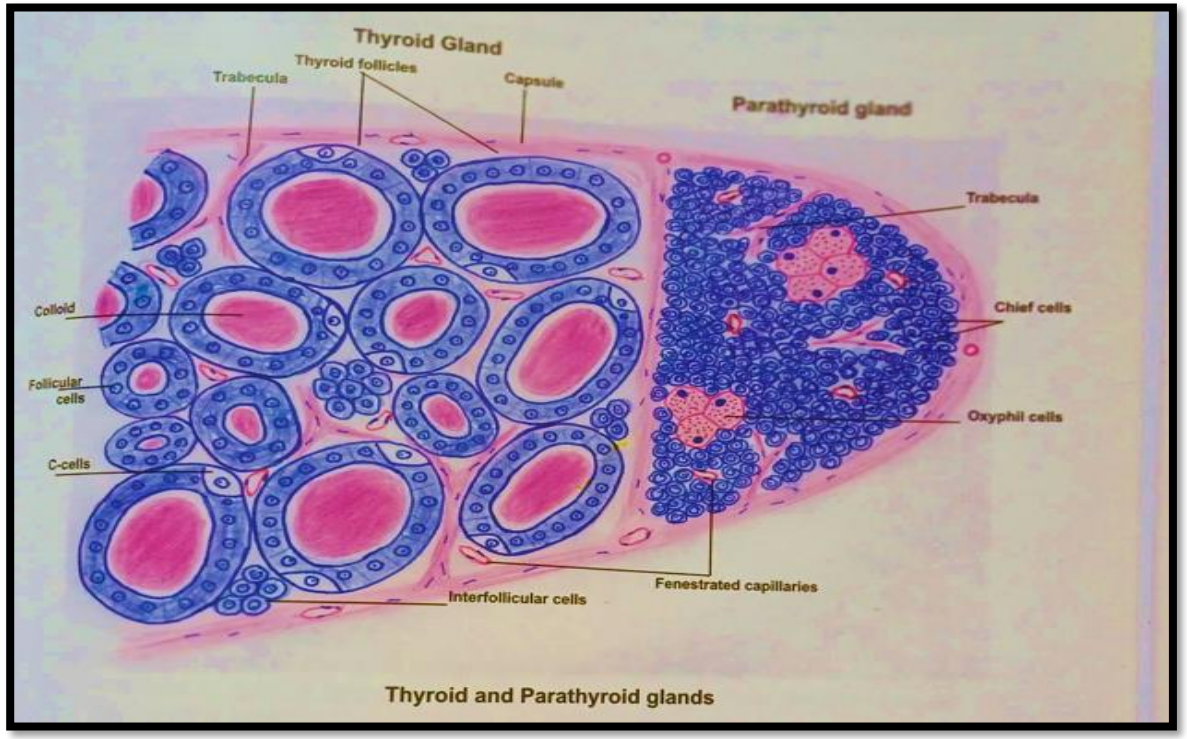
II- The parenchyma:

- It consists of thyroid follicles and interfollicular cells.

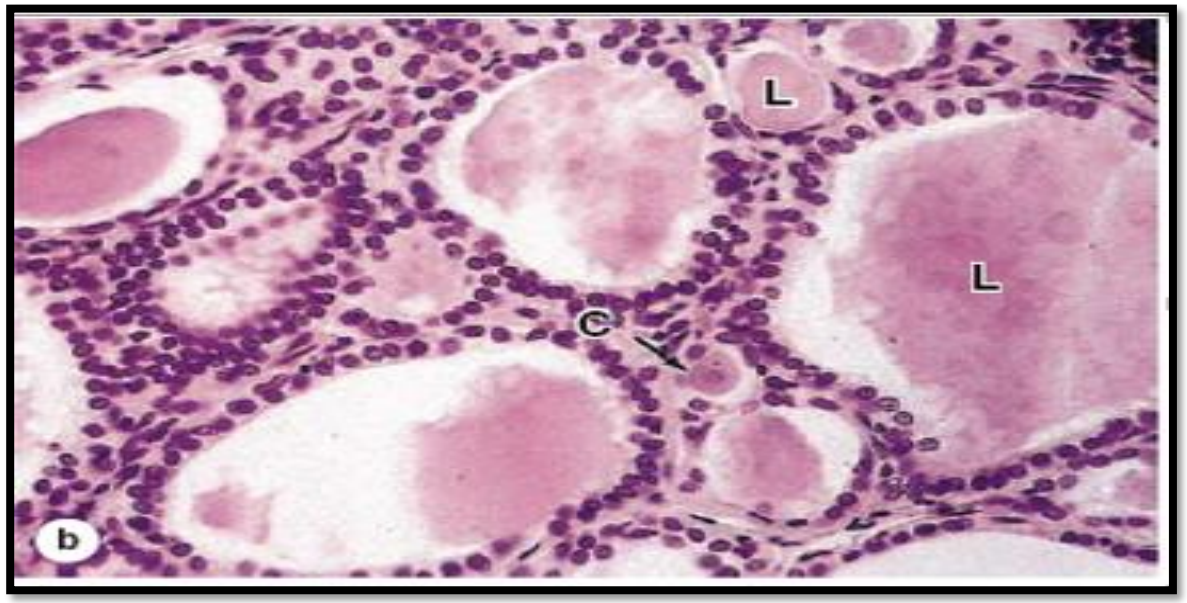


The thyroid follicles:

- They are the structural and functional unit of the gland.
- They may be round or oval in shape.
- Normally, they are lined with low cuboidal epithelium.
- The follicles contain colloid (a gelatinous substance) in their lumen. The morphologic appearance of the follicles varies according to the region of the gland and its functional activity (In the same gland larger follicles full of colloid and have low cuboidal epithelium are found beside smaller follicles which are lined with columnar cells).



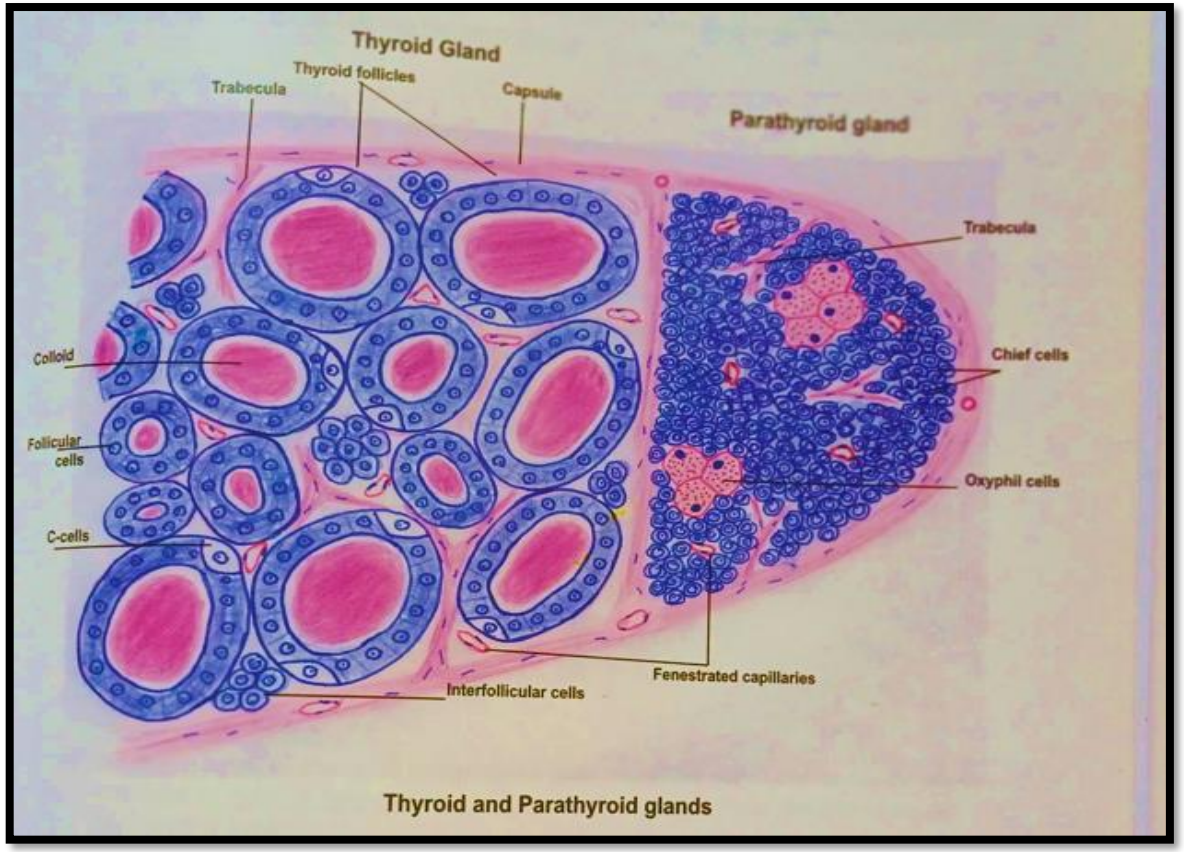
Thyroid and Parathyroid glands

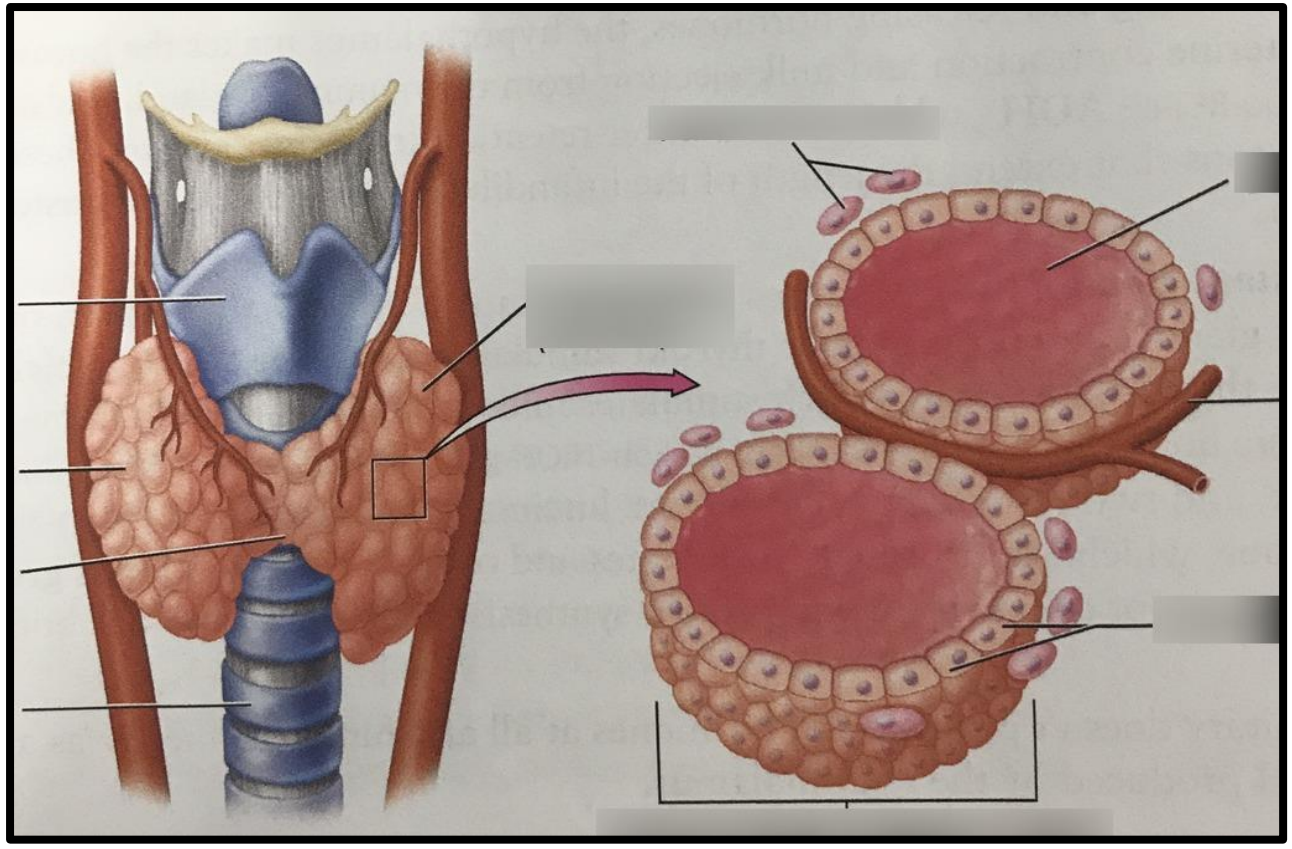


The cells lining the follicles are of two types:

a. Follicular cells.

b. Parafollicular cells.

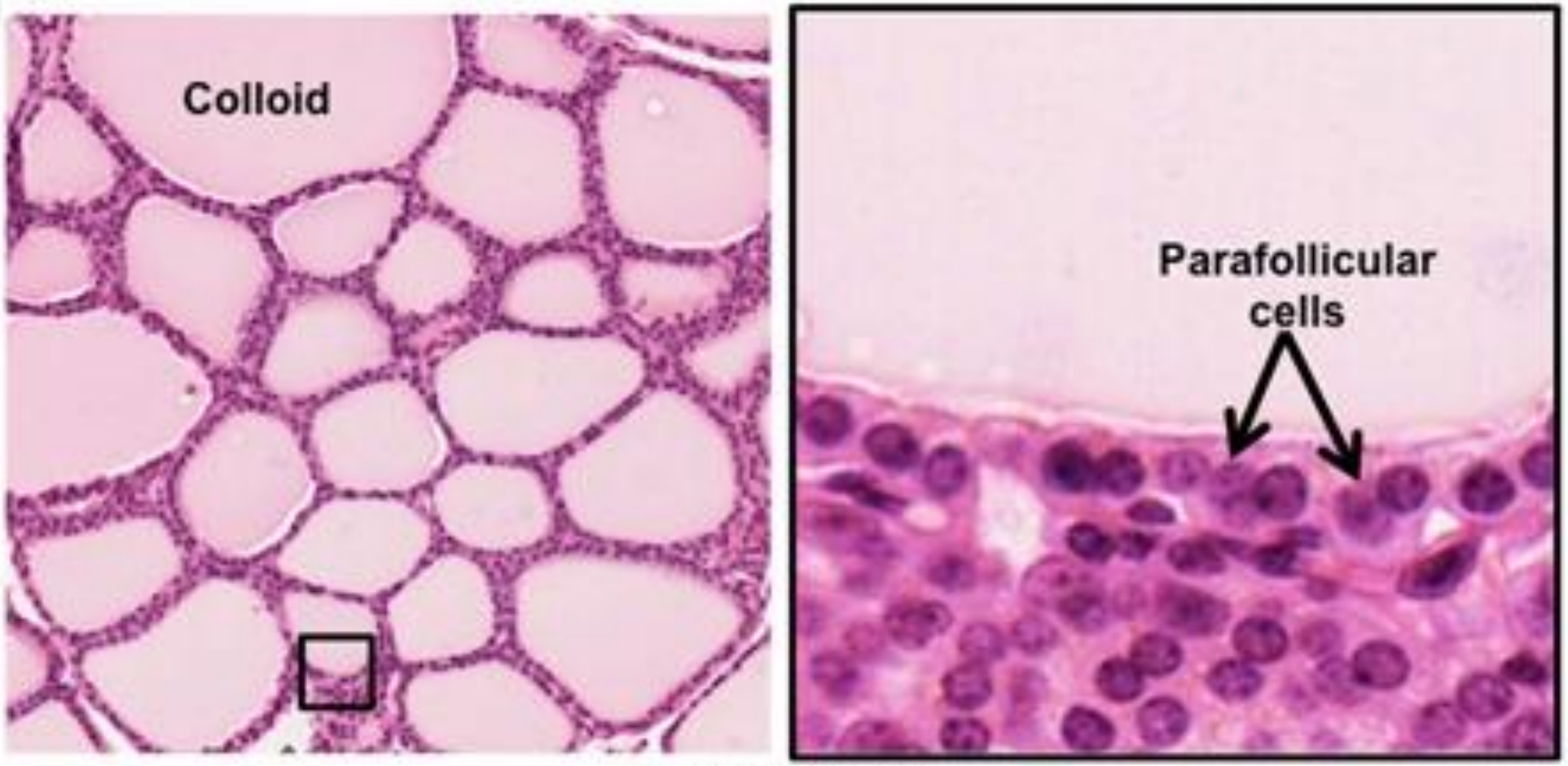




The follicular cells	The para-follicular cells (C cells or light cells or clear cells):
They constitute the majority of the cells lining the thyroid follicle (98%).	They form the minority of the cells lining the follicles (2% of the cells).
With LM they are cubical secretory cells with basophilic cytoplasm and central rounded nucleus.	➢ They are larger and paler than the follicular cells. ➢ They are rounded or oval in shape. ➢ They do not reach the lumen of the follicle and is enclosed between the follicular cells and the basement membrane surrounding the follicle.
Function: They synthesize and release the thyroid hormone.	**Function:** They secrete calcitonin; a hormone which lowers the blood calcium level by inhibiting bone resorption.

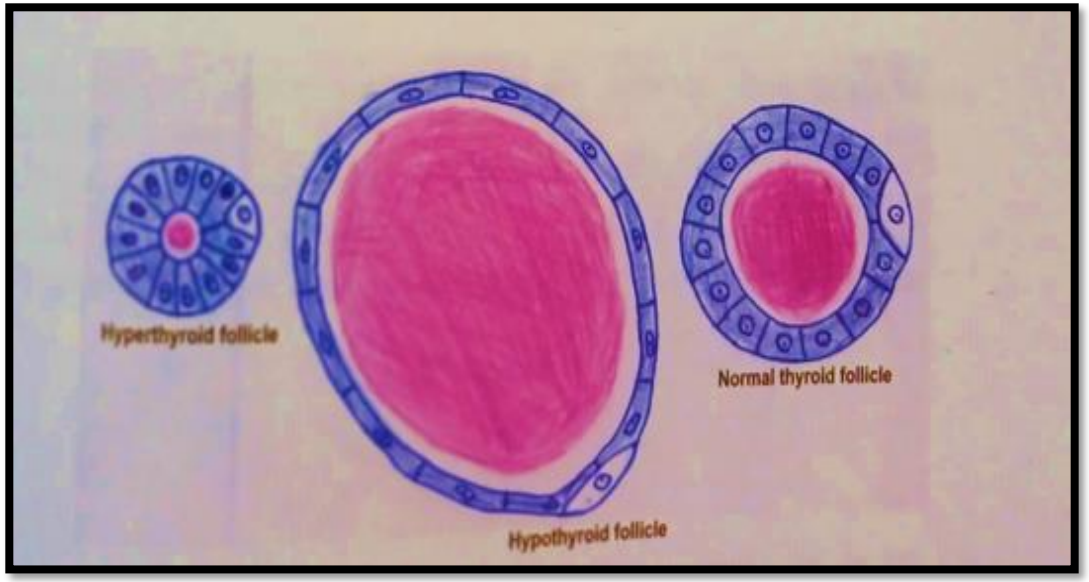
2-Inter-follicular cells

- They are masses of cells present in-between the follicles.
- They represent tangentially cut follicles (consist of follicular and para-follicular cells).



Thyroid gland

- The gland is considered **hypoactive** when the majority of the follicles are lined with squamous cells and **hyperactive** when the majority of the follicles are lined with columnar cells.



The colloid:

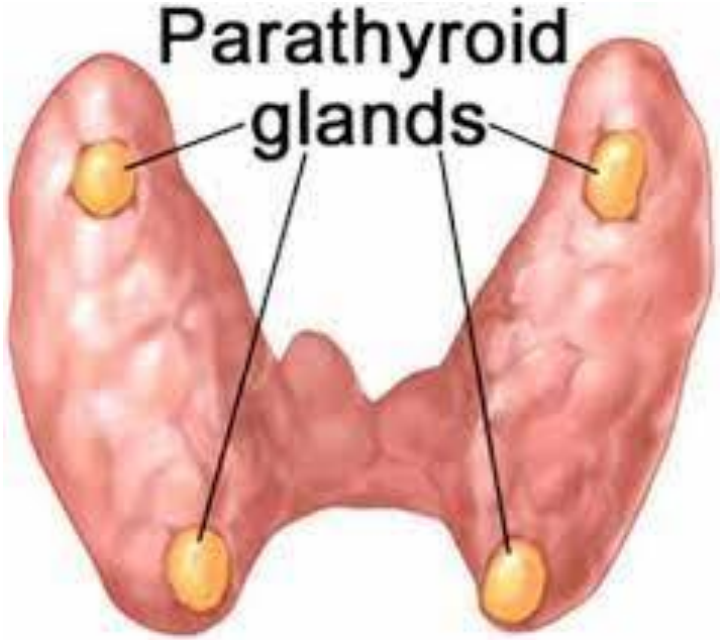
- Is a homogenous acidophilic material formed of thyroglobulin (a glycoprotein containing various iodinated amino acids; T4 & T3).
- It stains intensely with PAS and is eosinophilic with H & E.

The Parathyroid glands

- They are 4 small masses present on the posterior aspect of the thyroid gland.

Structure:

It consists of stroma and parenchyma.



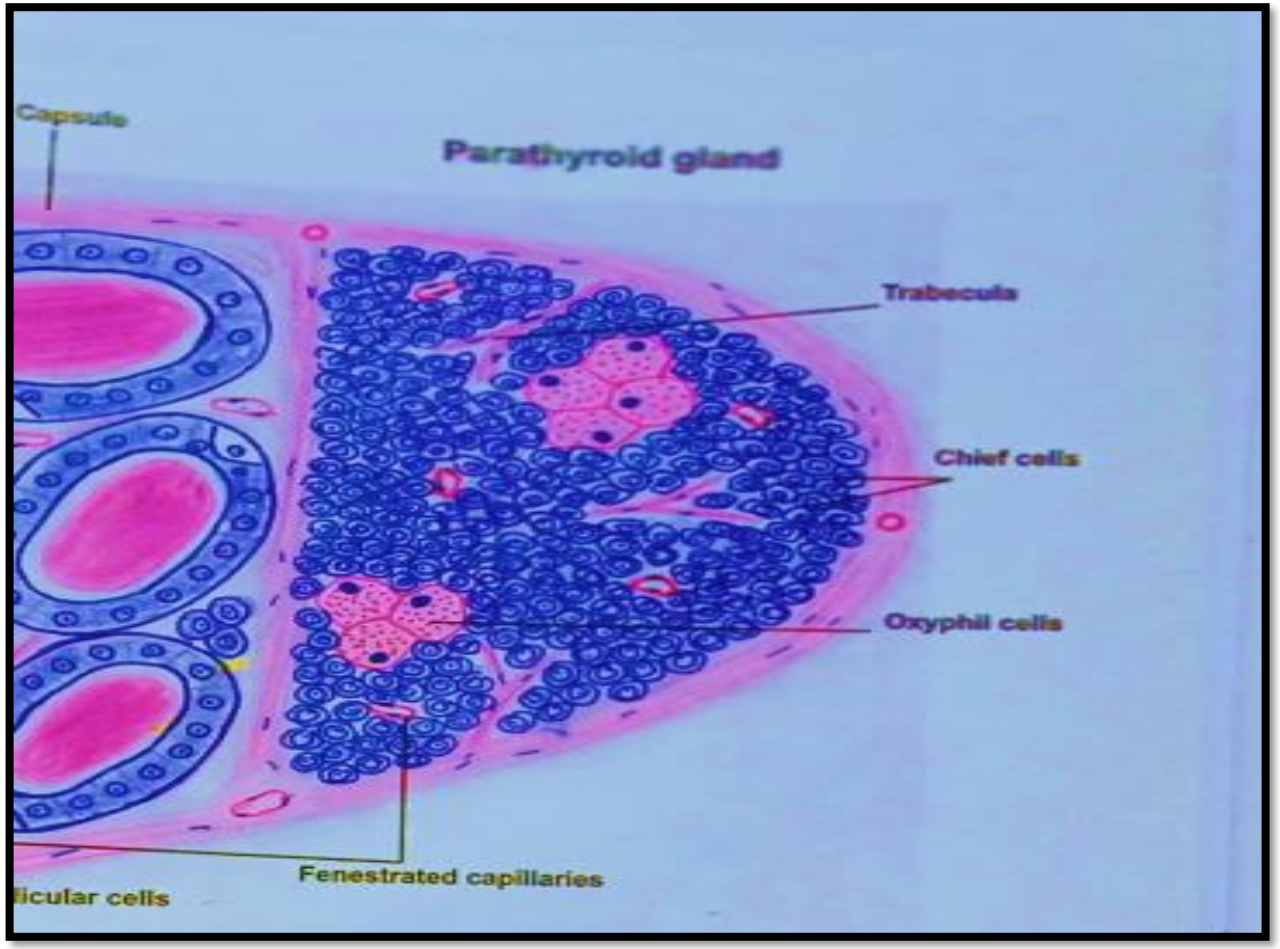
I. Stroma:

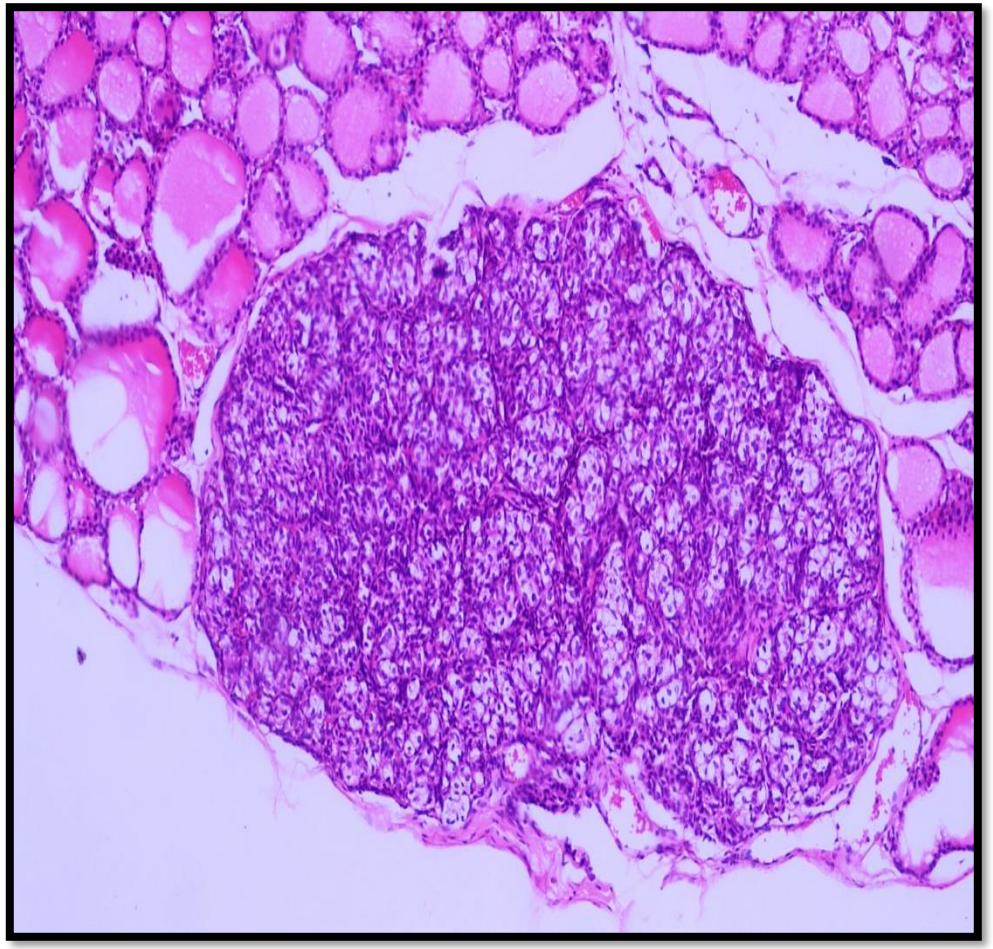
1. Connective tissue capsule.
2. Delicate connective tissue septa divide the gland into poorly defined lobules.
3. Reticular fibres.

II. The parenchyma:

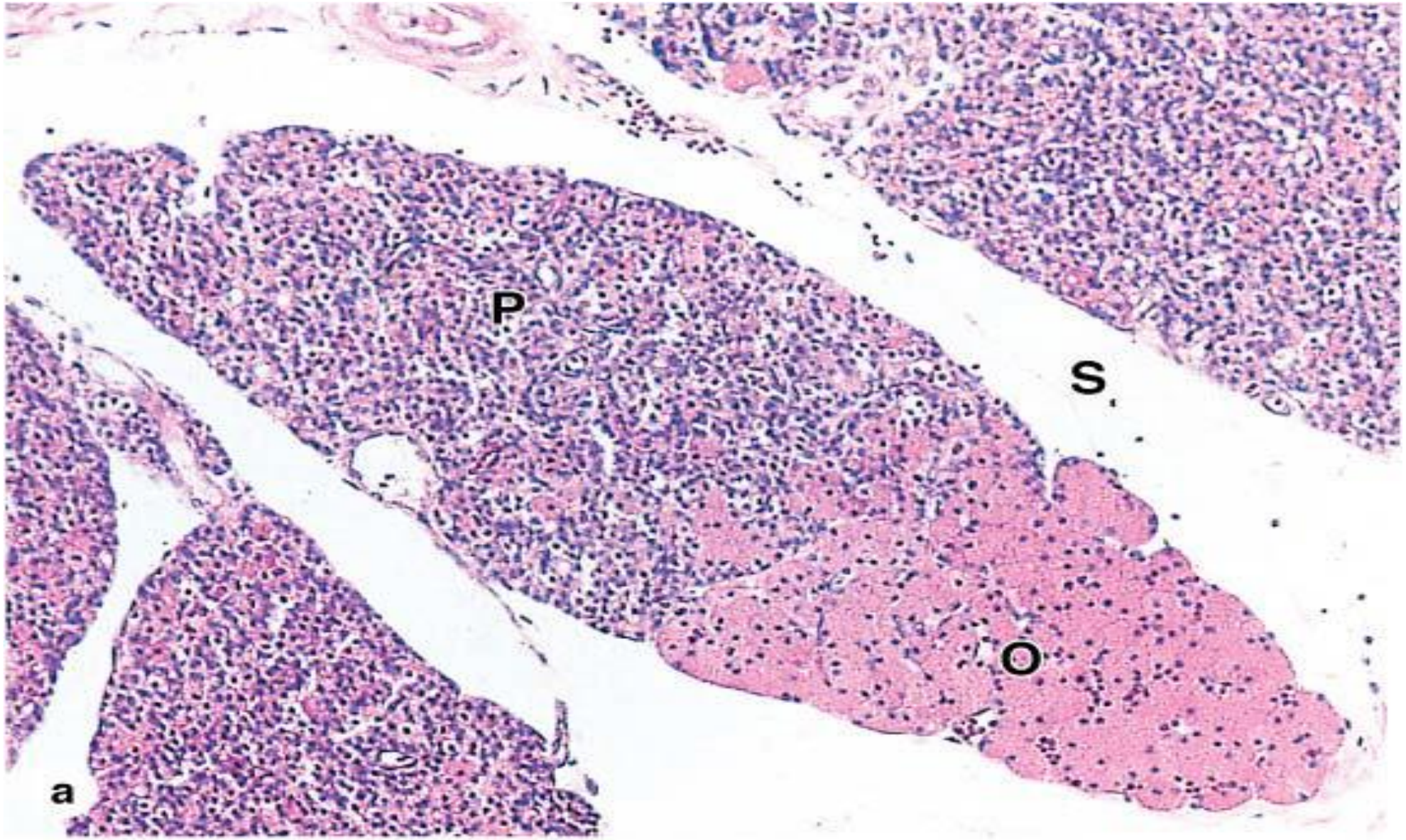
- It consists of anastomosing cords of cells separated by blood capillaries.
- Two types of cells are present in the gland of adults: chief cells and oxyphil cells.

The Parathyroid glands



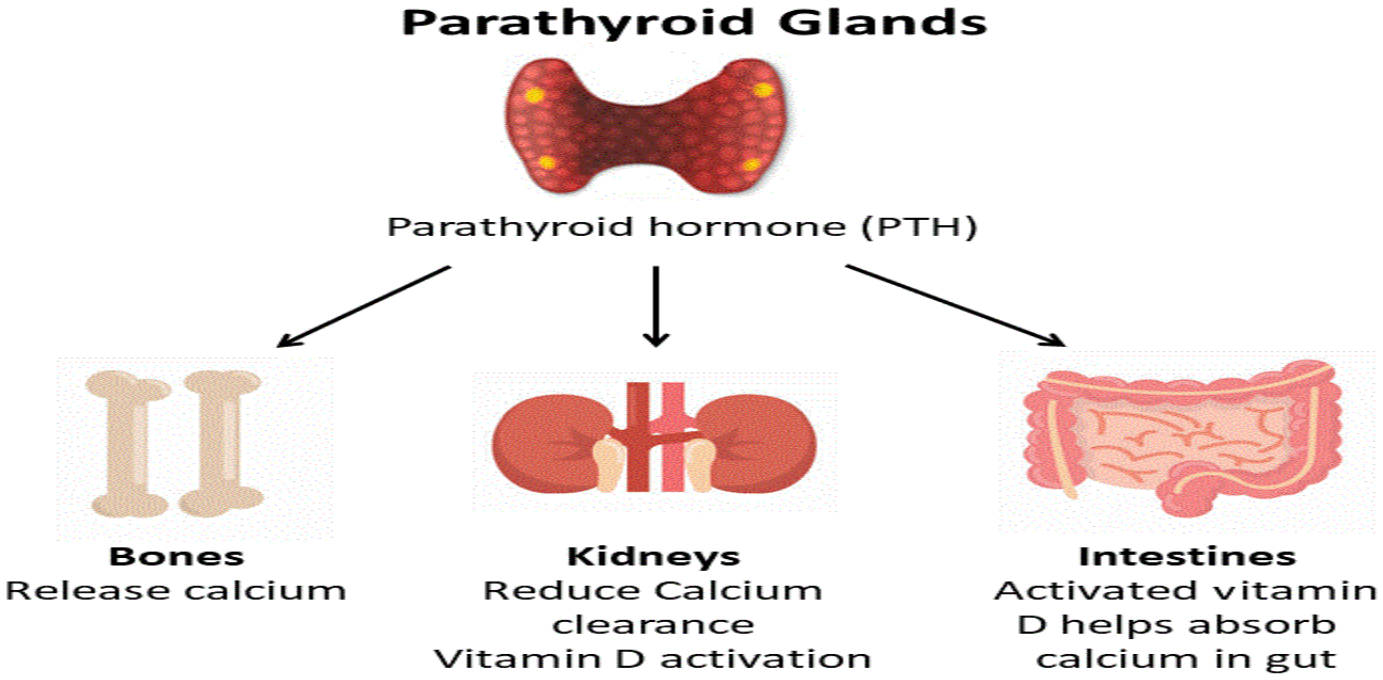


A- Chief cells (principal cells)	B- Oxyphil cell:
➢ They are the most numerous cells in the gland. ➢ They are smaller in size than oxyphil cells.	They are few in number.
➢ They are polygonal in shape. ➢ The nuclei are vesicular and rounded. ➢ They have pale cytoplasm because they contain large amount of glycogen and lipid.	➢ They are polygonal and larger in size than the chief cells. ➢ They have small densely stained nuclei. ➢ They have numerous acidophilic granules which are mitochondria.
Function: • They secrete parathormone (parathyroid hormone) when calcium level drops below normal.	**Function:** • They may be involved in secreting calcitonin.



Source: Mescher AL: *Junqueira's Basic Histology: Text and Atlas, 12th Edition:* http://www.accessmedicine.com

- Removal of parathyroid glands or hypo function → tetany and death due to diminished calcium level in blood.
- Hyper function of parathyroid → Ca level increases, P. level decreases and calcium deposits in several organs e.g.: kidney, arteries etc. The bone matrix is decalcified and the bone fractures easily (osteitis fibrosa cystica).



MCQ

1. Thyroid gland is considered hyperactive when the majority of follicles are lined with

a. Simple squamous epithelium
b. Simple cubical epithelium
c. Simple columnar epithelium
d. Stratified squamous epithelium
e. Stratified columnar epithelium

C

MCQ

2. Chief cells secrete which of the following hormones

a. T3

b. Growth hormone

c. Cortisone

d. Parathormone

e. Testosterone

d


Thank
You

References

- Student medical histology book, Mansoura university.
- Junqueira's Basic Histology: Text and Atlas, Fourteenth Edition. 14th edn. New York, USA: McGraw-Hill Education.
- **Pawlina, W. and Ross, M.H. (2019)**. Histology: A Text and Atlas, International Edition: With Correlated Cell and Molecular Biology. 8th edn.