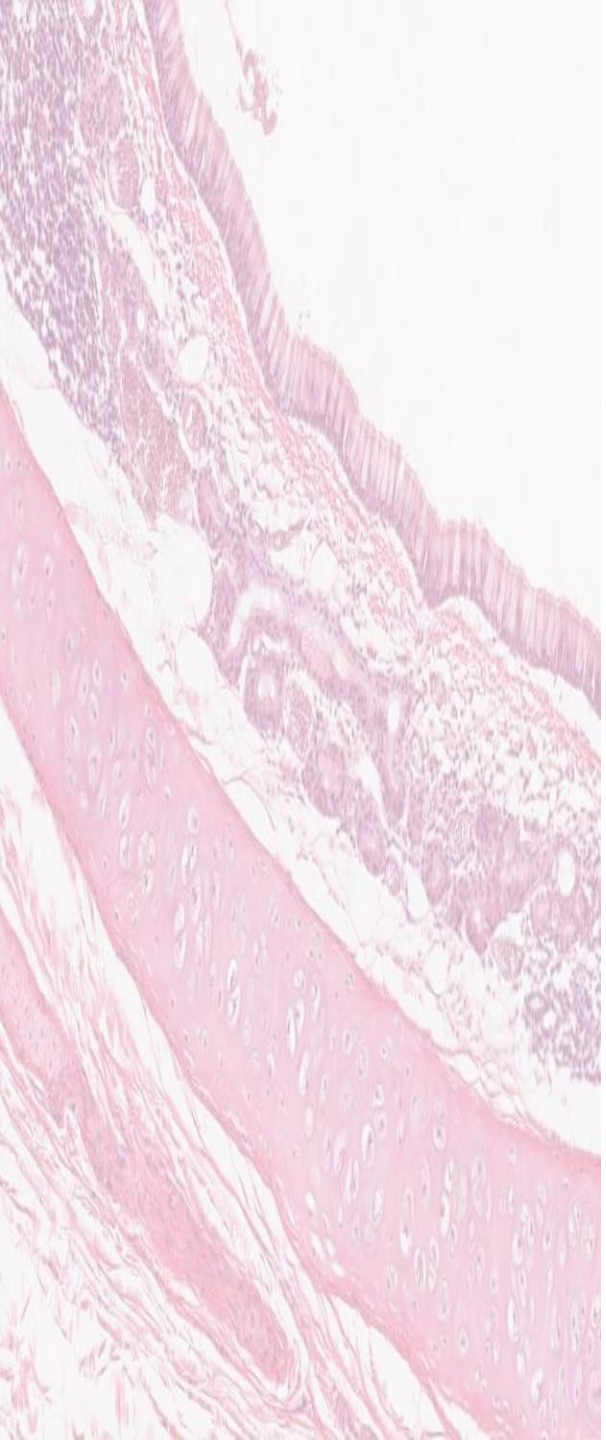

جامعة الملك سعود
King Saud University

436
MEDICINE
KING SAUD UNIVERSITY

تمت المراجعة
شوق الأحمري & عبدالعزيز العنقري

THYROID & PARATHYROID GLANDS

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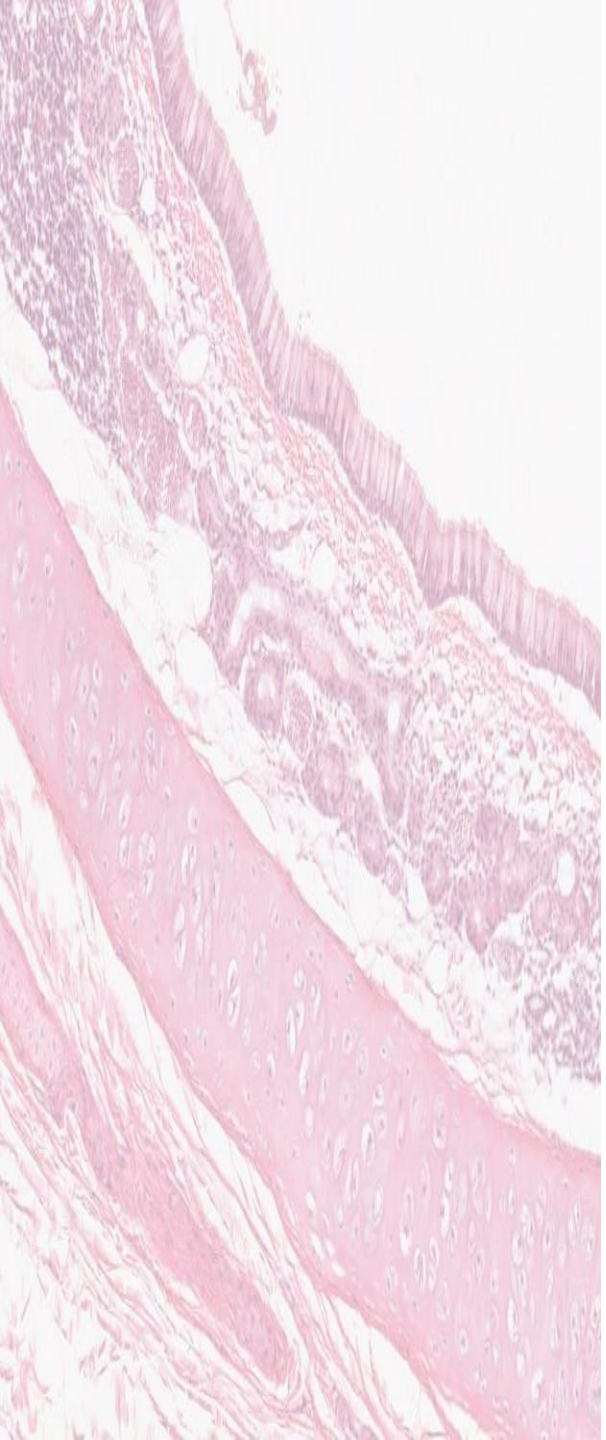


وَمَن يَتَوَكَّلْ عَلَى ٱللَّهِ فَهُوَ حَسْبُهُۥٓ

Objectives:

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

✓ Describe the histological structure of thyroid & parathyroid glands.

✓ Identify and correlate between the different endocrine cells in thyroid gland and their functions.

✓ Describe the functional structure of parathyroid cells

THYROID GLAND

Parenchyma

Are the structural and functional units of the thyroid gland. (synthesis of protein)

L/M:

1- Simple cuboidal epithelium:

a- Follicular cells. (Major . Small)

b- Parafollicular cells.(Minor, larger)

2- Colloid: central colloid-filled lumen. (gel like material - highly vascular - without blood capillaries nor cells)

N.B. Each follicle is surrounded by thin basal lamina. To separate the epithelium from the C.T.

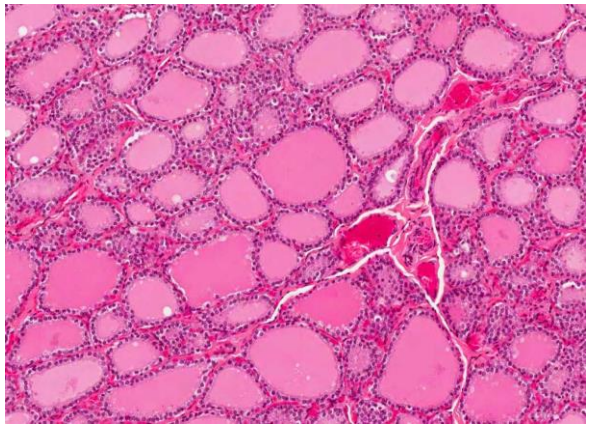
Stroma

1- Capsule: dense irregular collagenous C.T.

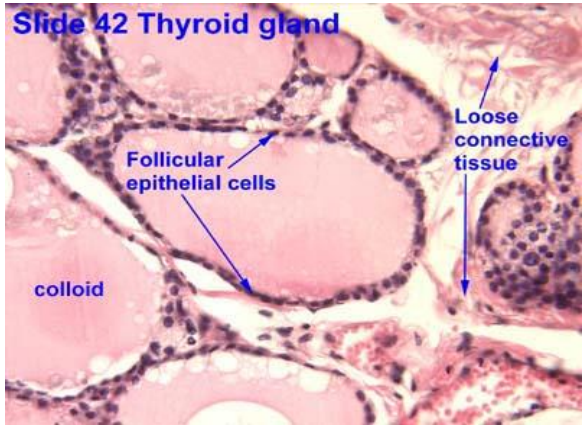
2- Septa: (Interlobular septa)

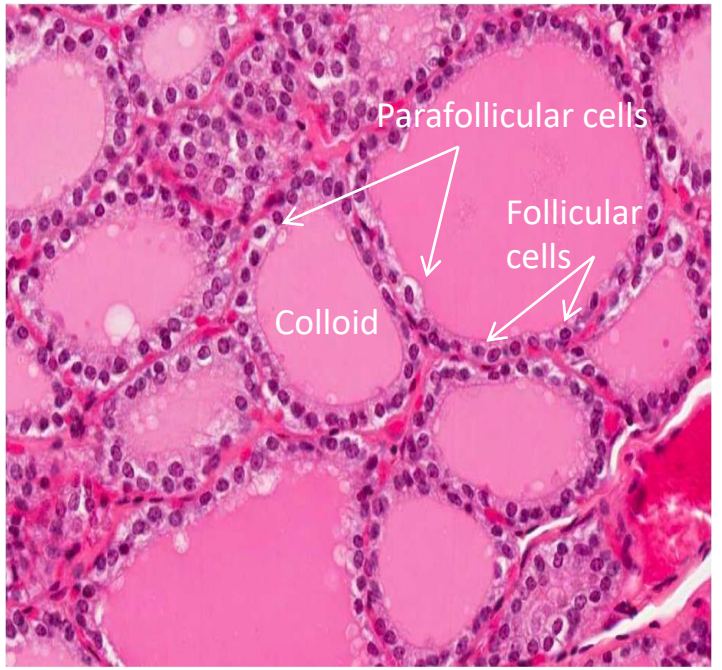
3- Reticular fibers:

Thin C.T., composed mostly of reticular fibers with rich capillary plexus* surrounds each thyroid follicle (separation)



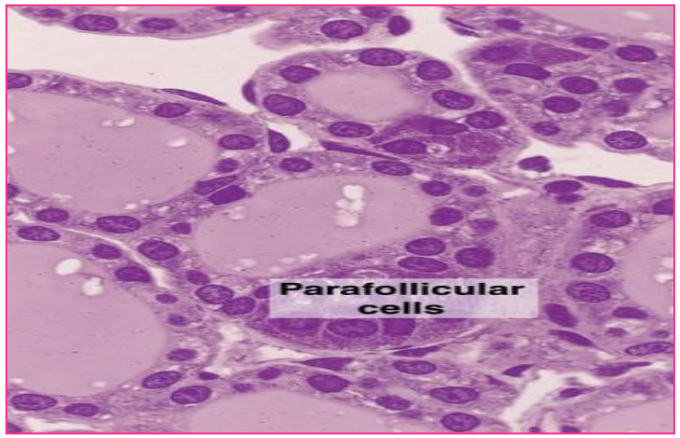
*They are fenestrated blood capillaries

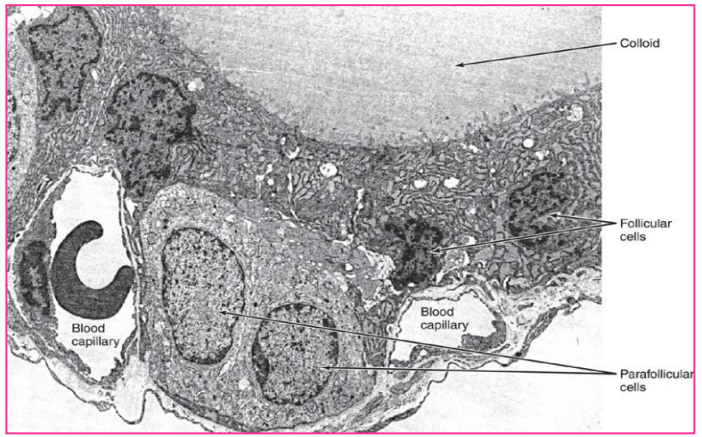




1- FOLLICULAR (PRINCIPAL) CELLS

Light microscope	Electron microscope
• Simple cuboidal cells • Round nucleus with prominent nucleoli. • Basophilic cytoplasm. • Apical surface reaches the lumen of the thyroid follicle.	• Mitochondria. • RER • Supranuclear Golgi Complex. • Numerous apically-located lysosomes. (lysosomes are needed to free the T3&T4 from thyroglobulin) • Numerous dispersed small vesicles: - contain newly formed thyroglobulin. - Numerous apical short microvilli. (for the endocytosis of colloid)

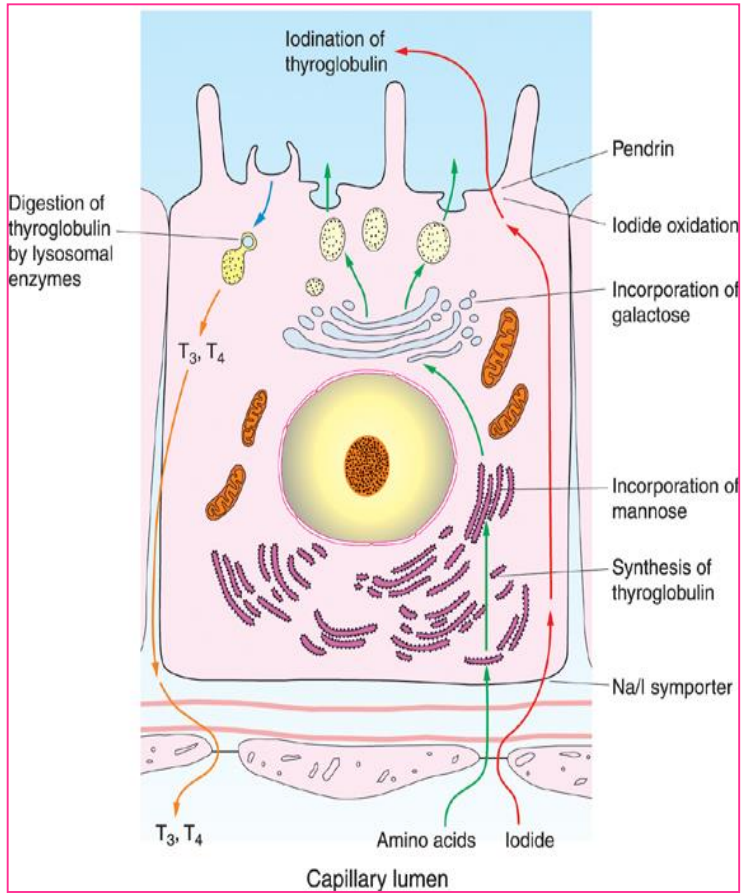




Function:

Synthesis of

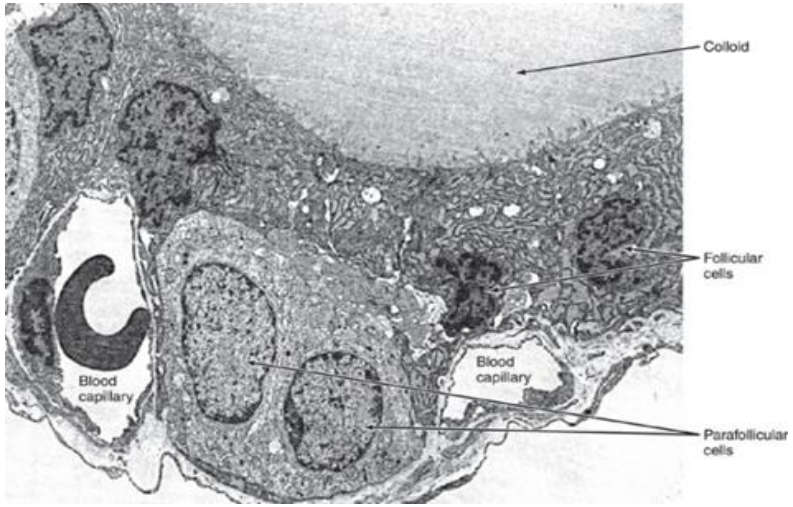
thyroid hormones (T4 & T3).

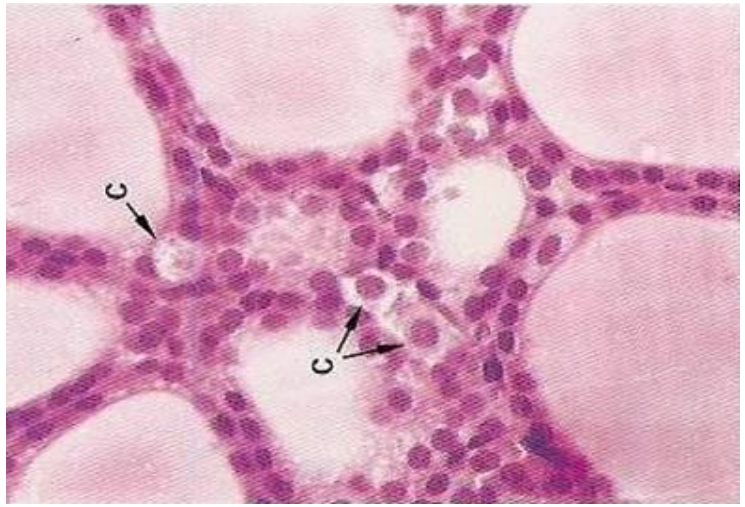


2- PARAFOLLICULAR CELLS (CLEAR CELLS) (C-CELLS)

Light microscope	Electron microscope
• Pale-stained cells (Clear Cells). Clear cytoplasm. • Found singly or in clusters in between the follicular cells. • Unlike follicular cells, their apices do not reach the lumen of the lumen of the follicle. • Are larger than follicular cells (2-3 times). • Represent only 0.1% of the epithelial follicular cells. • Have a round nucleus.	• Mitochondria. • Rough endoplasmic reticulum (RER) (moderate). • Well-developed Golgi. Moderate as in less than follicular cells.

Function: Secrete calcitonin. it works with parathyroid hormone to balance the level of Ca^{++} in the blood

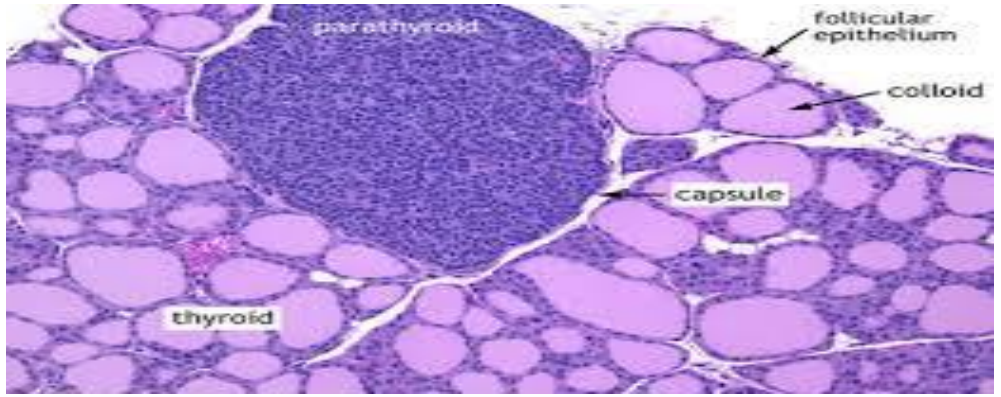




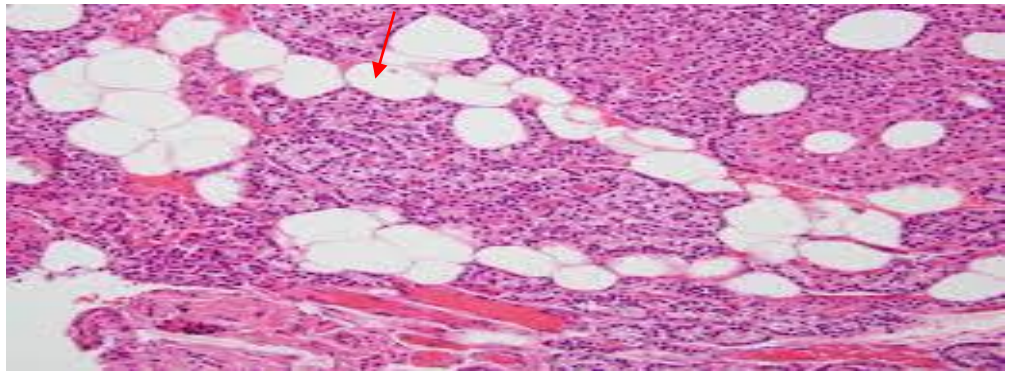
PARATHYROID GLANDS

They are 4 glands on the posterior surface of the thyroid gland.

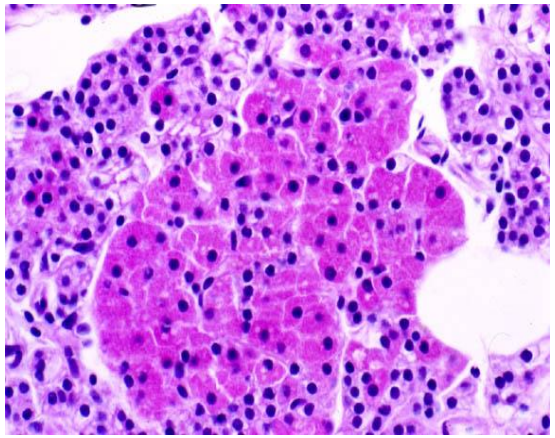
A. Stroma of parathyroid gland:		B. Parenchyma of Parathyroid gland:	
1. Capsule:	Each gland has its thin capsule.	Formed of cords or clusters of epithelial cells (chief cells & oxyphil cell) with blood capillaries in between. These cells are surrounded by reticular fibers.	
2. Septa:	Thin	1. Chief cells: Main functioning cells	• Are slightly eosinophilic. • Rich in rER. • They secrete parathyroid hormone (increase blood calcium level) The only type of cell in newborn
3. Reticular C.T.	C.T. stroma in older adults often contains many adipose cells. Adipose cells may increase as you get older	2. Oxyphil cells: Oxy: pink or red	• They are arranged in groups or clusters or as isolated cells. • They are deep eosinophilic (acidophilic). • They have more numerous mitochondria. • They are less numerous but larger than chief cells. • They are of unknown function. • N.B. They may be inactivated chief cells. Appear at puberty and it is claimed as the degenerative form of chief cell

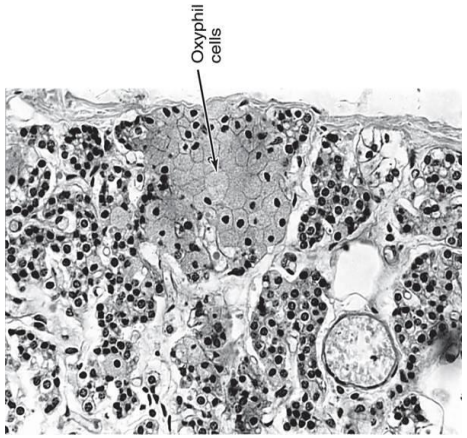


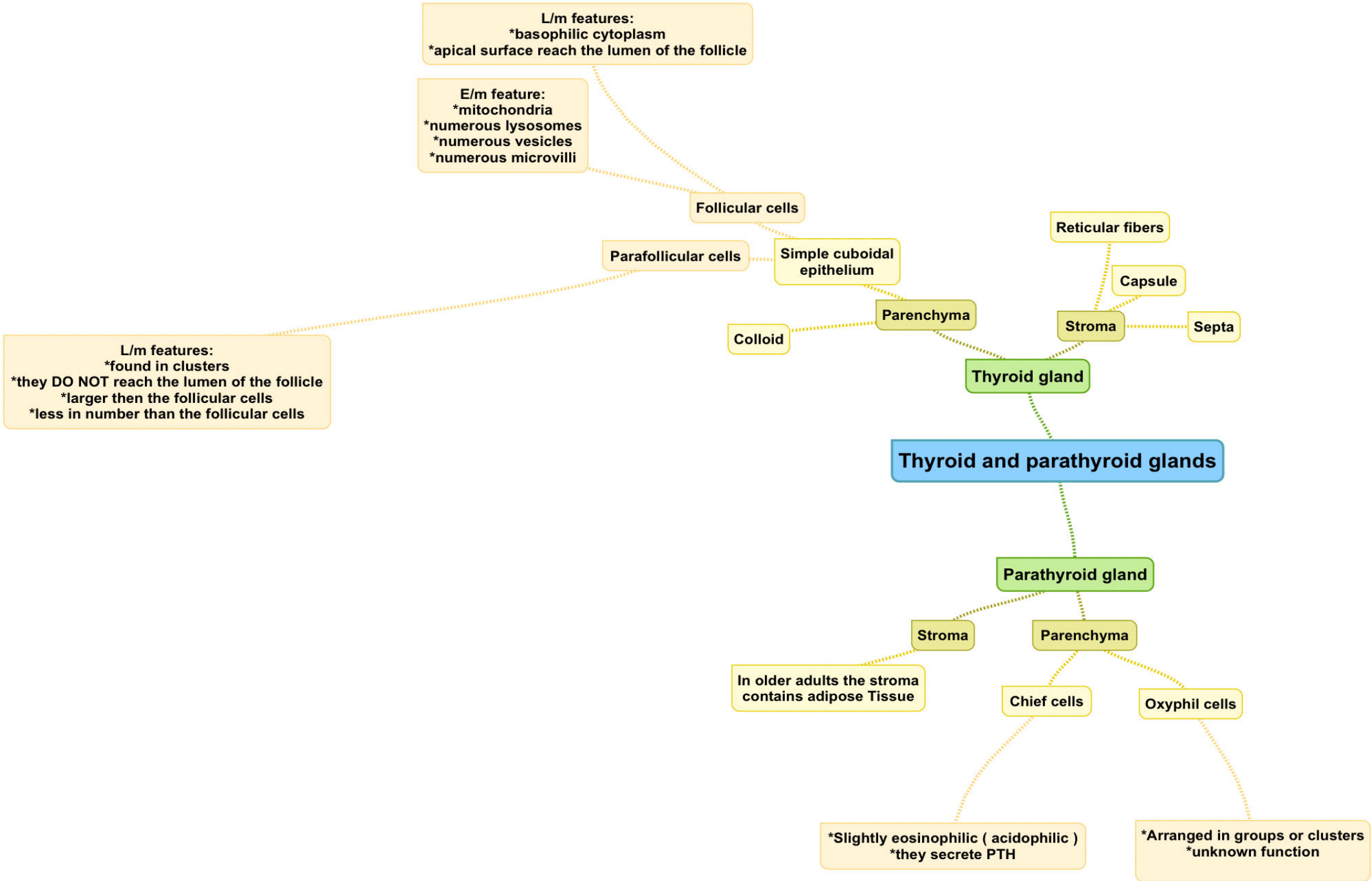
Adipose cells:

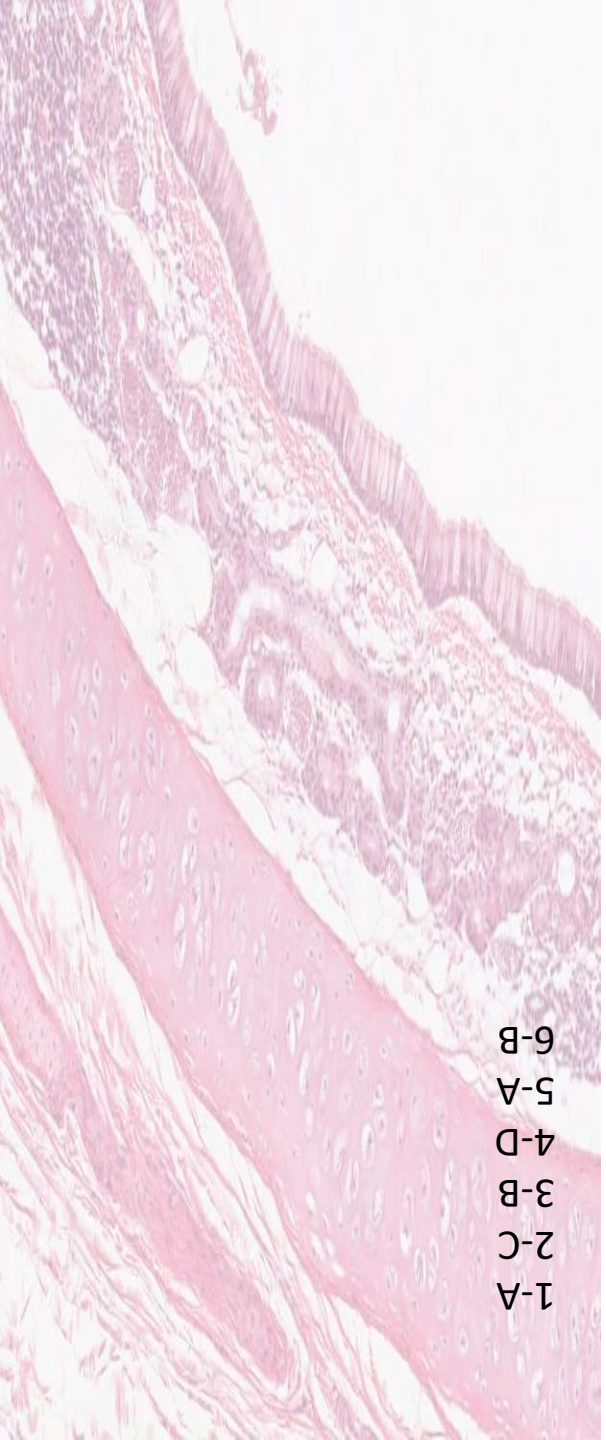


Parenchyma of Parathyroid gland:






L/m features:
*basophilic cytoplasm
*apical surface reach the lumen of the follicle
E/m feature:
*mitochondria
*numerous lysosomes
*numerous vesicles
*numerous microvilli
Follicular cells
Parafollicular cells
Simple cuboidal epithelium
L/m features:
*found in clusters
*they DO NOT reach the lumen of the follicle
*larger then the follicular cells
*less in number than the follicular cells
Reticular fibers
Capsule
Parenchyma
Stroma
Septa
Colloid
Thyroid gland
Thyroid and parathyroid glands
Parathyroid gland
Stroma
Parenchyma
In older adults the stroma contains adipose Tissue
Chief cells
Oxyphil cells
*Slightly eosinophilic (acidophilic)
*they secrete PTH
*Arranged in groups or clusters
*unknown function



MCQs

1) T4&T3 are synthesized by which cell?

A-Follicular cell B-Para follicular cell

C-Chief cell D-Oxyphil cell

2) C-cells (clear cells) secrete which hormone?

A-TSH B-T4

C-Calcitonin D-ADH

3) Parathyroid hormone is synthesized from?

A-Oxyphil cells B-Chief cells

C-Follicular cells D-Parafollicular cells

4) Which cells of the following their apical surface reach the lumen of the thyroid follicle?

A-Parafollicular cells B-Chief cells

D-Oxyphil cells D-Follicular cells

5) Oxyphil cell is deep eosinophilic?

A- true B-False

6) Calcitonin increases blood calcium level?

A-true b-False

1-A
2-C
3-B
4-D
5-A
6-B

HISTOLOGY TEAM 436

Thank you & good luck

- Histology team

Done by:

- ✓ Ahmed Badahdah
- ✓ Mutasem Alhasani
- ✓ Omar Turkistani
- ✓ Nawaf Aldarweesh
- ✓ Mohammed Khojah

Team leaders:

- ✓ Rana Barasain
- ✓ Faisal Alrabaii

References:

- ✓ Females' and Males' slides.
- ✓ Doctors' notes