



MED437  
KING SAUD UNIVERSITY

# Thyroid and Parathyroid glands



HISTOLOGY  
TEAM 437

Red: important.

Black: in male | female slides.

Gray: notes | extra.

Editing file



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## ➤ OBJECTIVES

- Describe the histological structure of THYROID GLAND
- Identify and correlate between the different ENDOCRINE CELLS in THYROID GLAND and THEIR FUNCTIONS
  
- The microscopic structure of the PARATHYROID GLAND
- The functional structure of the PARATHYROID CELLS



## ➤ Thyroid Gland

### THYROID GLAND

#### 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.

Highly vascular to supply the gland with amino acids and Iodine

#### PARENCHYMA

#### THYROID FOLLICLES:

Are the structural and functional units of the thyroid gland.

#### L/M:

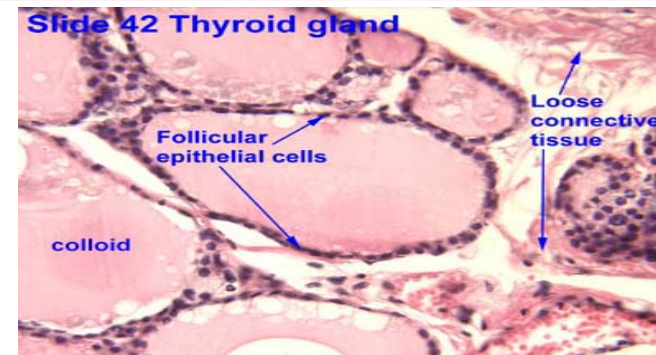
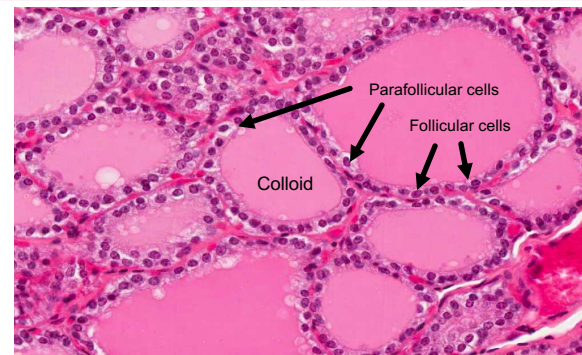
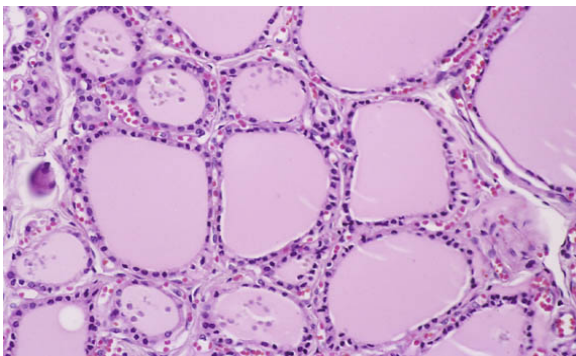
- 1- Simple cuboidal epithelium:

a- Follicular cells.

b- Parafollicular cells.

- 2- Colloid: central colloid-filled lumen. **Acidophil**  
gel like material

N.B. Each follicle is **surrounded by thin basal lamina**.

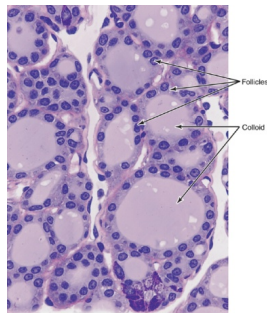


## FOLLICULAR (PRINCIPAL) CELLS

99.9% of the cells

L/M

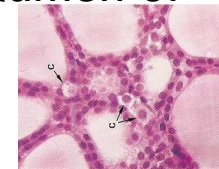
- Simple cuboidal cells
- **Round nucleus** with prominent nucleoli.
- Basophilic cytoplasm.
- Apical surface **reaches the lumen** of the thyroid follicle.



## PARAFOLLICULAR CELLS (CLEAR CELLS) (C-CELLS)

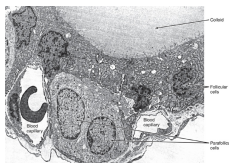
0.1% of the cells

- Pale-stained cells (Clear Cells).
- Are found singly or in clusters in between the follicular cells.
- Their apices **do not** reach the lumen of the lumen of the follicle.
- Are **larger than follicular cells** (2-3 times).
- Only 0.1% of the epithelial cells.
- Have round nucleus



E/M

- Mitochondria.
- **RER synthesis of thyroglobulin**
- Supranuclear Golgi Complex.
- Numerous apically-located lysosomes.
- Numerous dispersed small vesicles: contain **newly formed thyroglobulin**.
- Numerous apical short microvilli.



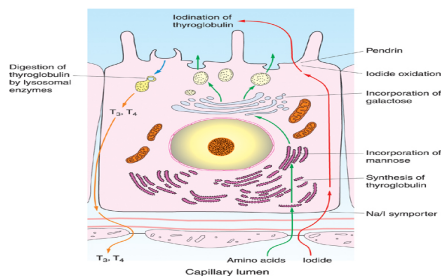
- Mitochondria.
- RER (moderate).
- Well-developed Golgi.



Function

**Synthesis of thyroid hormones (T4 & T3)**

**Secrete calcitonin.**



- Lysosomes are important because it has peroxidase enzyme which convert reduced iodine to iodine
- The secretory vesicles are Apical in thyroid gland and basal in parathyroid
- Calcitonin works with parathyroid hormone to balance the level of Ca<sup>++</sup> in the blood



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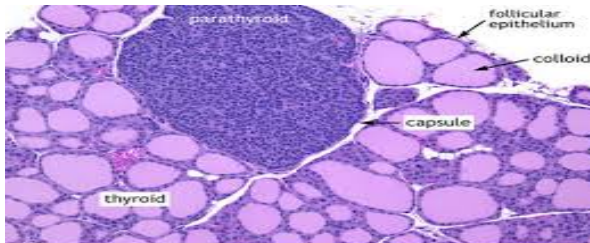
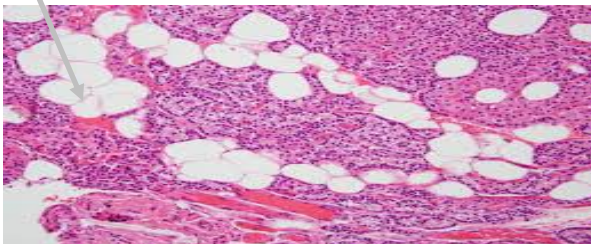
## ➤ Parathyroid Glands

They are 4 glands on the posterior of thyroid gland.

### Stroma

- 1- Capsule: Each gland has its thin capsule.
  - 2- Septa: thin.
  - 3- Reticular C.T.
- C.T. stroma in older adults often contains many adipose cells.

Adipose cells may increase with age

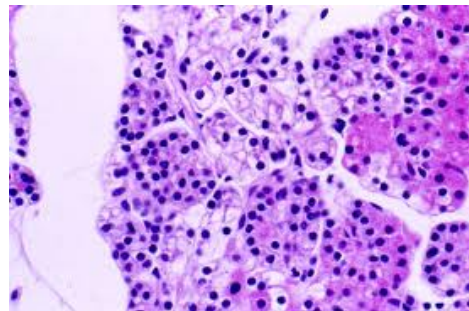


### Parenchyma

The parenchyma is formed of cords or clusters of epithelial cells (**chief cells & oxyphil cell**) with blood capillaries in between. These cells are surrounded by reticular fibers.

#### Chief cells

- are slightly eosinophilic.
  - are rich in rER.
- They secrete parathyroid hormone** (↑ blood calcium).



#### Oxyphil cells

- 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.





➤ **QUESTIONS:**

**Q1: What is the epithelium of thyroid follicles?**

- A) Simple columnar epithelium      B) Simple squamous epithelium  
C) Simple cuboidal epithelium      D) Simple stratified epithelium

**Q2: What type of cells is responsible for the secretion of T4 & T3?**

- A) Clear cells   B) Principal cells   C) Both of them   D) None of them

**Q3: What is the structure whose apices do NOT reach the follicle lumen?**

- A) Capsule      B) Follicular cells      C) Parafollicular cells      D) None

**Q4: What are the cells that can be found singly or in clusters?**

- A) Clear cells   B) Principal cells   C) None   D) All of them

**Q5: Which part of thyroid gland stroma, is thin CT with rich capillary plexus?**

- A) Septa      B) capsule      C) reticular fibers      D) none

**Q6: What is the cell responsible for the secretion of Calcitonin?**

- A) follicular cells      B) parafollicular cells      C) All of them      D) none

B -9  
C -5  
A -4  
C -3  
B -2  
C -1



**Q7: Which one of the following produce parathyroid hormone?**

A) Follicular cells B) Parafollicular cell C) chief cells D) oxyphil cells

**Q8: Which of the following is a Characteristic of oxyphil cells?**

A) Rich in rER B) abundant mitochondria  
C) smaller than chief cells D) slightly eosinophilic

**Q9: Which of the following is a Characteristic of chief cells?**

A) Rich in rER B) abundant mitochondria C) basophilic D) All of them

**Q10: Which of the following is not a histological structure found in parathyroid gland?**

A) Chief cells B) colloid C) reticular fibers D) oxyphil cells

**Q11: Which cell has an un-known function and has numerous mitochondria?**

A) Follicular cells B) Parafollicular cell C) chief cells D) oxyphil cells

D-11  
B-10  
A-9  
B-8  
C-7



### Team members :

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