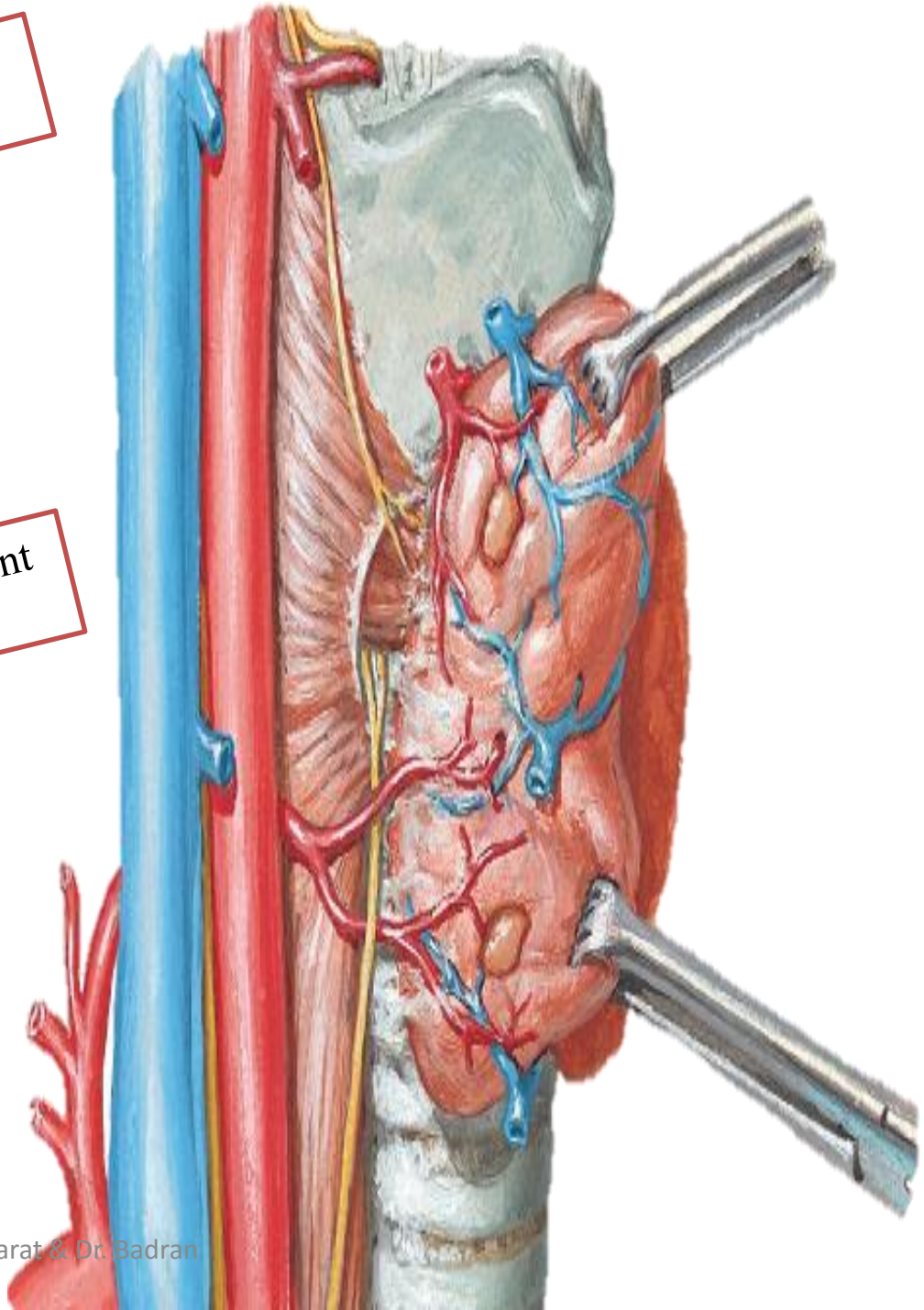
PARATHYROID GLAND

Gross anatomy

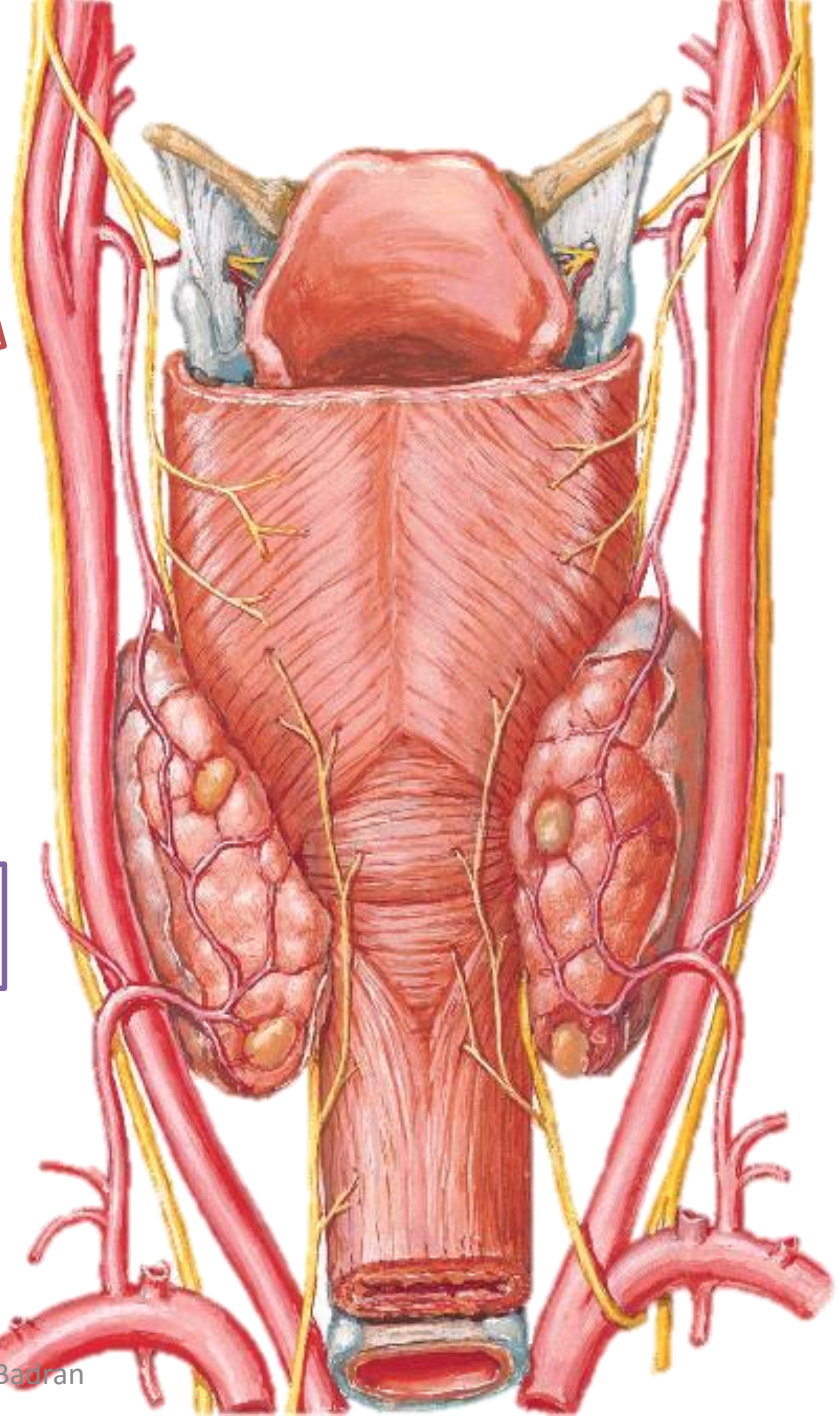
Superior glands usually dorsal to the external laryngeal nerve at level of cricoid cartilage

Inferior glands located ventral to the recurrent laryngeal nerve.



Most of the blood supply comes from branches of inferior thyroid artery, although branches from superior thyroid supply ~ 20% of the superior gland

Glands drain ipsillaterally by superior, middle, and inferior thyroid veins.



Embryology

In the fifth week, epithelium ***of the dorsal wing*** of the third pouch differentiates into **INFERIOR PARATHYROID GLAND** **while** the ***ventral wing*** forms **THE THYMUS**

Both gland primordia lose their connection with the pharyngeal wall, and the thymus then migrates in a caudal and a medial direction, pulling the **inferior parathyroid with it**

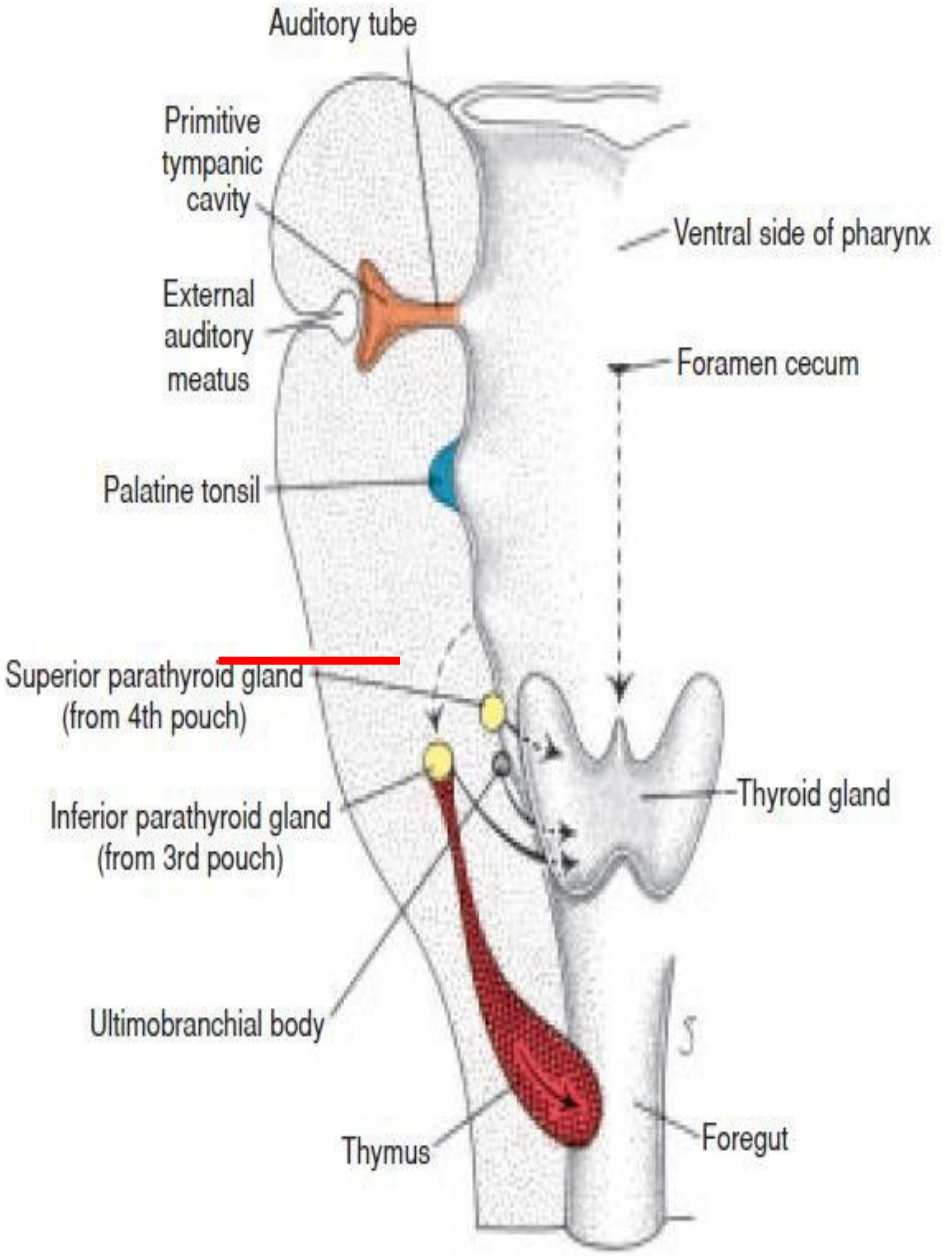


Figure 15.11 Migration of the thymus, parathyroid glands, and ultimobranchial body. The thyroid gland originates in the midline at the level of the foramen cecum and descends to the level of the first tracheal rings.

Epithelium of the dorsal wing of the fourth pharyngeal pouch forms
THE SUPERIOR PARATHYROID GLAND

When the parathyroid gland loses contact with the wall of the pharynx, it attaches itself to the dorsal surface of the caudally migrating *thyroid* as the superior parathyroid gland

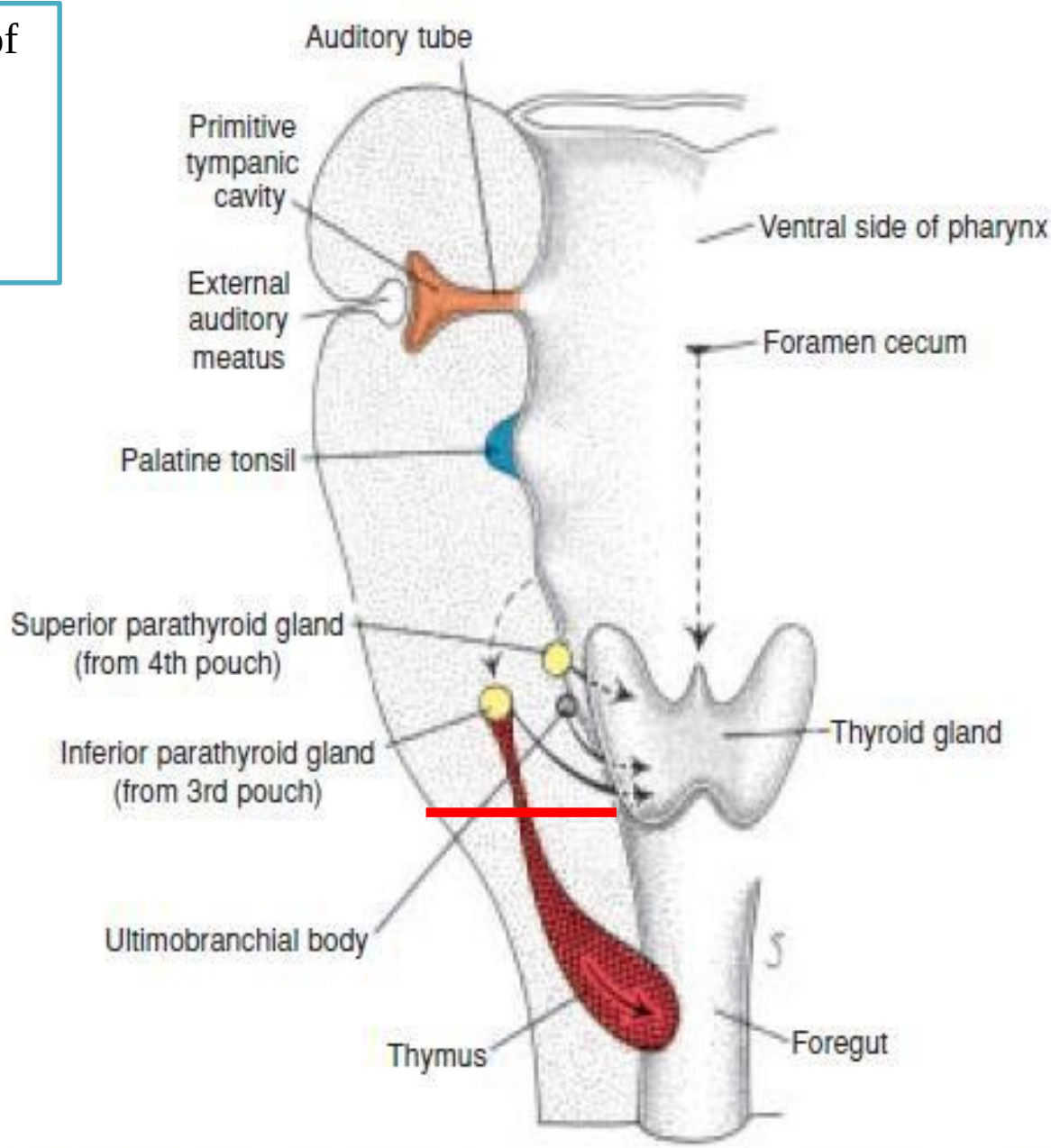


Figure 15.11 Migration of the thymus, parathyroid glands, and ultimobranchial body. The thyroid gland originates in the midline at the level of the foramen cecum and descends to the level of the first tracheal rings.

The inferior parathyroid glands occasionally migrate to the level of the aortic arch or, rarely, fail to migrate, remaining in the high neck.

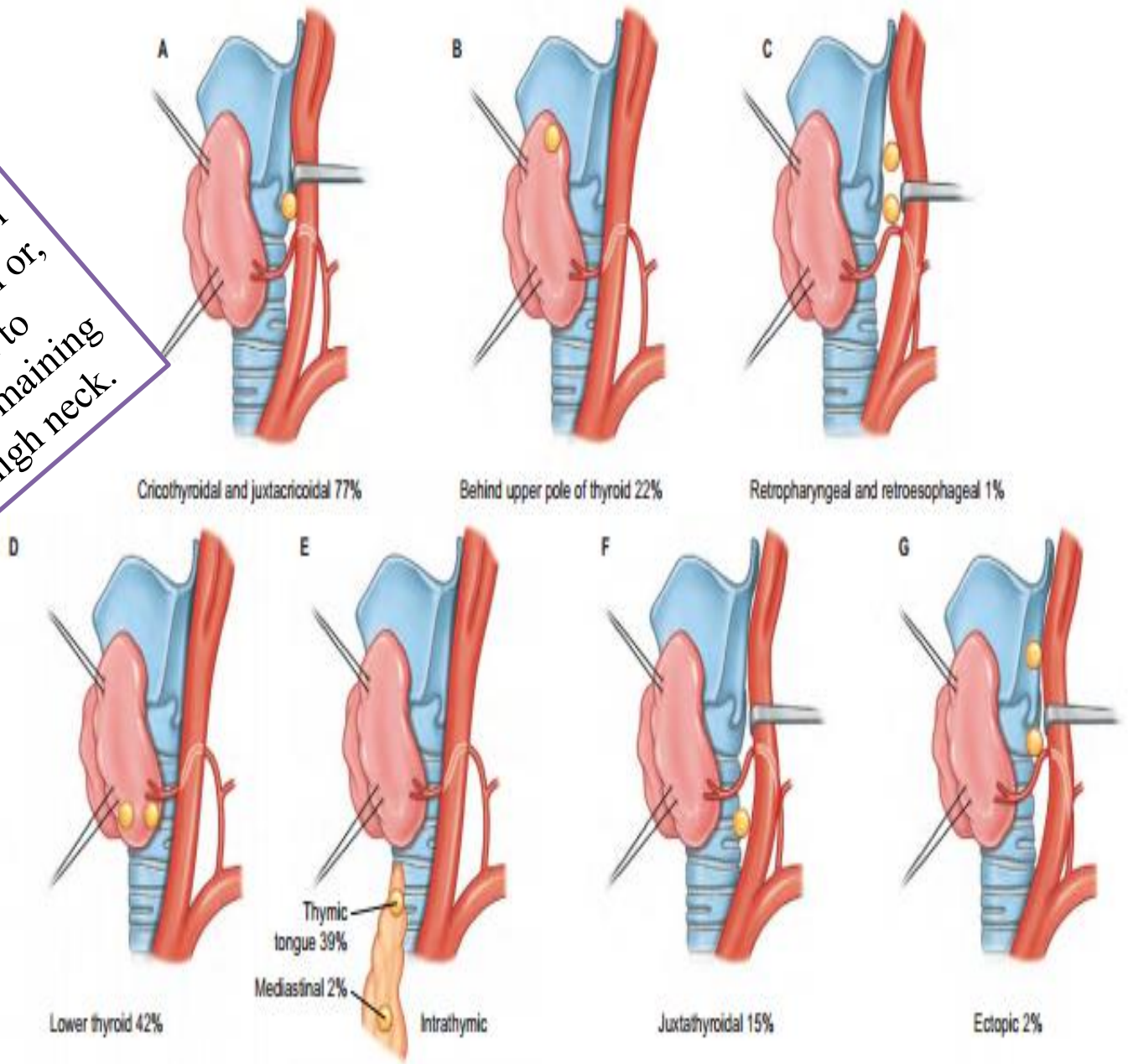
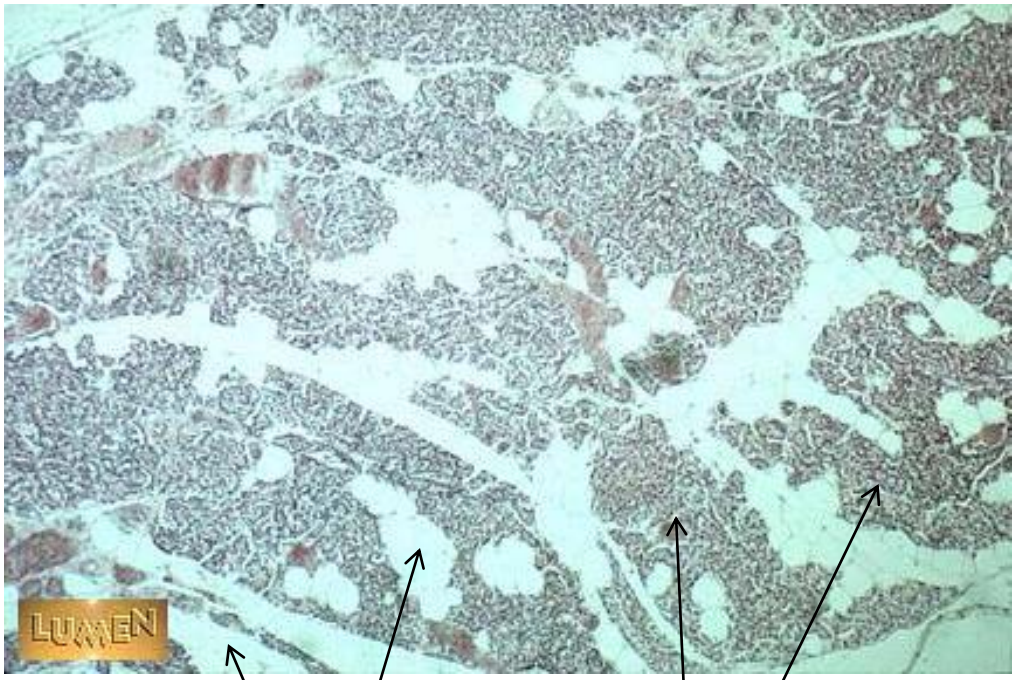


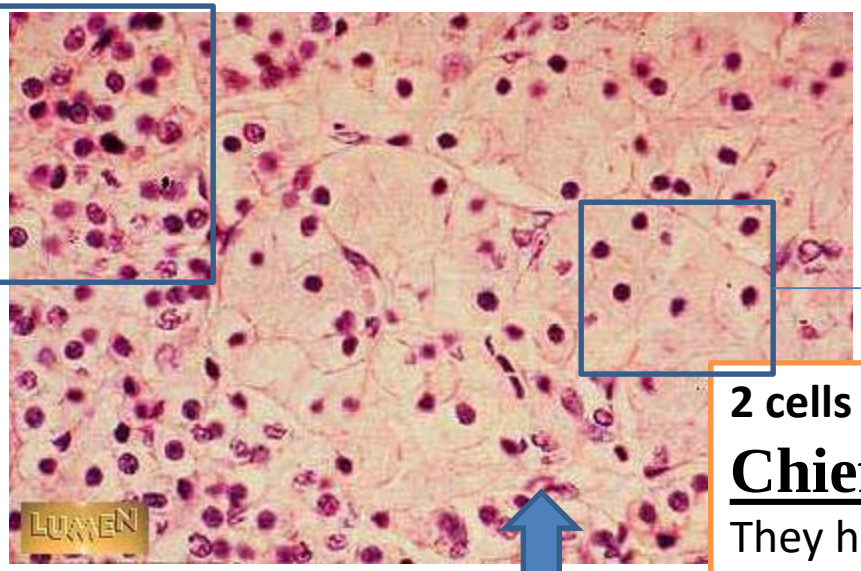
Fig. 28.23 Distribution of superior (**A–C**) and inferior (**D–G**) parathyroid glands. **A**, Cricothyroidal and juxtathyroidal; **B**, Behind upper pole of thyroid; **C**, Retropharyngeal and retroesophageal; **D**, Lower thyroid; **E**, Intrathymic; **F**, Juxtathyroidal; **G**, Ectopic.

Parathyroid Gland – low power



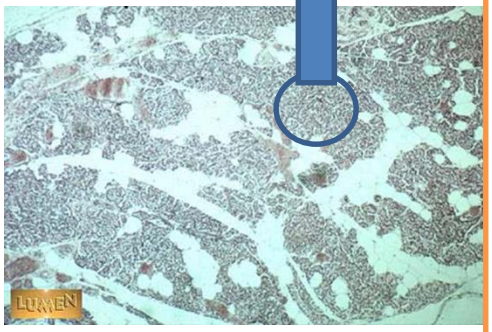
Low power of parathyroid, showing random cords of cells. The parathyroid is somewhat lobulated in appearance and considerable adipose tissue is intermingled with secretory portions.

Parathyroid Gland – high power



Chief cells

Oxyphil cells

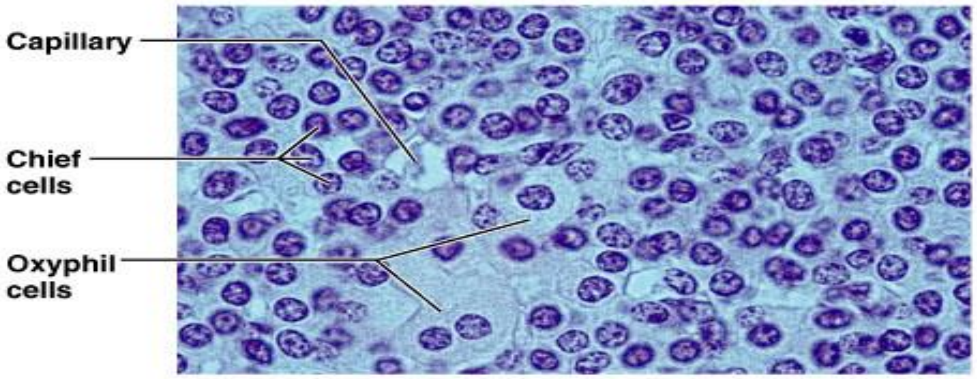


2 cells types of the Parathyroid:

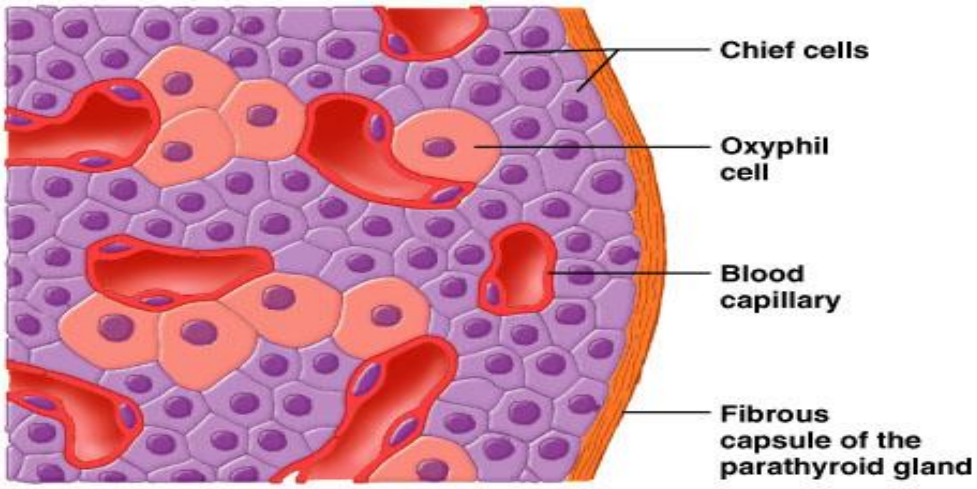
Chief cells secrete parathormone (PTH). They have large round nuclei with a small amount of clear cytoplasm.

Oxyphil cells have smaller, darker nuclei and relatively larger amount of cytoplasm. The significance of the oxyphil cells is not clear.

Some oxyphil cells show low levels of PTH synthesis, suggesting that these cells are transitional derivatives of principal cells.



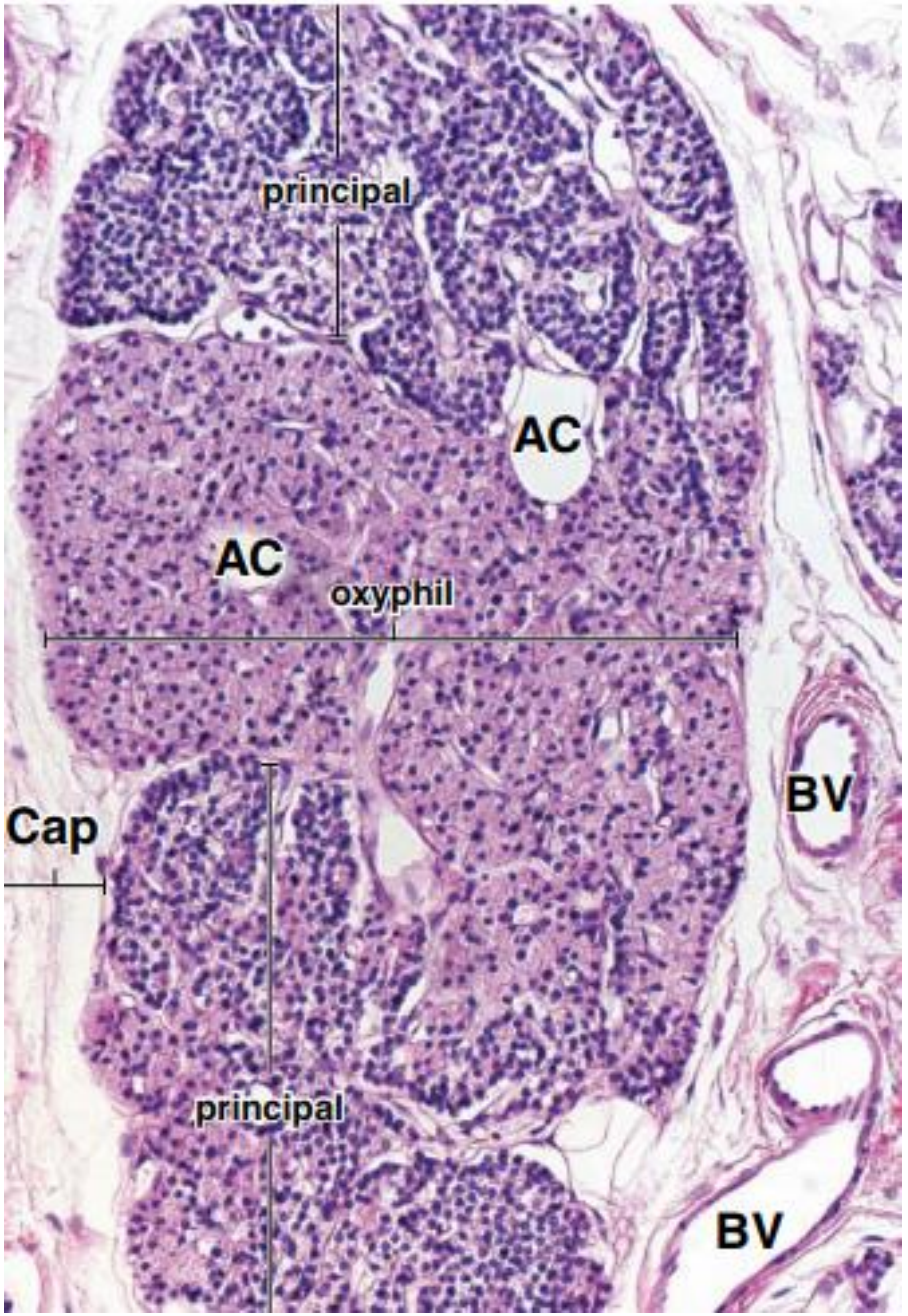
(b)



(c)

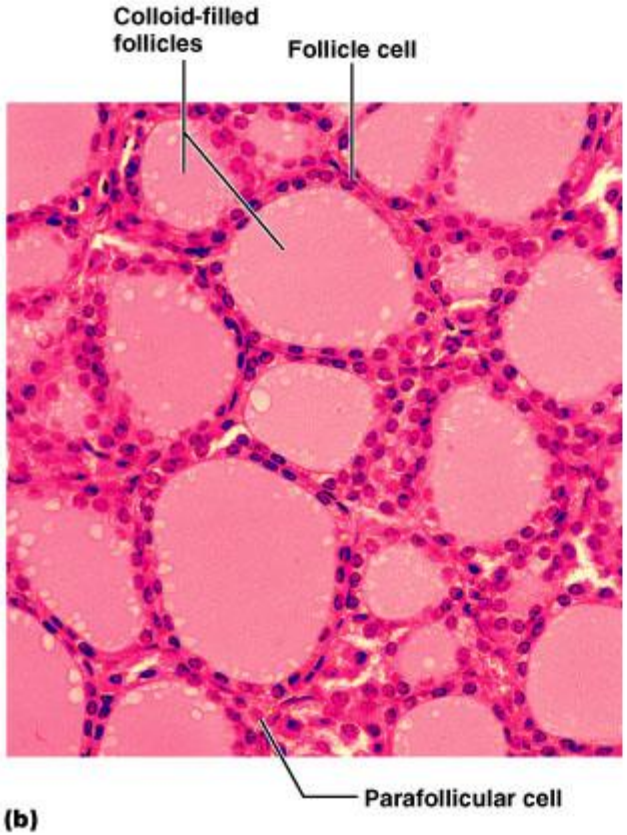
Read only

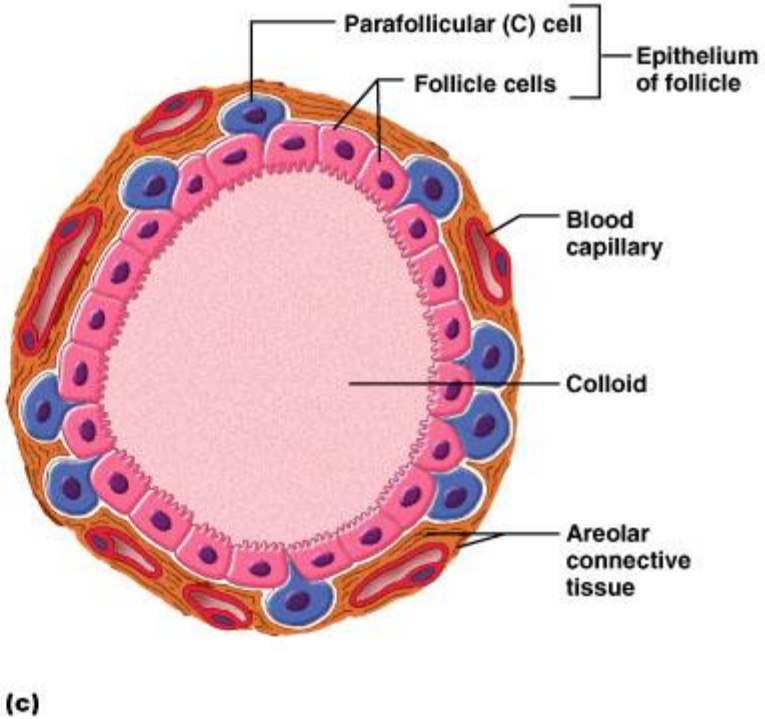
• Photomicrograph of human parathyroid gland. This H&E–stained specimen shows the gland with part of its connective tissue capsule (Cap). The blood vessels (BV) are located in the connective tissue septum between lobes of the gland. The principal cells are arranged in two masses (top and bottom) and are separated by a large cluster of oxyphil cells (center).
The oxyphil cells are the larger cell type with prominent eosinophilic cytoplasm. They may occur in small groups or in larger masses, as seen here. The principal cells are more numerous. They are smaller, having less cytoplasm, and consequently exhibit closer proximity of their nuclei. Adipose cells (AC) are present in variable, although limited, numbers



THYROID GLAND

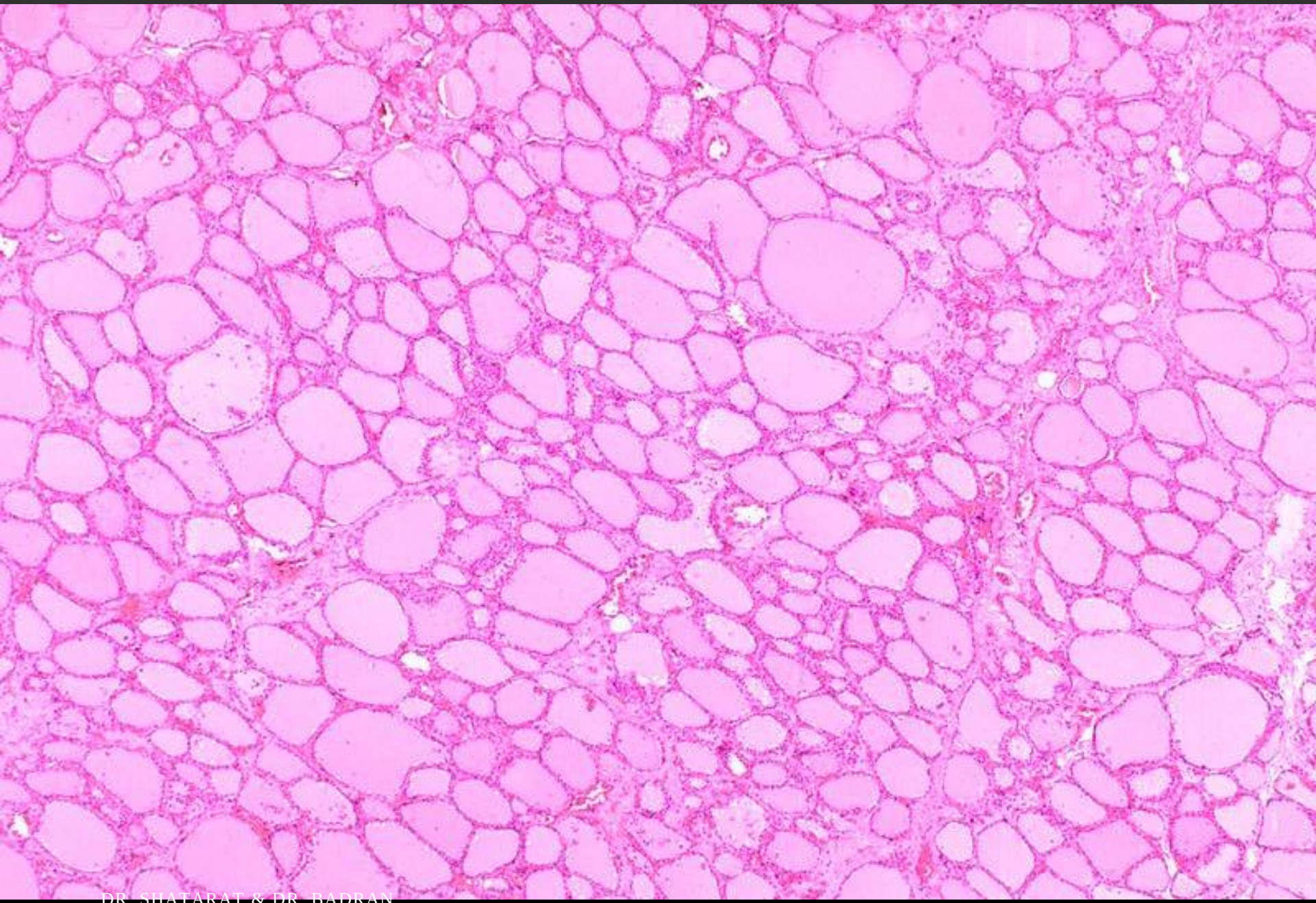
The thyroid gland is the only endocrine gland that stores its secretory product in large quantities—normally about a 100-day supply.

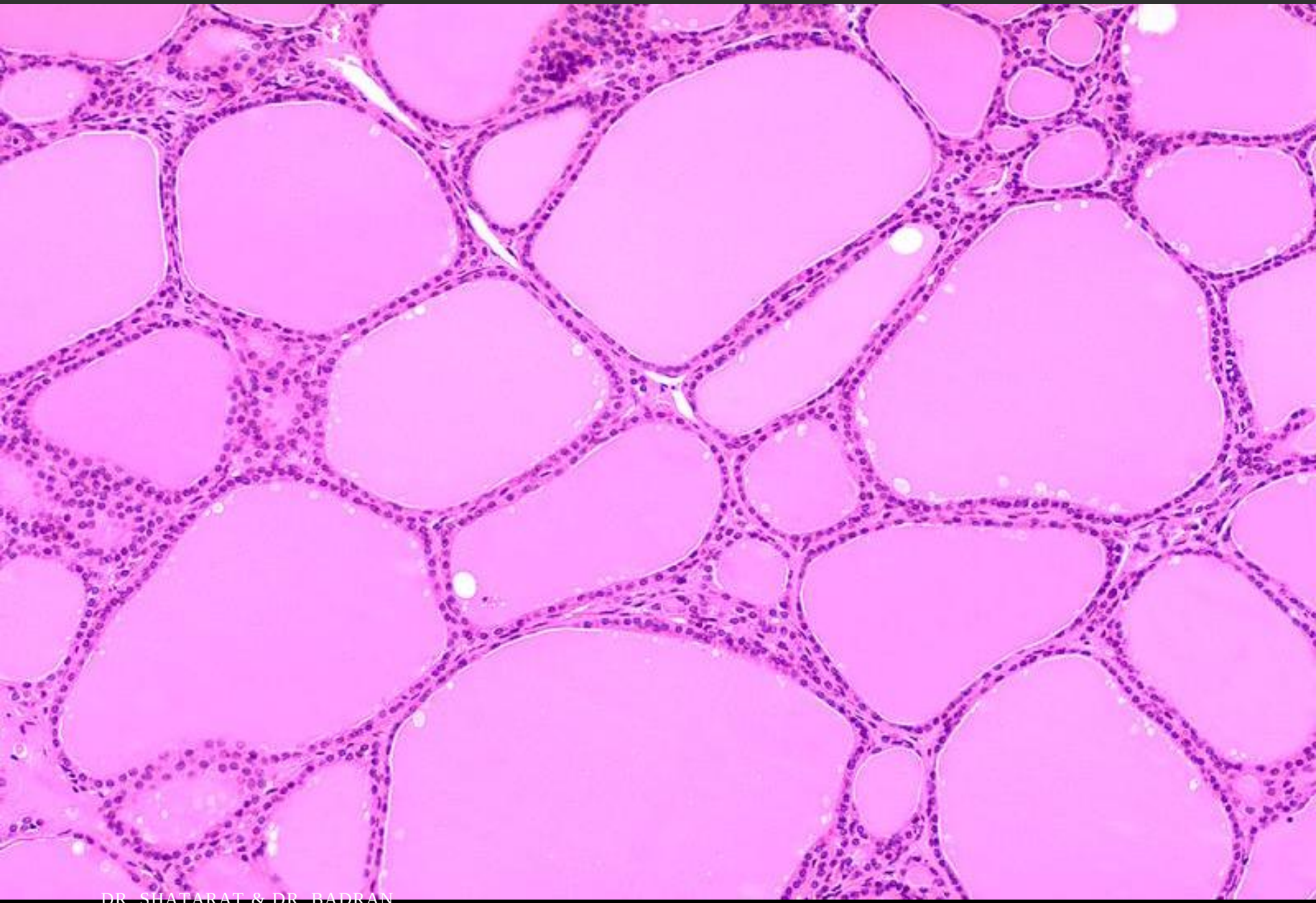




Thyroid follicle:

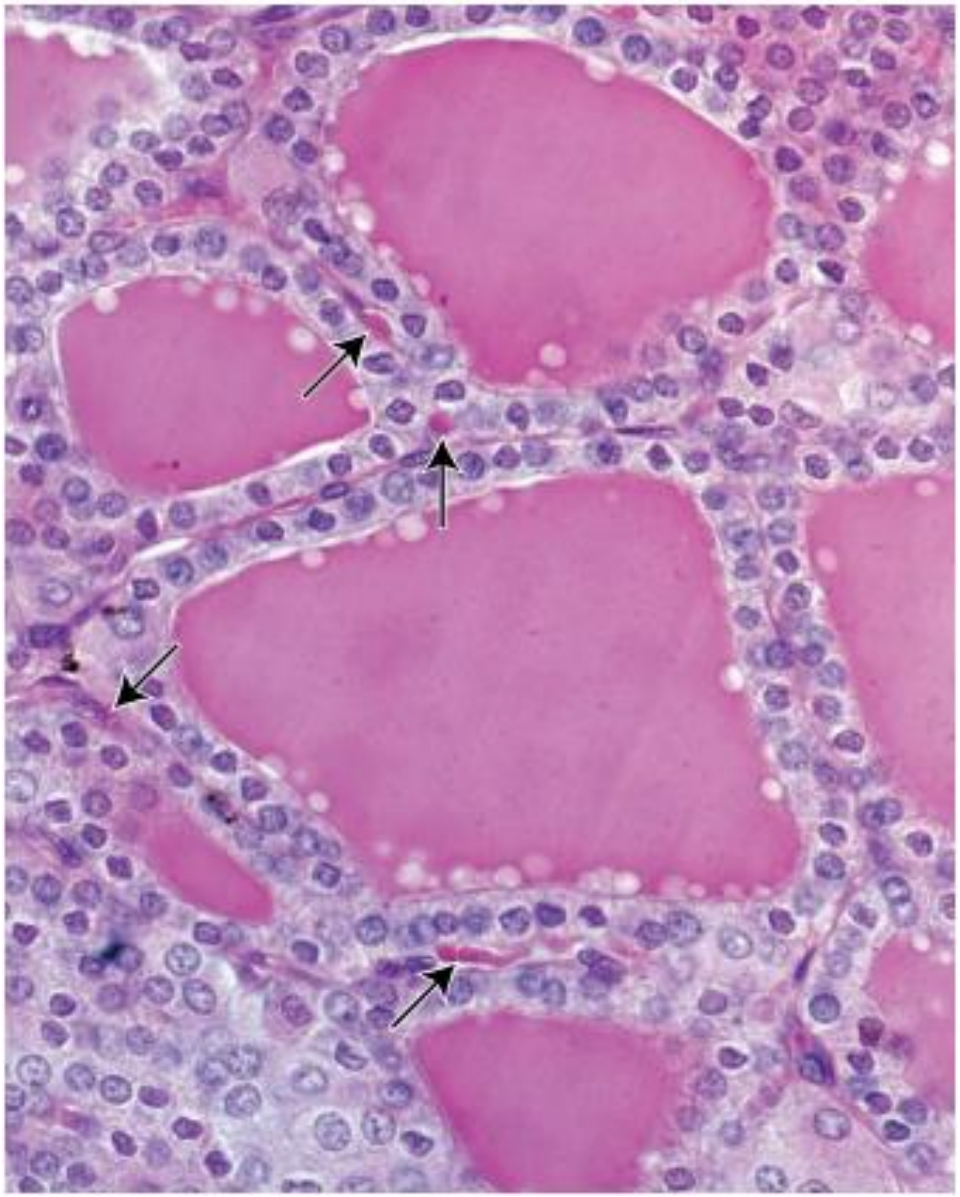
- The structural and functional unit of the thyroid gland.
- Consists of a group of cells resting on the same basal lamina surrounding a lumen filled with colloid.
- The follicles are variable in size.
- Hormones are stored in the follicles.
- Each follicle is surrounded by variable amount of connective tissue.





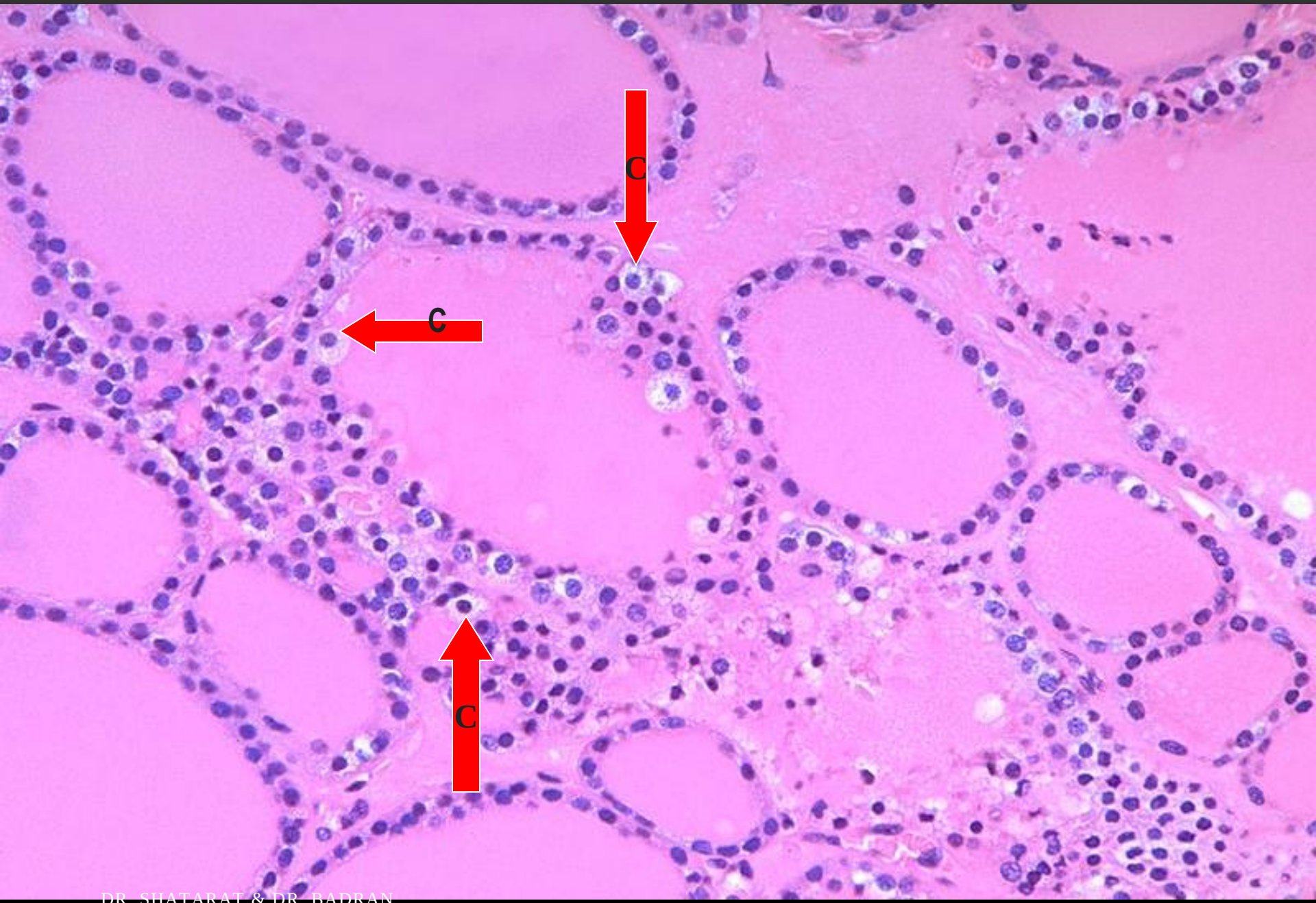
Follicular cells (principal cells):

- Squamous-columnar cells according to activity.
- Basophilic cytoplasm.
- Nucleus: round-ovoid with 2 nucleoli.
- Many rER.
- Numerous apical lysosomes and mitochondria.
- Supranuclear Golgi complex.
- Apical microvilli.
- Numerous vesicles in the cytoplasm.

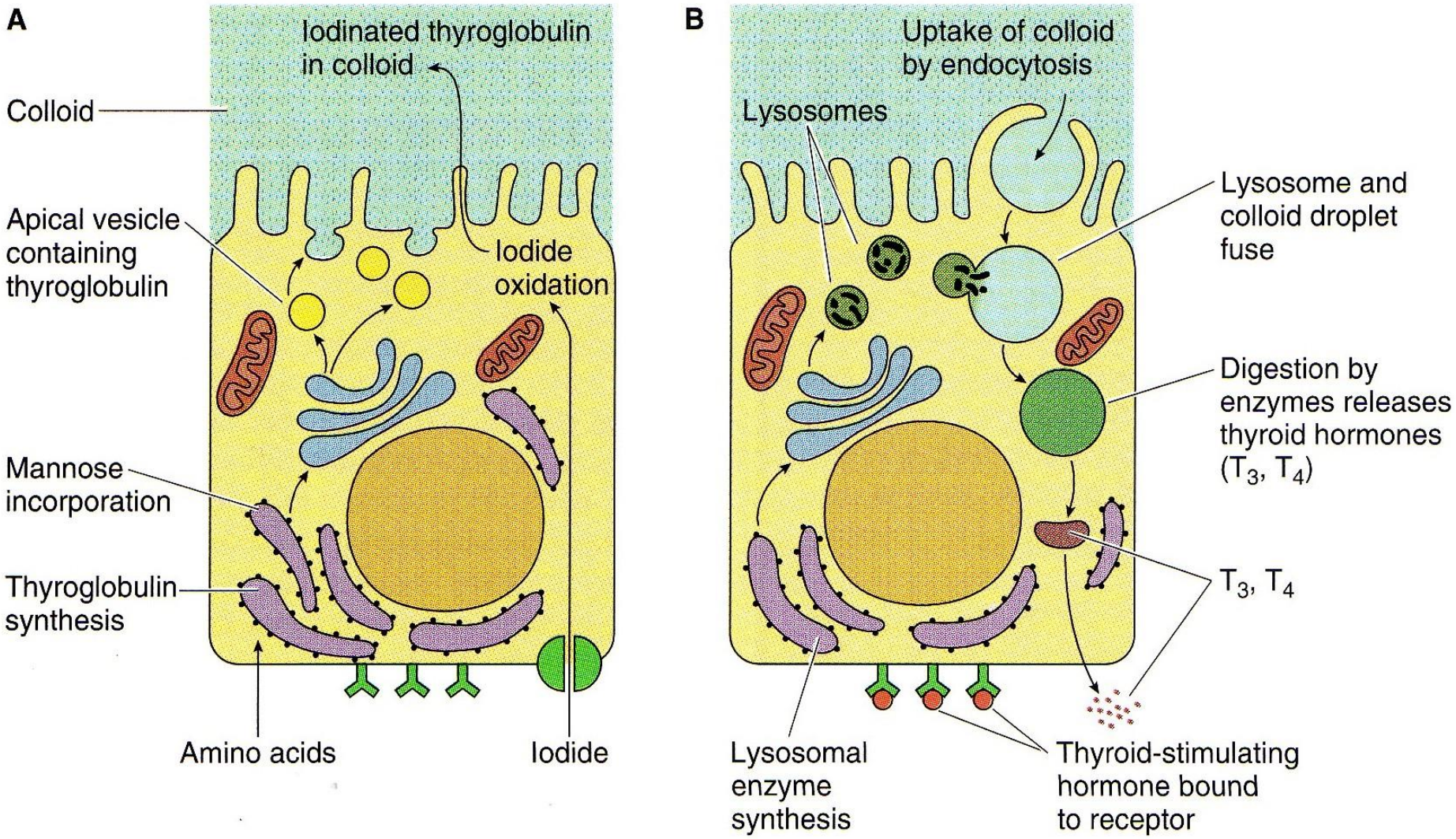


Parafollicular cells (Clear cells, C cells):

- Pale staining, larger than follicular cells.
- Occur singly or in clusters among follicular cells.
- Overlapped by follicular cells.
- E.M:
  - Moderate rER.
  - Well-developed Golgi.
  - small, dense, basal secretory granules.
- Secrete calcitonin:
  - Inhibits bone resorption by osteoclasts.
  - Stimulated when Ca^2 is high.


C
C
C


Thyroid Gland
H&E
lobule
follicles
interlobular
connective tissue


A
Iodinated thyroglobulin in colloid
Colloid
Apical vesicle containing thyroglobulin
Iodide oxidation
Mannose incorporation
Thyroglobulin synthesis
Amino acids
Iodide
B
Uptake of colloid by endocytosis
Lysosomes
Lysosome and colloid droplet fuse
Digestion by enzymes releases thyroid hormones (T_3, T_4)
T_3, T_4
Lysosomal enzyme synthesis
Thyroid-stimulating hormone bound to receptor


Ask patient to
protrude their tongue
Why


Observe movement of any masses...
No movement
Thyroid gland mass
Lymph node
Upward movement
Thyroglossal cyst


PERCUSSION


Percuss to detect any retrosternal dullness
(e.g. large goitre extending inferiorly)