

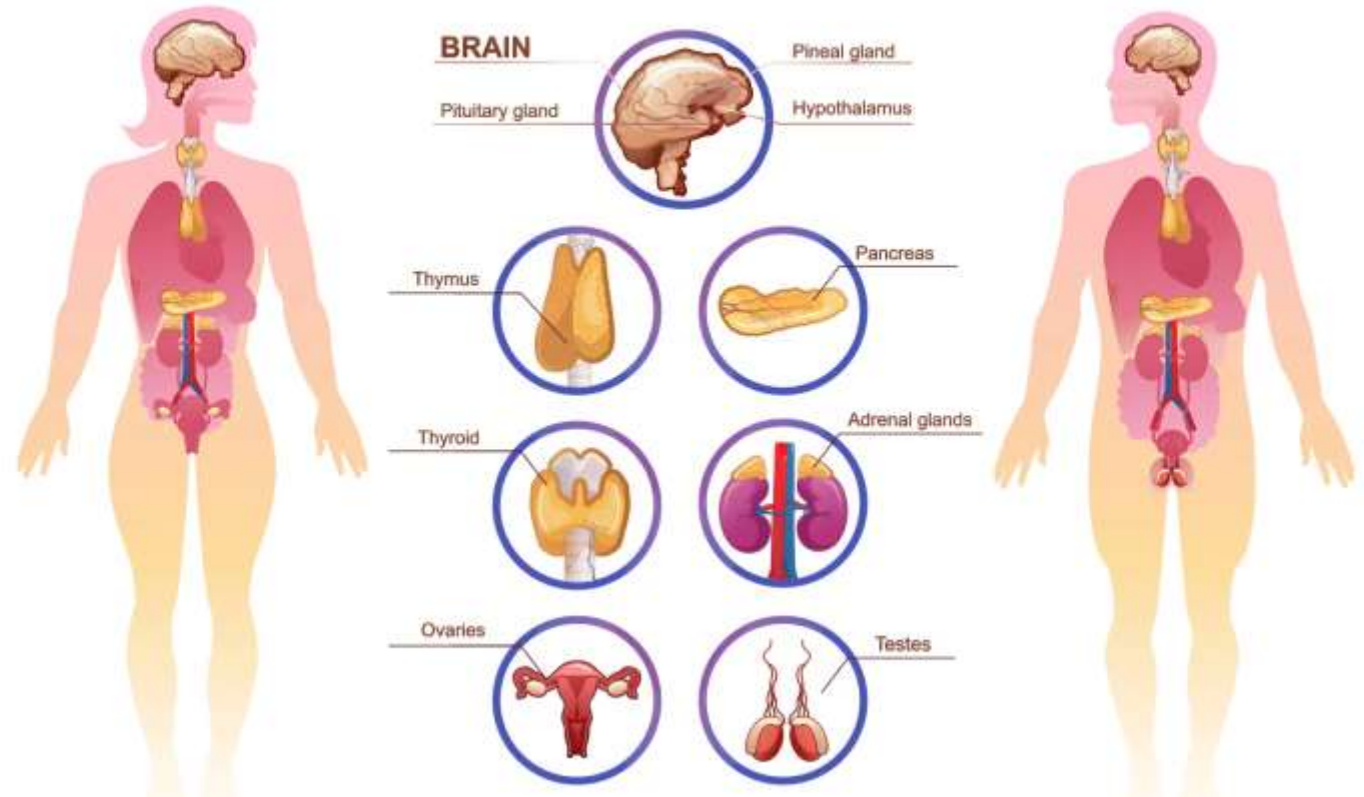
# HISTOLOGY OF PITUITARY, THYROID AND PARATHYROID

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## Endocrine System

The endocrine system is a system of cellular communication. The means of communication is via hormones. The hormones are secreted by ductless glands directly into the bloodstream. Generally, the response to hormones is non-localized.

## ENDOCRINE SYSTEM



If a gland secretes its product through a duct, it is an exocrine gland.

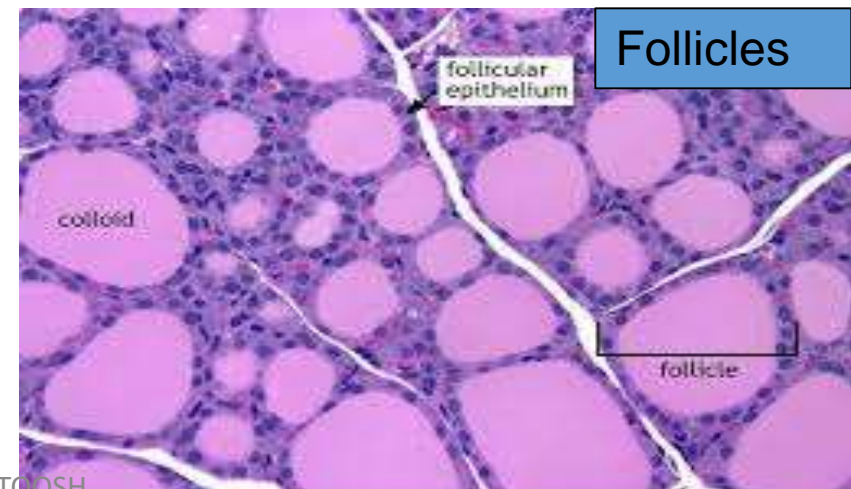
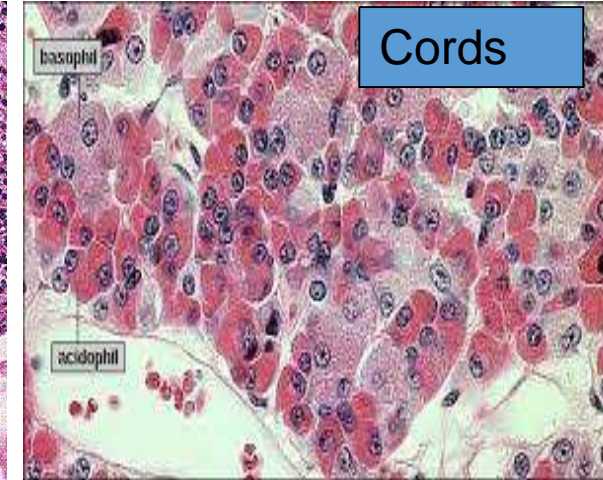
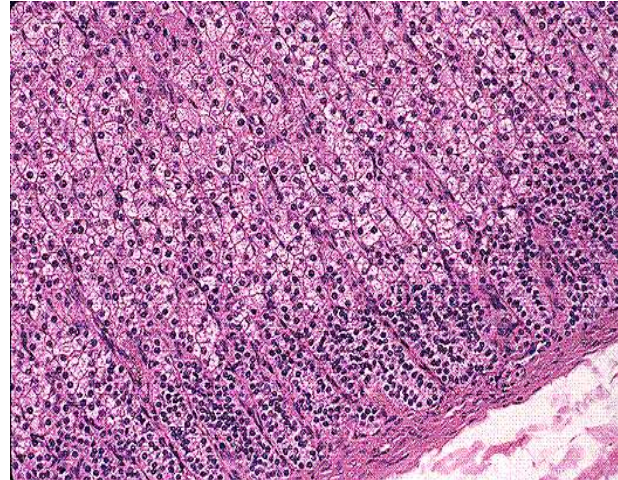
# Basic structure of endocrine glands

## ❑ Stroma

- ❑ CT inside the gland
- ❑ CT capsule
- ❑ Loose tissue

## ❑ Plexus of blood vessels

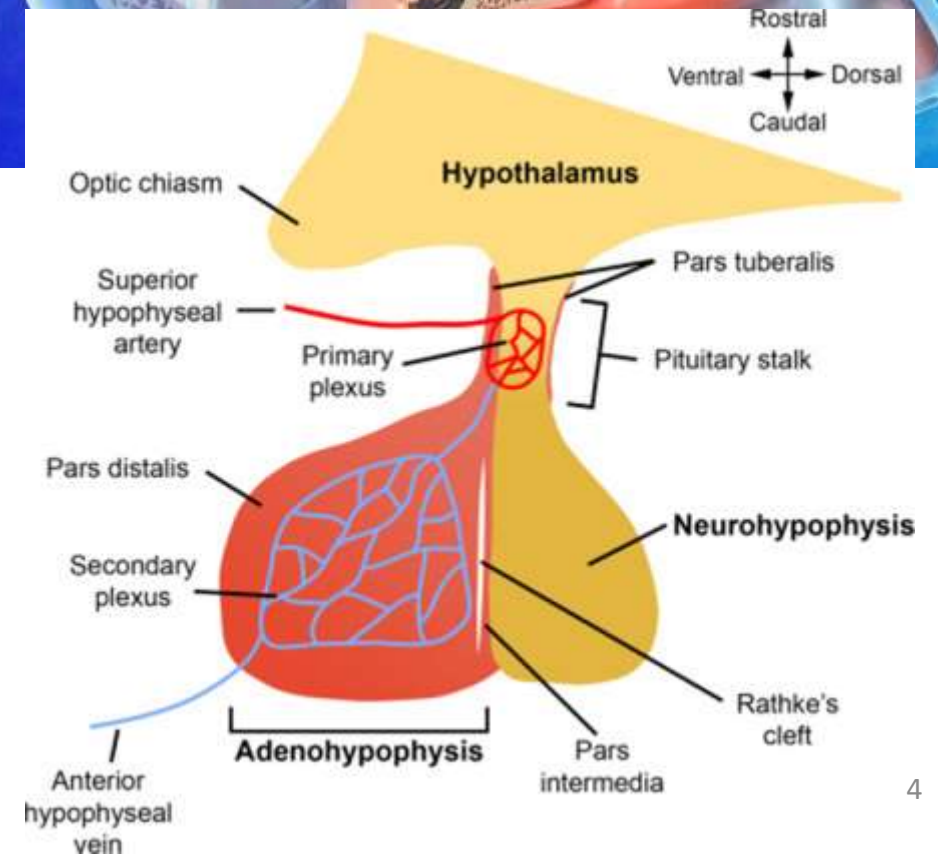
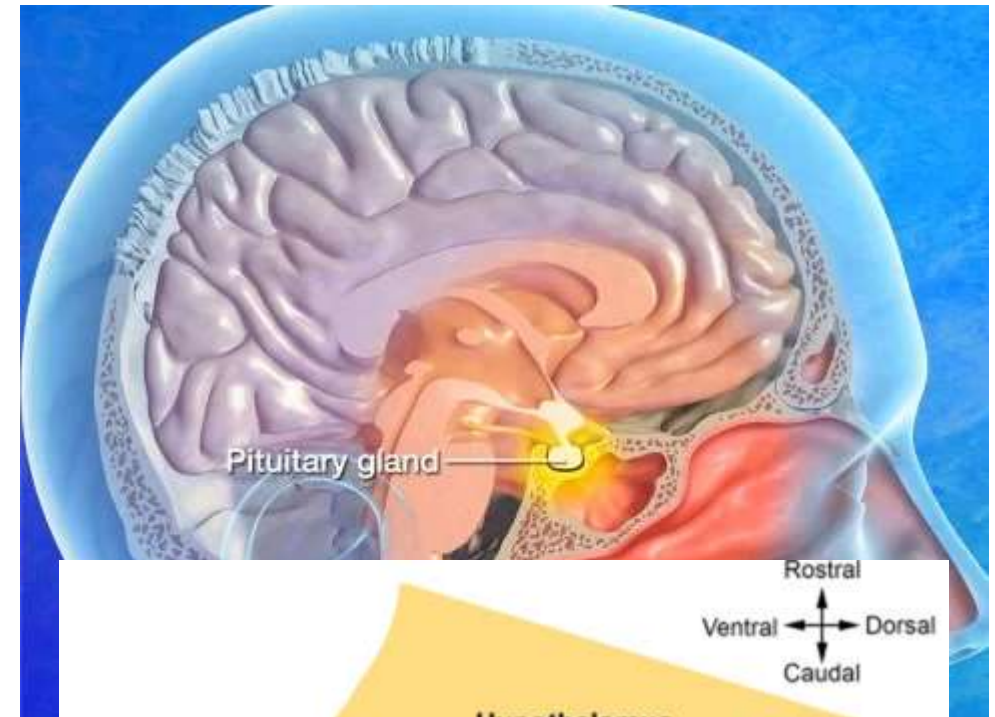
## ❑ Parenchyma= cells





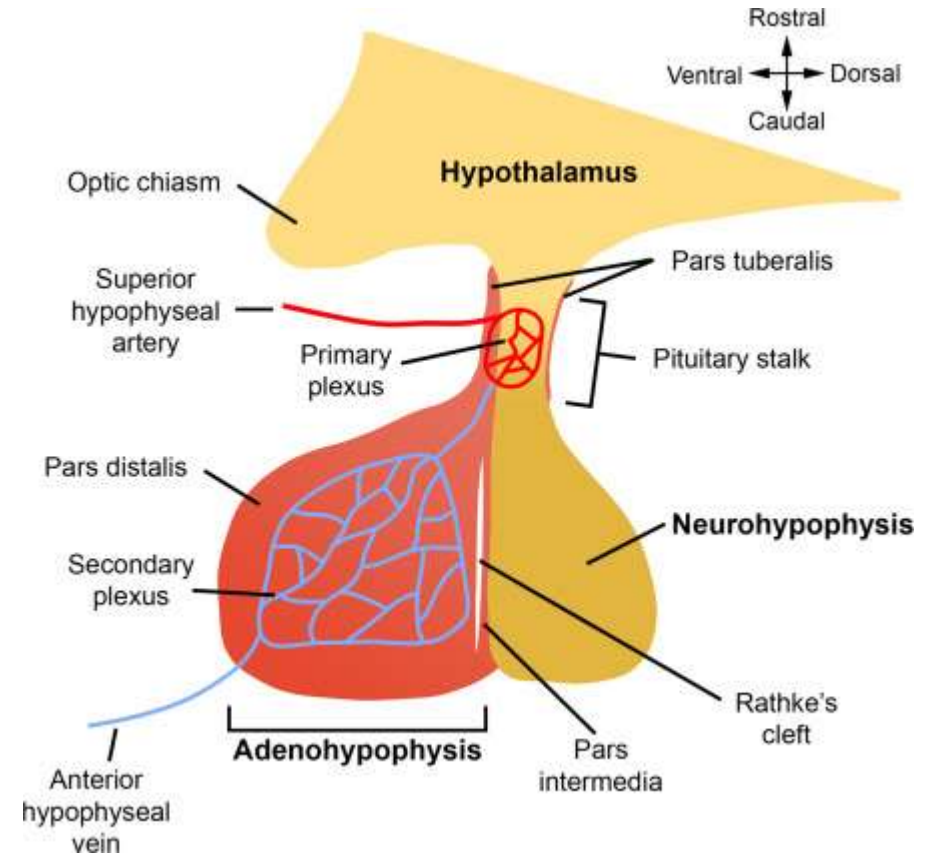
# Pituitary

- ❖ The pituitary is nicknamed the master gland. The infundibulum connects the pituitary to the hypothalamus.
- ❖ The pituitary can be subdivided into the neurohypophysis. and the adenohypophysis.
- ❖ The neurohypophysis can be further sub-divided into the:
  - ✓ pars nervosa, The pars nervosa is the posterior lobe.
  - ✓ infundibular stalk,
  - ✓ and median eminence
- ❑ The neurohypophysis secretes two hormones: OXYTOCIN and ANTIDIURETIC hormone.



The adenohypophysis can be further sub-divided into the:

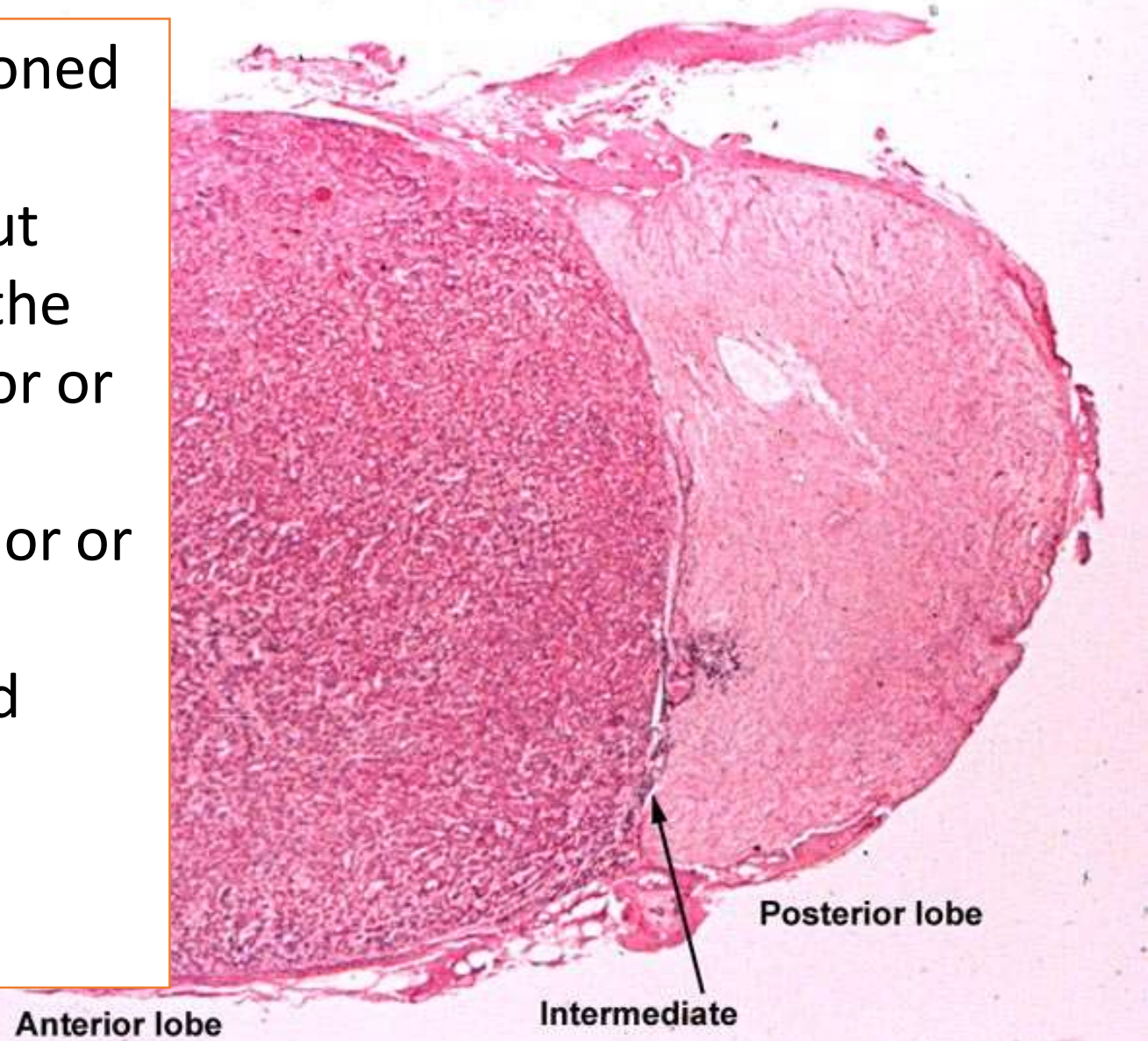
- ✓ pars distalis, The pars distalis is the anterior lobe of the pituitary
  - ✓ pars intermedia,
  - ✓ and pars tuberalis..
- ❖ The adenohypophysis (more specifically, the pars distalis of the adenohypophysis) secretes tropic hormones. Tropic hormones affect cellular activity in their target organ.
- ☐ There are several cell types in the pars distalis (anterior pituitary).
- ✓ Lactotropic cells secrete prolactin.
  - ✓ Thyrotropic cells secrete thyroid stimulating hormone (TSH).
  - ✓ Somatotropic cells secrete growth hormone.
  - ✓ Corticotropic cells secrete adrenocorticotrophic hormone (ACTH) and
  - ✓ melanocyte-stimulating hormone (MSH).
  - ✓ Gonadotropic cells secrete follicle stimulating hormone (FSH) and luteinizing hormone (LH).



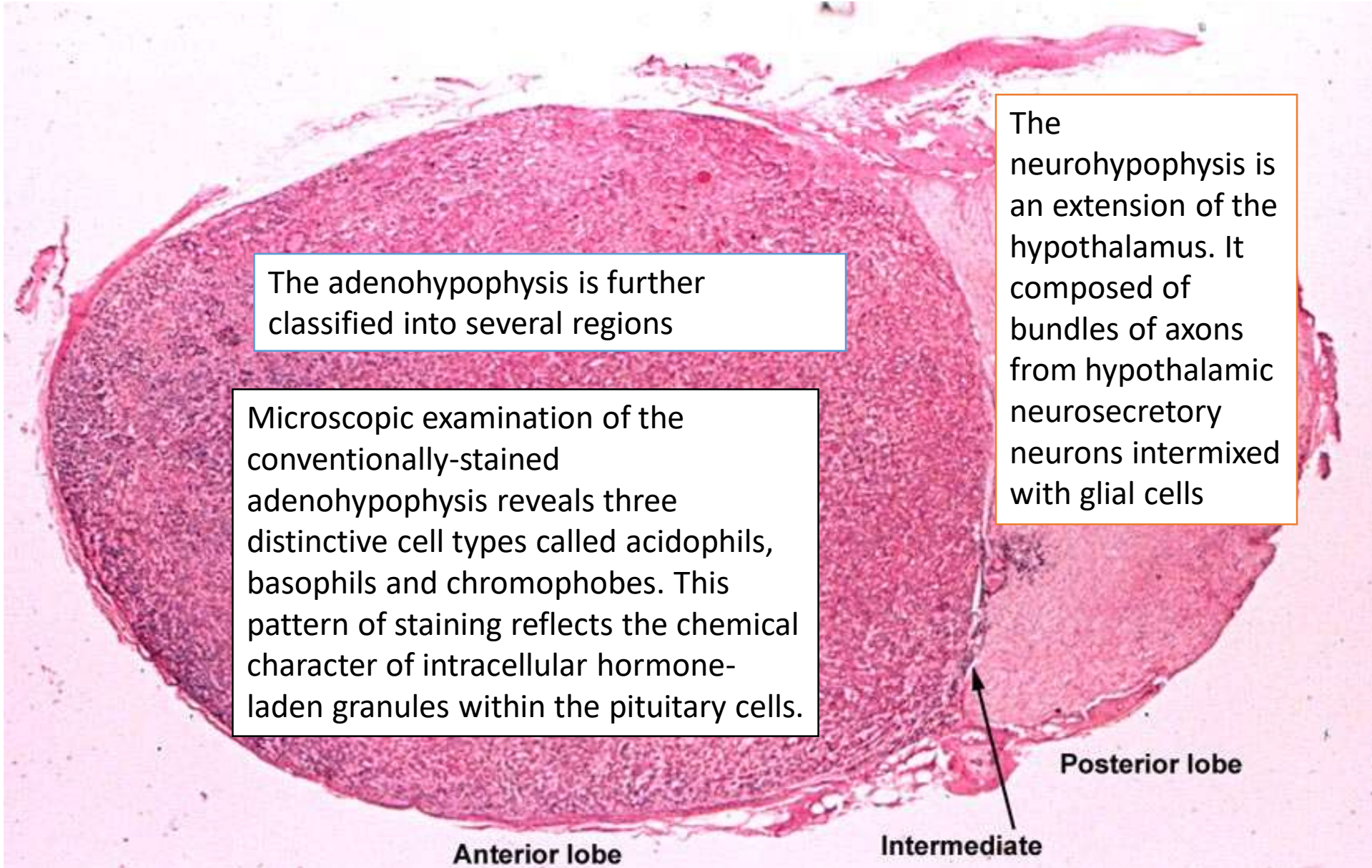
# Pituitary gland

Close examination of a sectioned pituitary gland reveals:

- ✓ **TWO** closely apposed, but distinctive tissues called the adenohypophysis (anterior or glandular pituitary) and neurohypophysis (posterior or neural pituitary).
- ✓ The adenohypophysis and neurohypophysis have separate embryological origins.







The adenohypophysis is further classified into several regions

Microscopic examination of the conventionally-stained adenohypophysis reveals three distinctive cell types called acidophils, basophils and chromophobes. This pattern of staining reflects the chemical character of intracellular hormone-laden granules within the pituitary cells.

The neurohypophysis is an extension of the hypothalamus. It composed of bundles of axons from hypothalamic neurosecretory neurons intermixed with glial cells

Anterior lobe

Intermediate

Posterior lobe

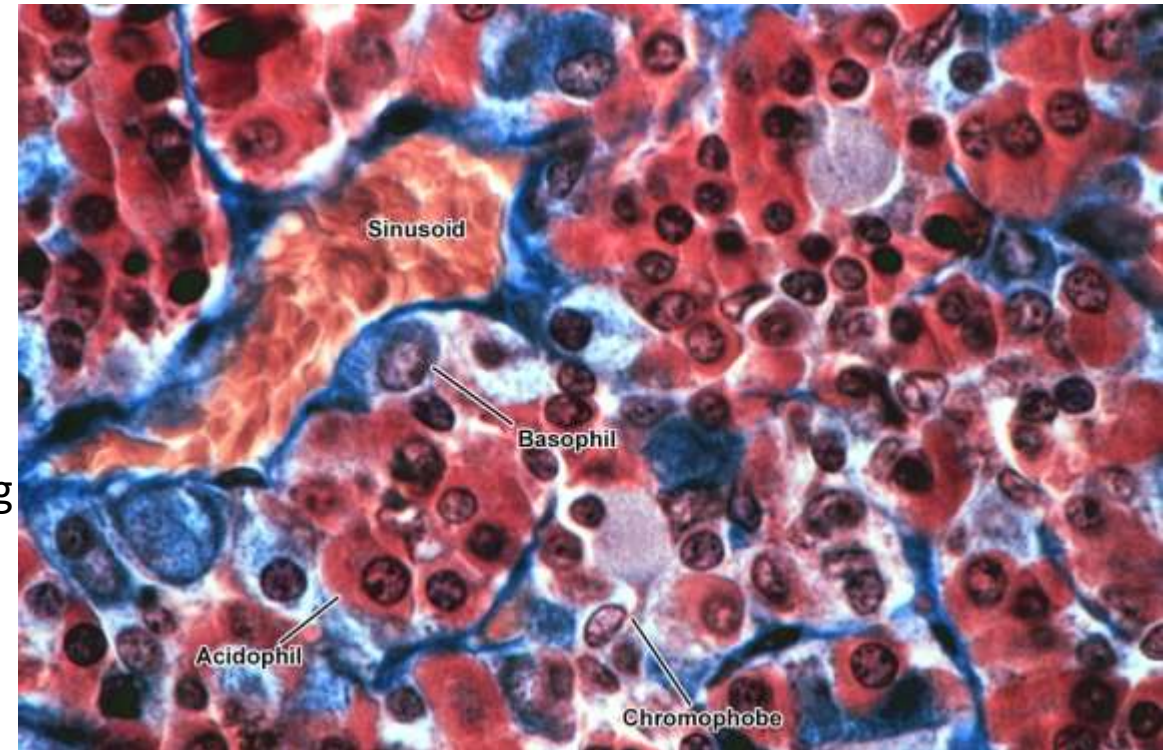
# Anterior pituitary (trichrome stain)

- ✓ The cells of the pars distalis (anterior pituitary) can be classified as acidophils or basophils depending on their affinity for acid or basic dyes, respectively.
- ✓ The **ACIDOPHILS** are the somatotrophic cells and the lactotrophic cells. Thus, growth hormone and prolactin are secreted by acidophilic cells.
- ✓ The **BASOPHILS** are the gonadotrophic cells, corticotrophic cells and thyrotrophic cells. Thus, the basophils secrete FSH, LH, ACTH, and TSH.

Histology hint: There are two mnemonics to use when thinking of acidophils and basophils of the anterior pituitary.

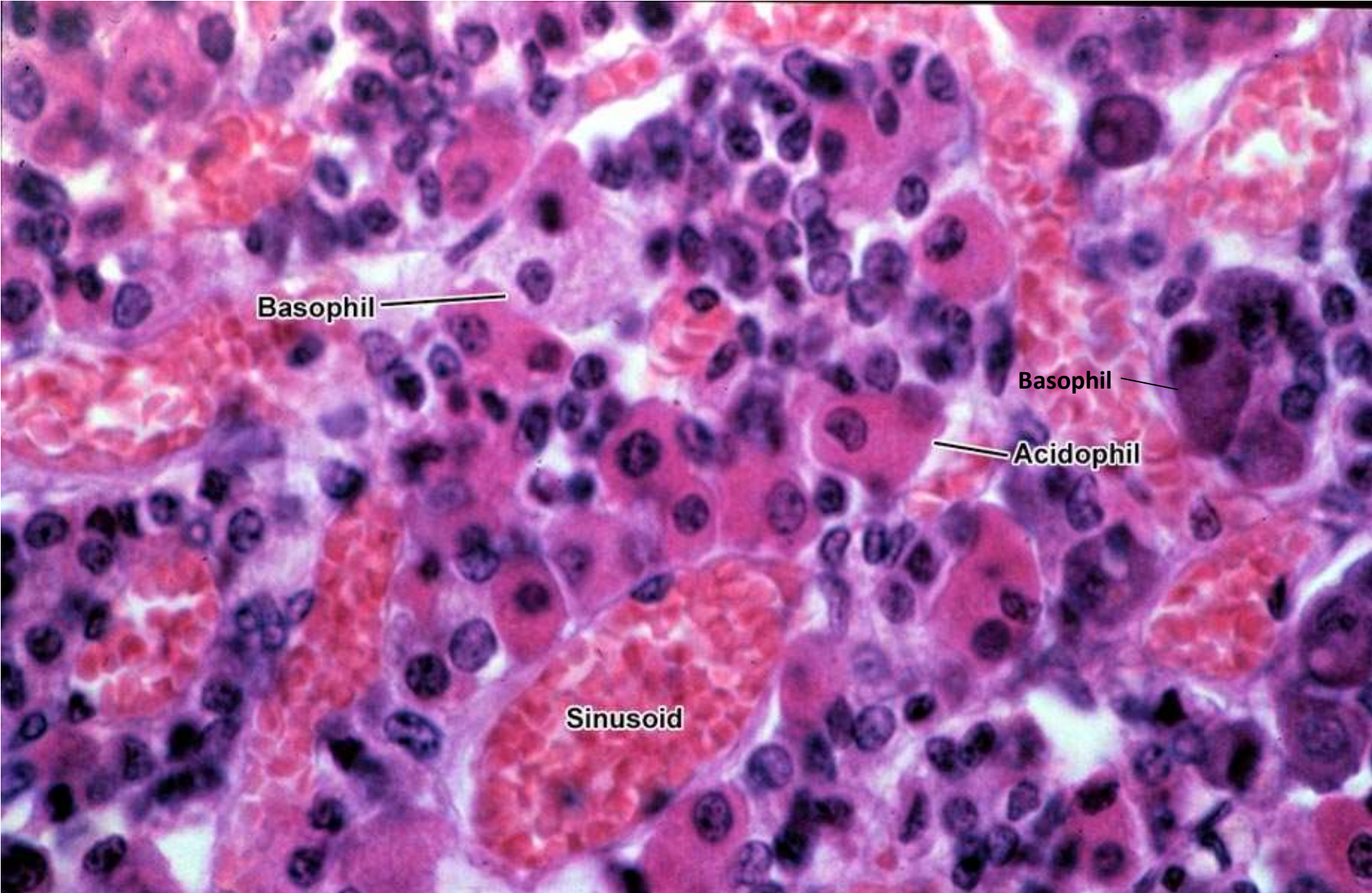
"GPA" (growth hormone and prolactin are secreted by the acidophils).

"B-FLAT" (basophils secrete FSH, LH, ACTH, and TSH).





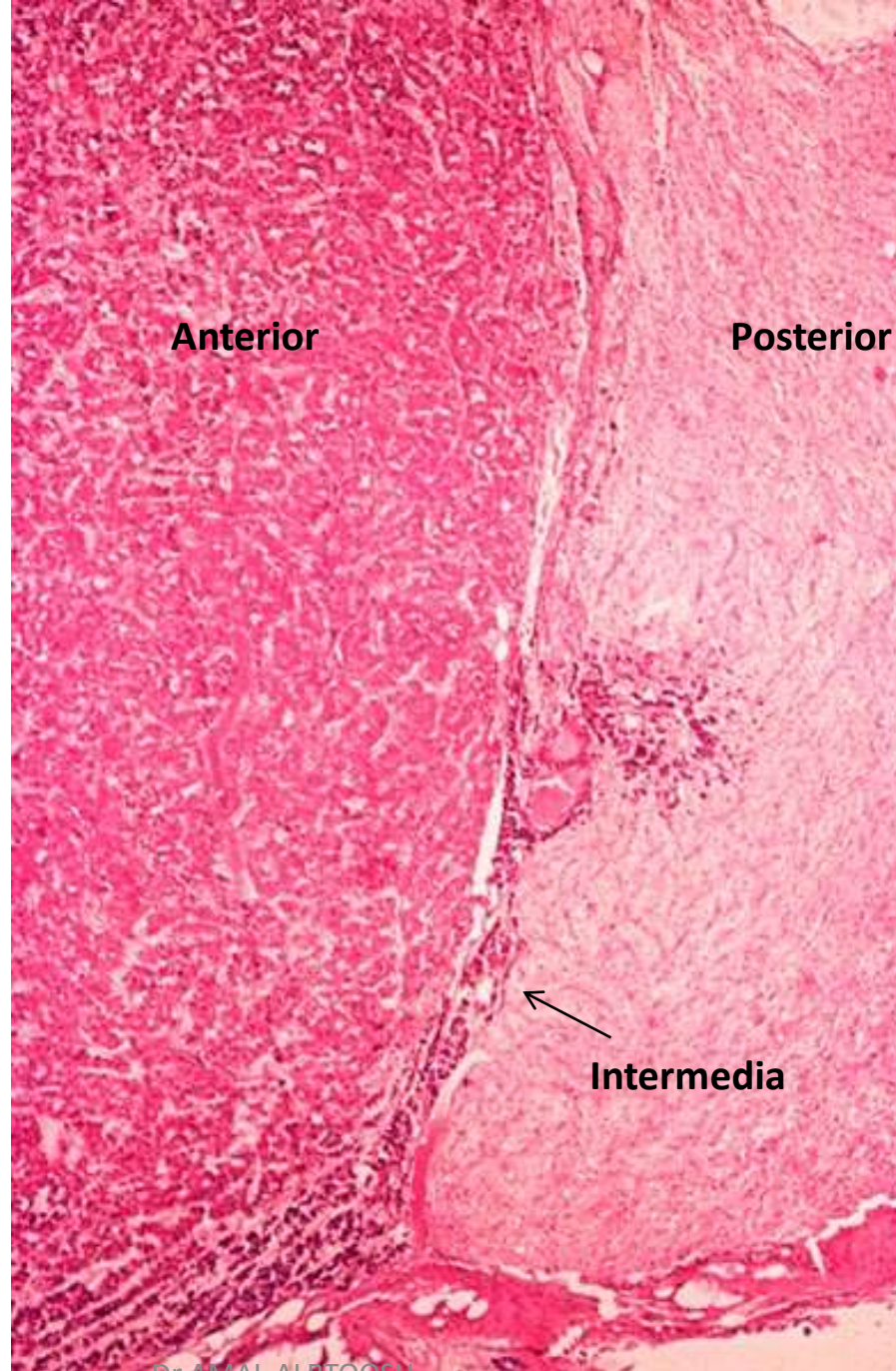
# Anterior pituitary (H&E stain)





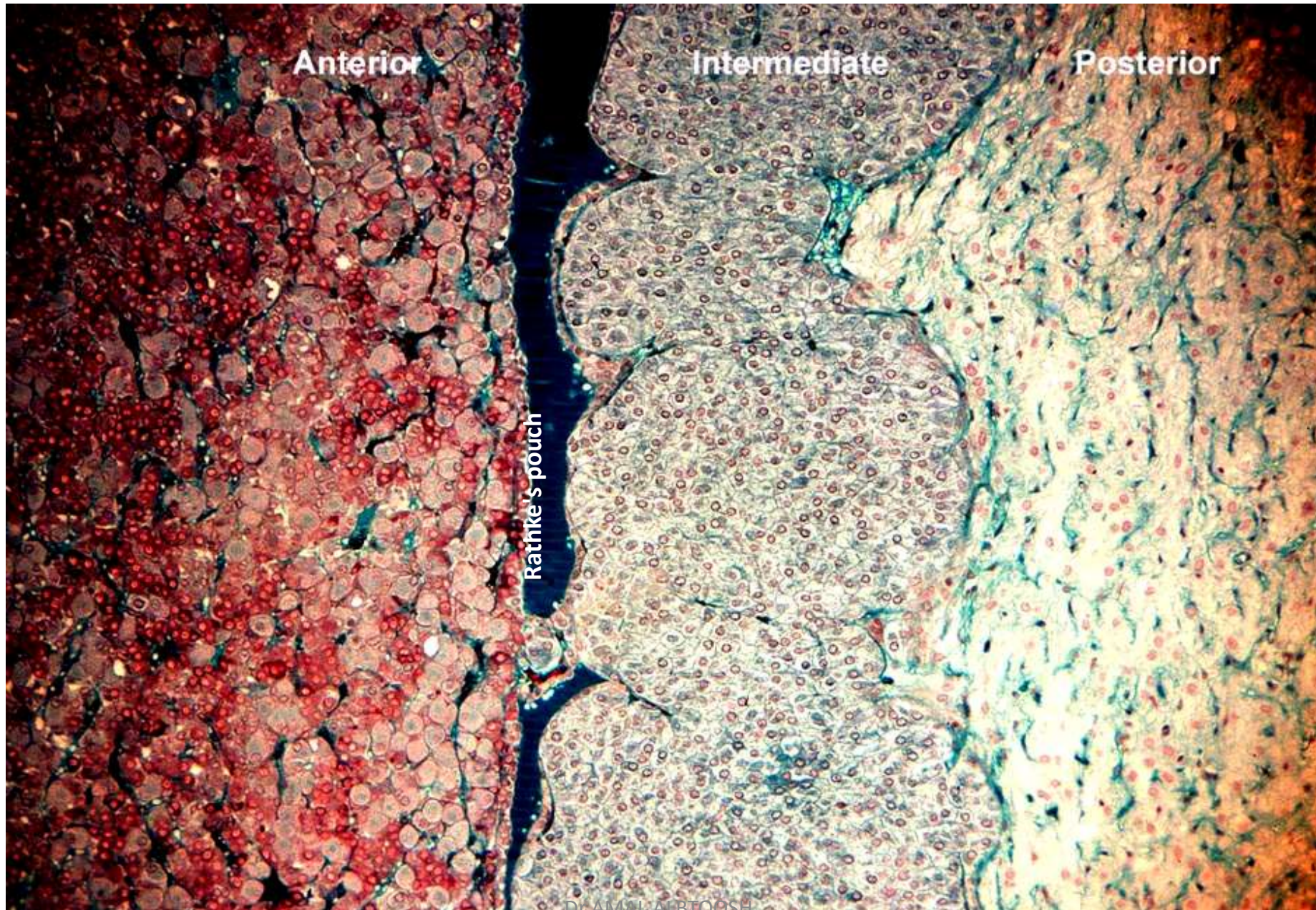
Pars intermedia,  
between anterior and  
posterior pituitary

(Poorly developed and of  
doubtful function in humans)



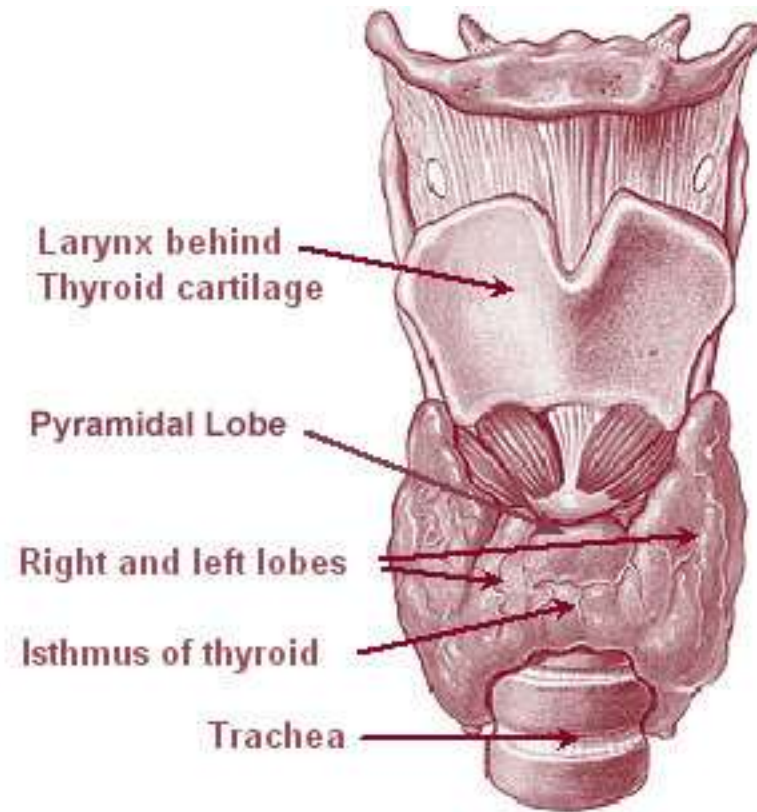


# Pars intermedia (rat pituitary)



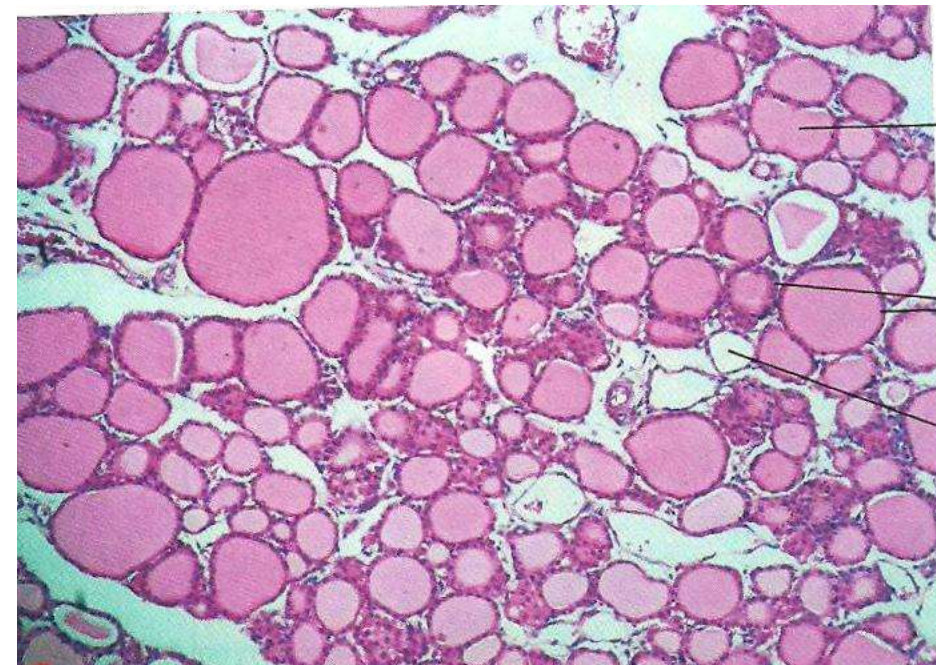


# THYROID GLAND



# Microscopic structure

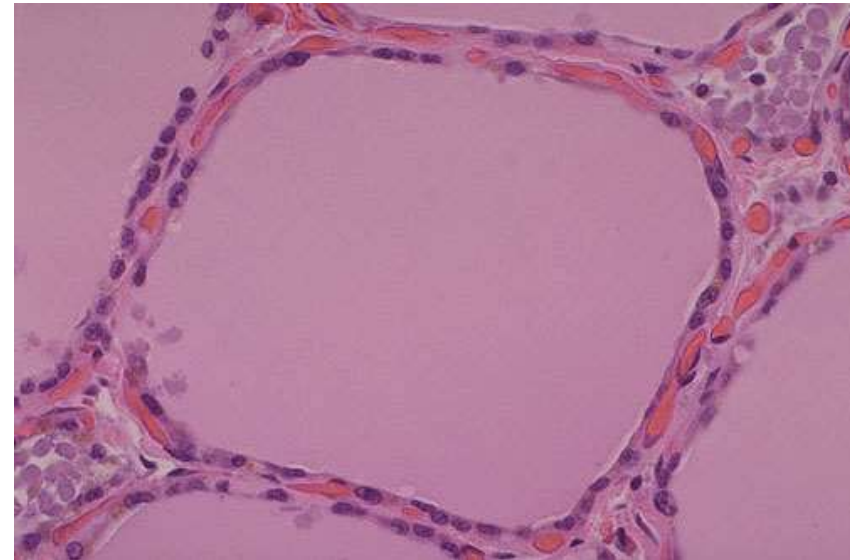
- The gland is surrounded by a thin fibrous **capsule**.
- Septa from the capsule extend into the gland & divide it into **lobules**.
- Lobules are made up of spherical masses called **follicles**.
- Follicle has a cavity filled with homogenous material called **colloid**.
- Follicular cells are normally cuboidal in shape.
- Secrete 2 hormones:
  - tri-iodothyronine (T3) &
  - tetra-iodothyronine (T4) or thyroxine.



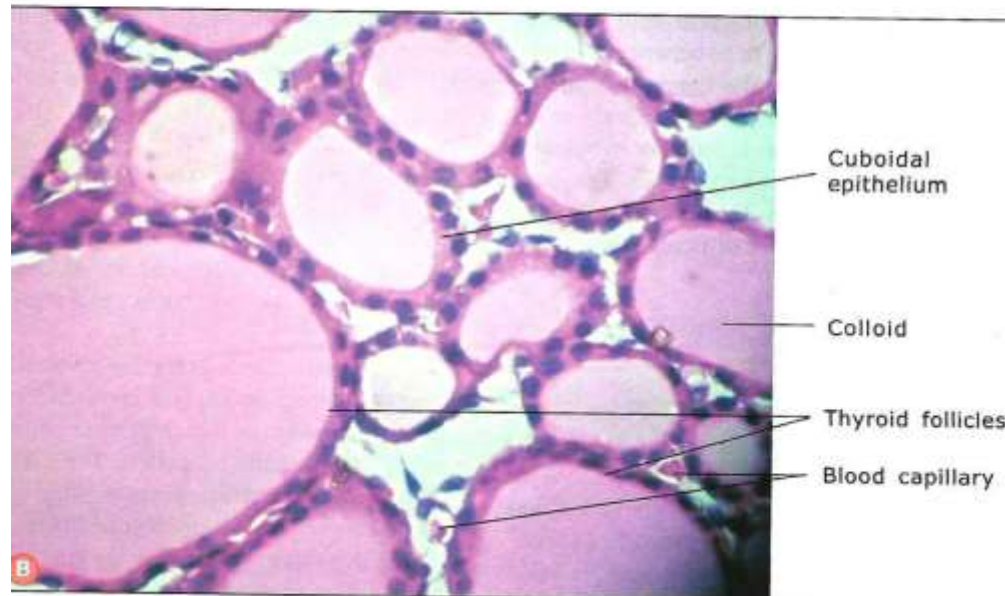
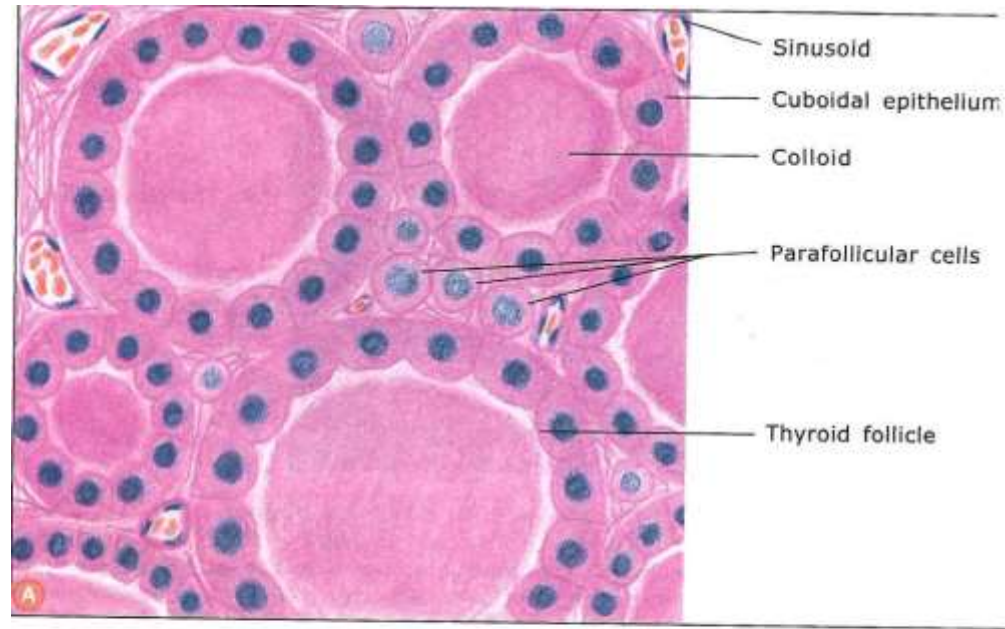
# Microscopic structure

## **Parafollicular cells (C-cells):**

- Embedded within a follicle or lie between follicles.
- Singly or in groups.
- Cells are polyhedral with oval eccentric nucleus and cytoplasm contains secretory granules.
- Light staining cells.
- Secrete hormone calcitonin.



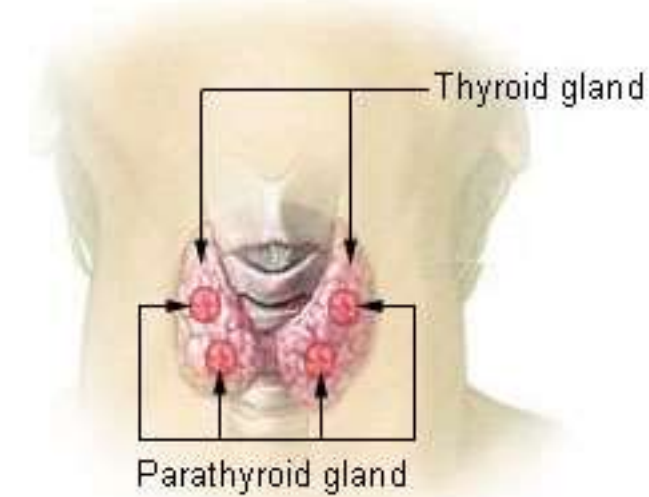




## Thyroid and Parathyroid Glands

# Parathyroid Gland

- Small ovoid bodies (4 in no.) embedded in the connective tissue capsule on the posterior surface of thyroid gland.
- Consists of 2 types of cells:
  - ✓ **Chief cells (principal cells):** more numerous, polygonal, round centrally located nucleus & mildly eosinophilic cytoplasm, secrete **parathyroid hormone (PTH)**.
  - ✓ **Oxyphil cells:** larger in shape, deep acidophilic cytoplasm.



Parathyroid Gland (H&E stain)