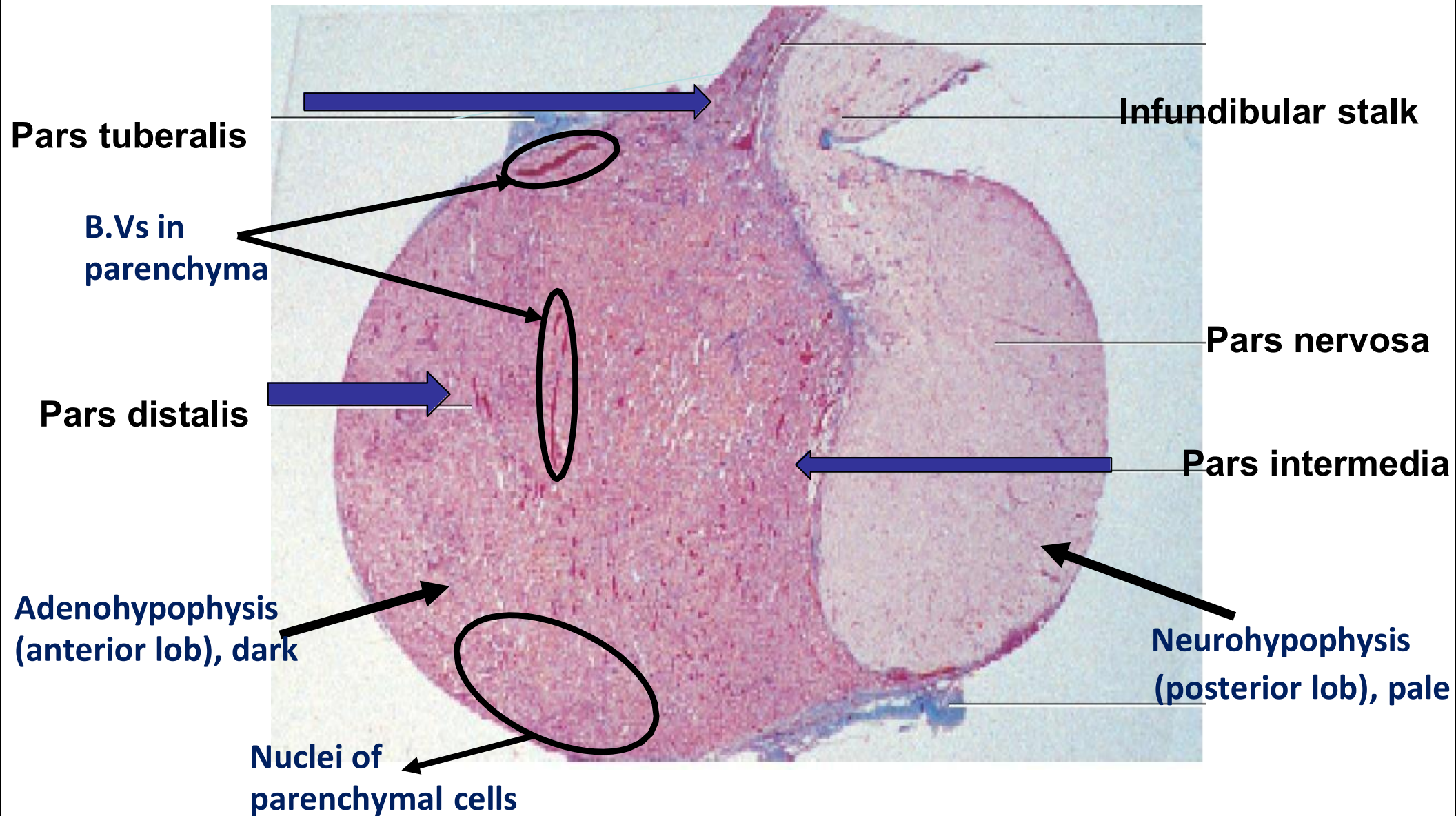


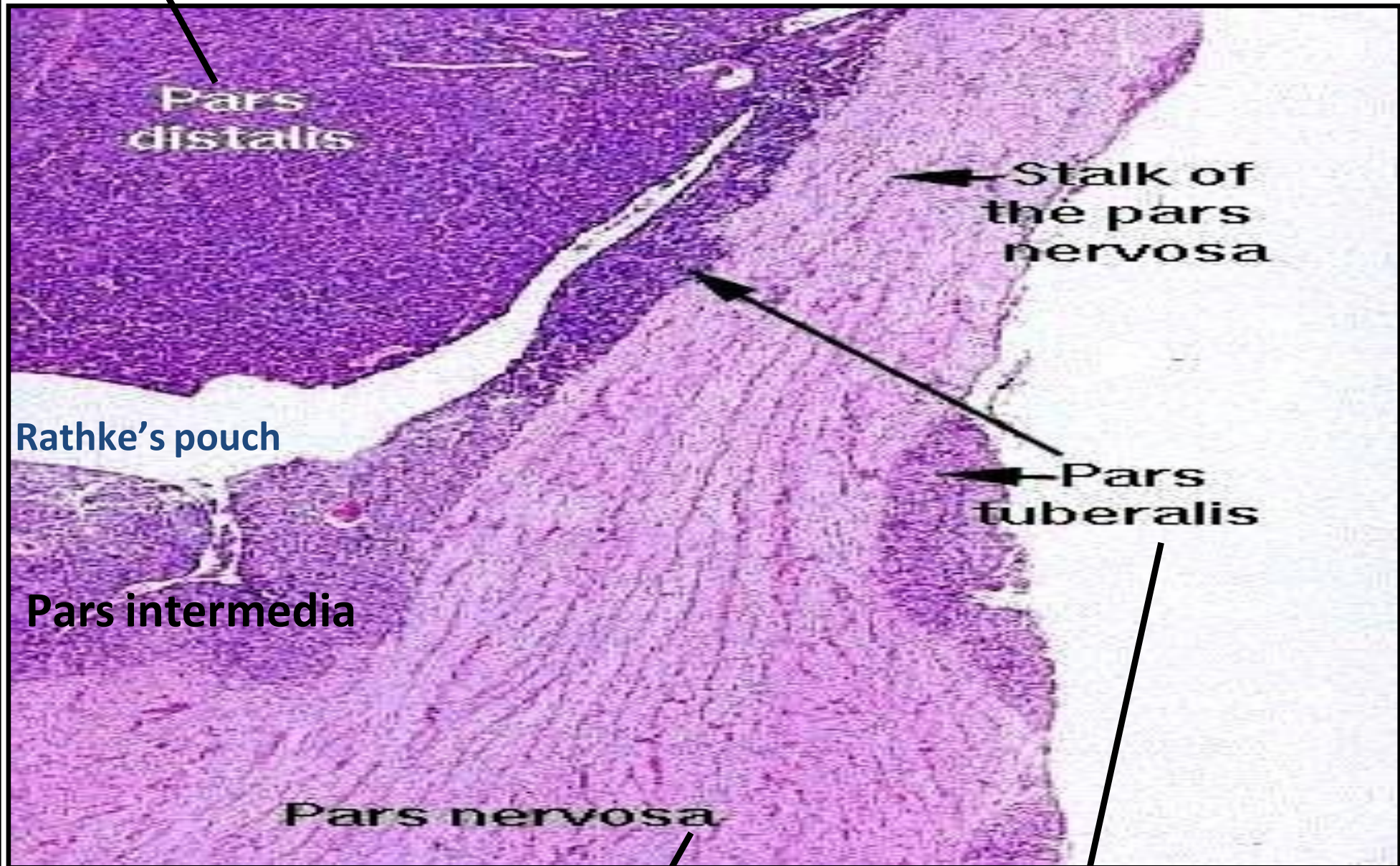
# PITUITARY GLAND





Full of cells

# PITUITARY GLAND



Pars distalis

Stalk of the pars nervosa

Rathke's pouch

Pars tuberalis

Pars intermedia

Pars nervosa

Pale, full of fibers (unmyelinated axons) come from supraoptic + paraventricular nuclei to transmit neuro secretions

Highly vascular region containing the veins of the hypophyseal portal system and wraps the infundibulum. Contain chromophobes



# Pars Intermedia

Pars intermedia in animals (presence of colloid)

- Human/ unclear function (**rudimentary**)
- animals / the basophilic cells produce melanocyte stimulating hormone (**MSH**)

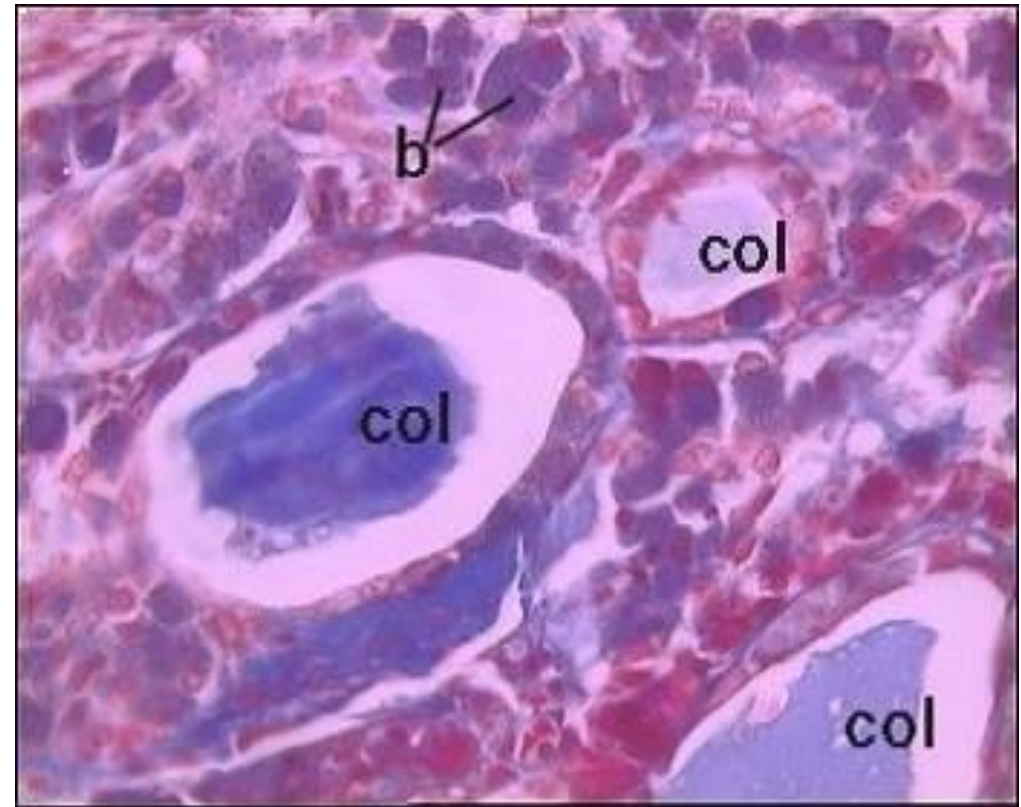
Posterior lobe (pale)

PP

Pars intermedia (cyst)

PA

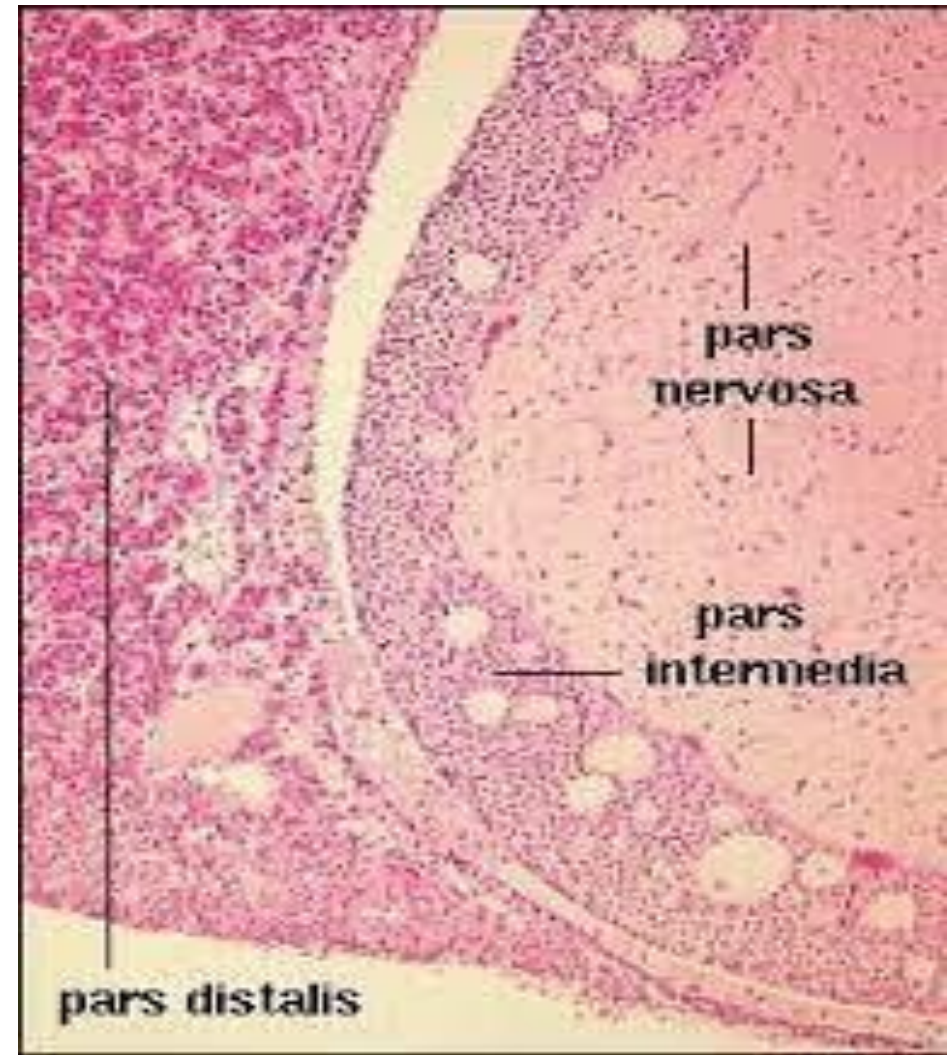
Anterior lobe (dark)





# Pars Intermedia

found in animals

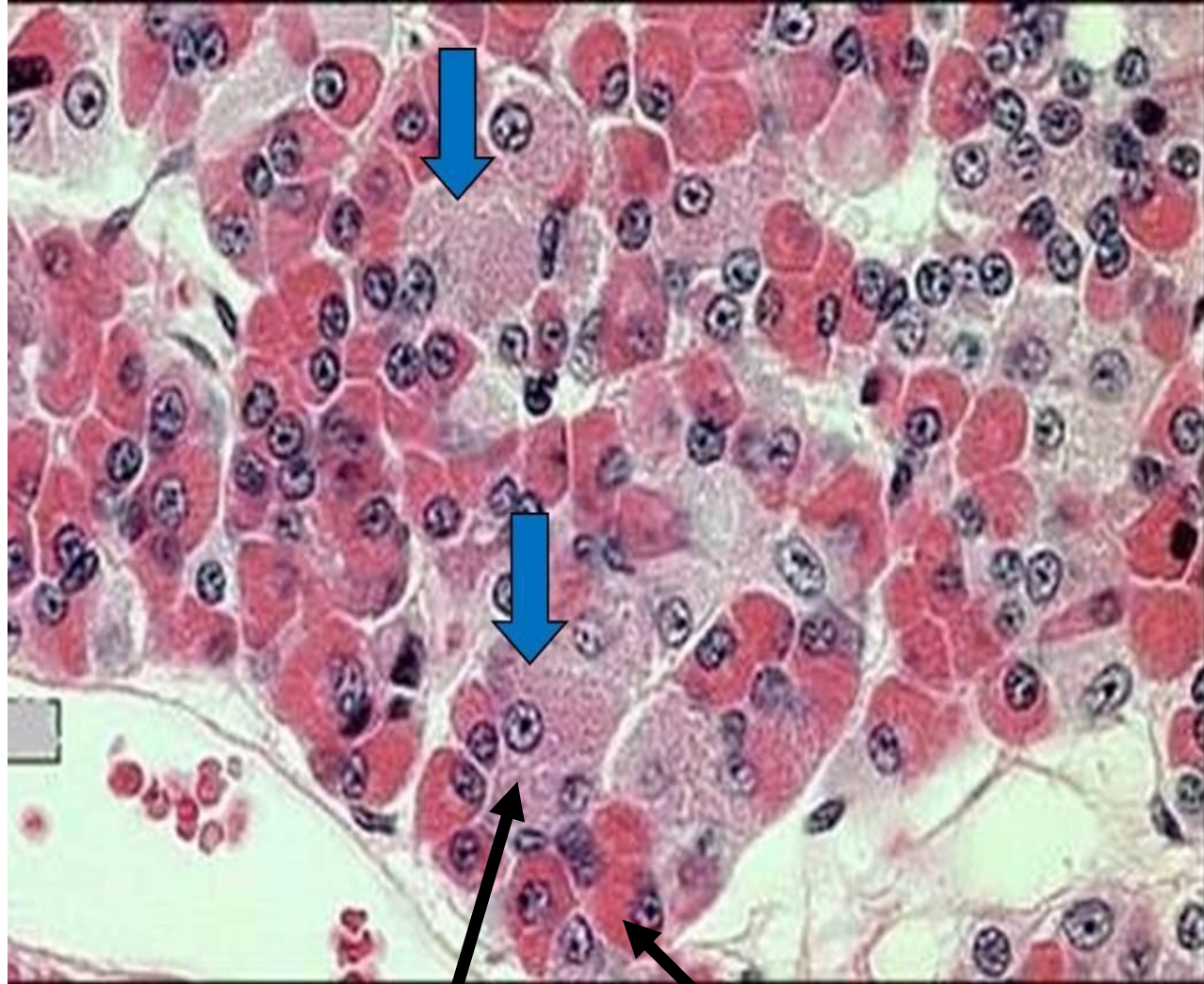




# **Pars distalis** =adenohypophysis

## Chromophils

- 1 Acidophils 37%
- 2 Basophils 11%
- 3 Chromophobes 52%  
mostly found in pars tuberalis
- 4 Fenestrated sinusoids



**Basophil**

**Acidophil**

# Acidophils

- **Somatotrophs**

- **Growth H.**

- **Mammotrophs**

- **Prolactin**

- Small in ♂ and non preg ♀

- Large irregular in pregnant and lactating ♀ (Erdheim cells)

- **Crinophagy:**

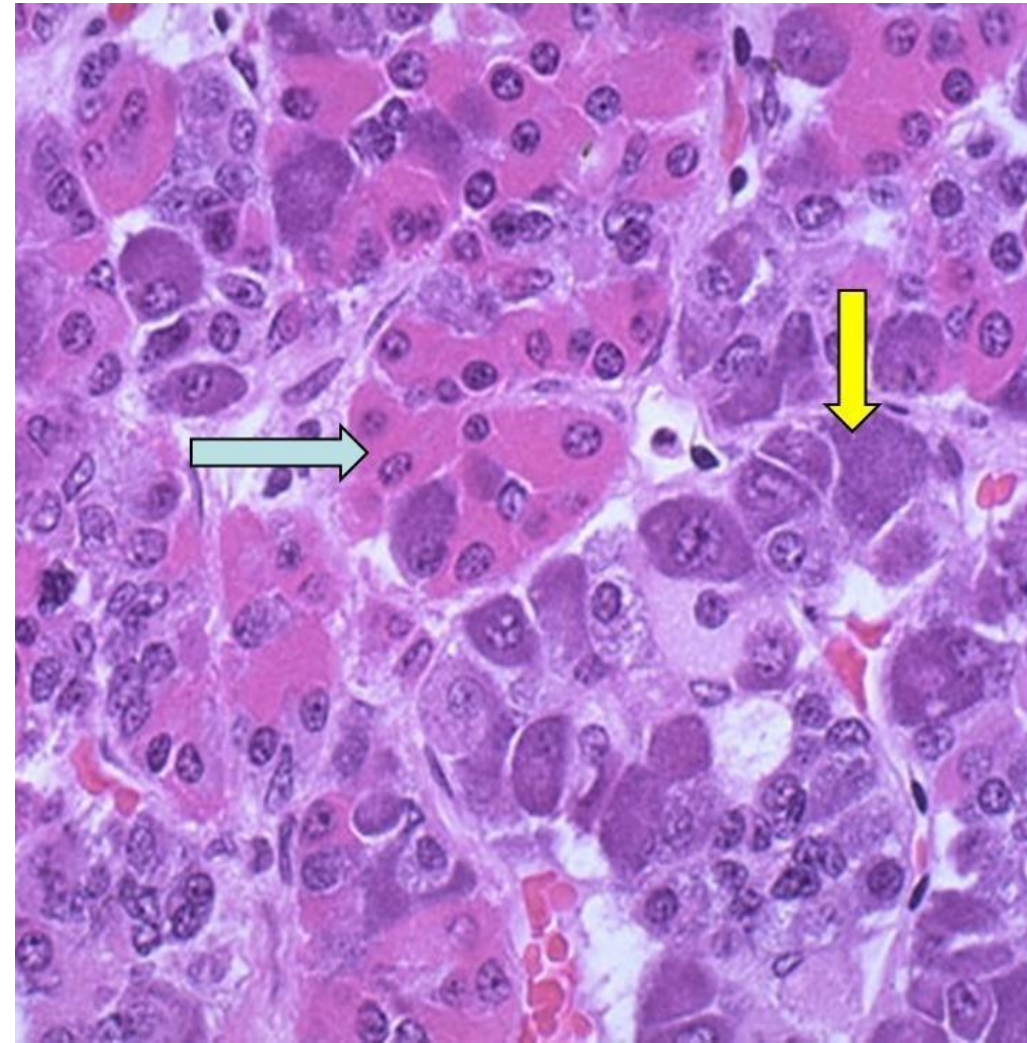
when suckling is terminated, lysosomes eliminate the excess secretory granules

## Basophils :

- **TSH**

- **FSH, LH**

- **ACTH**



→ Acidophil

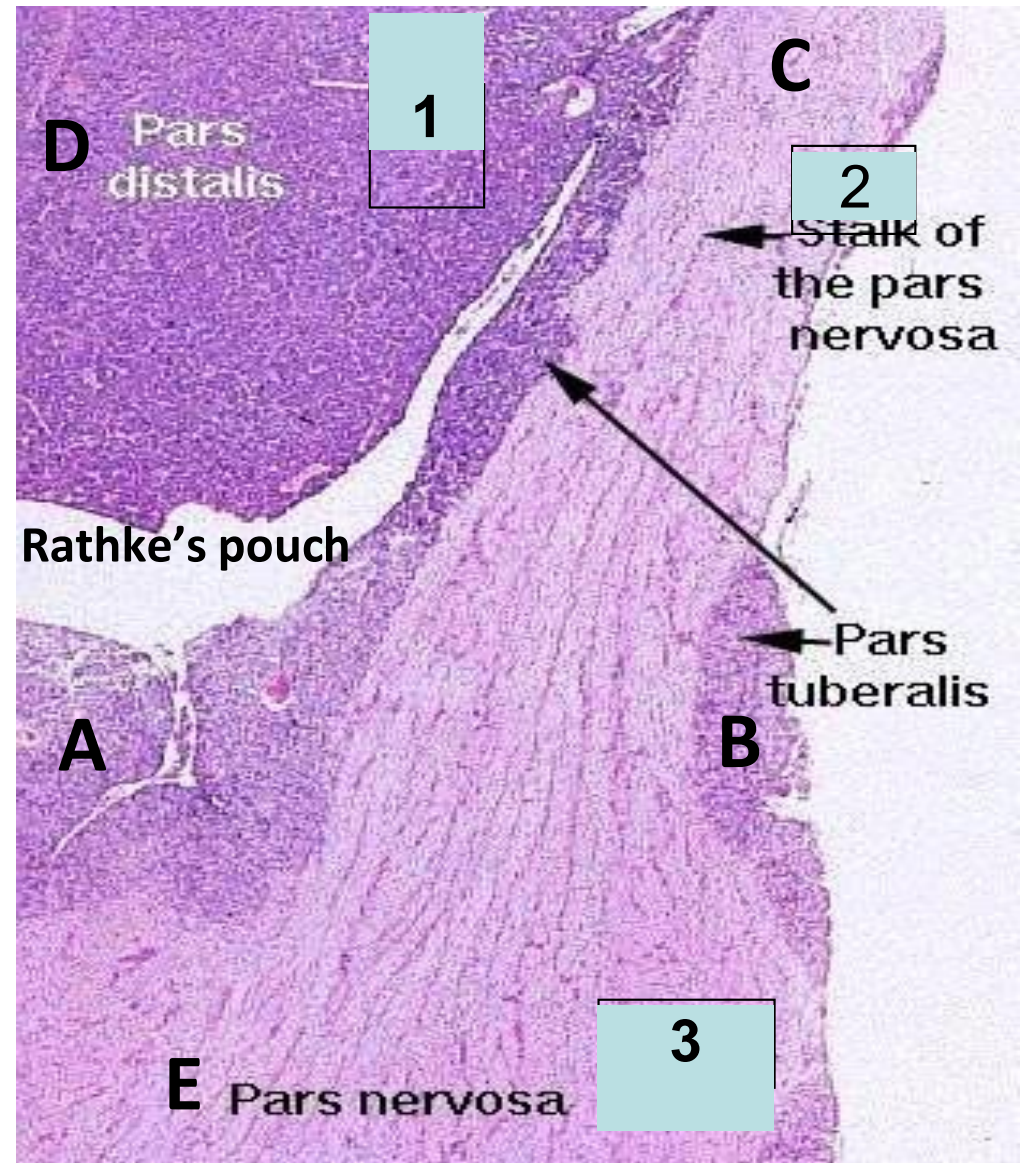
↓ Basophil

السؤال: بتجيب صورة عادية زي اللي فوق و بتأشر على وحدة من  
لاخلايا وبتحكيلك شو بتفرز هاي لاخلية بدون ما تحكي اسمها, فالامفروض  
هن عارفين اسم الخلية وشكلها وشو بتفرز. الخلايا الحمضية في الها نوعين  
لنوع بفرز هرمون, والخلايا القاعدية الها 3 انواع وكل نوع بفرز هرمون



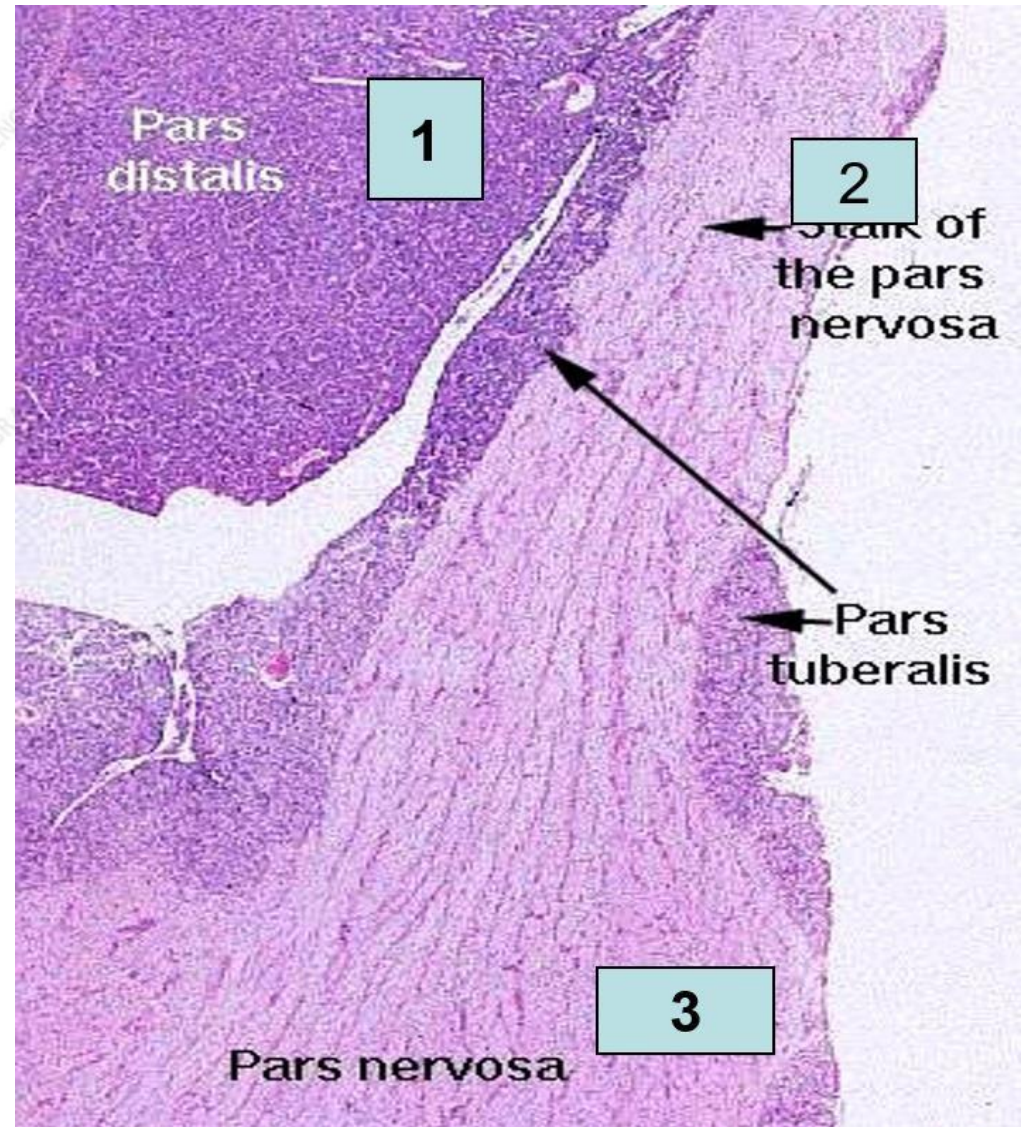
# Where is oxytocin stored ?

- a. Pars intermedia
- b. Pars tuberalis
- c. Infundibulum
- d. Pars distalis
- e. Pars nervosa



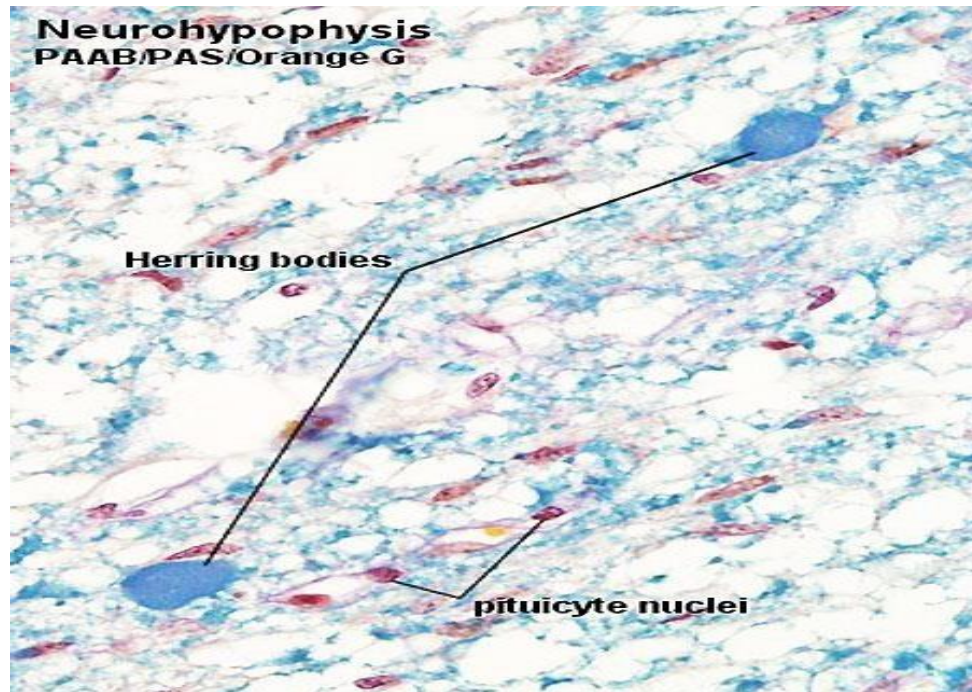


# Neurohypophysis

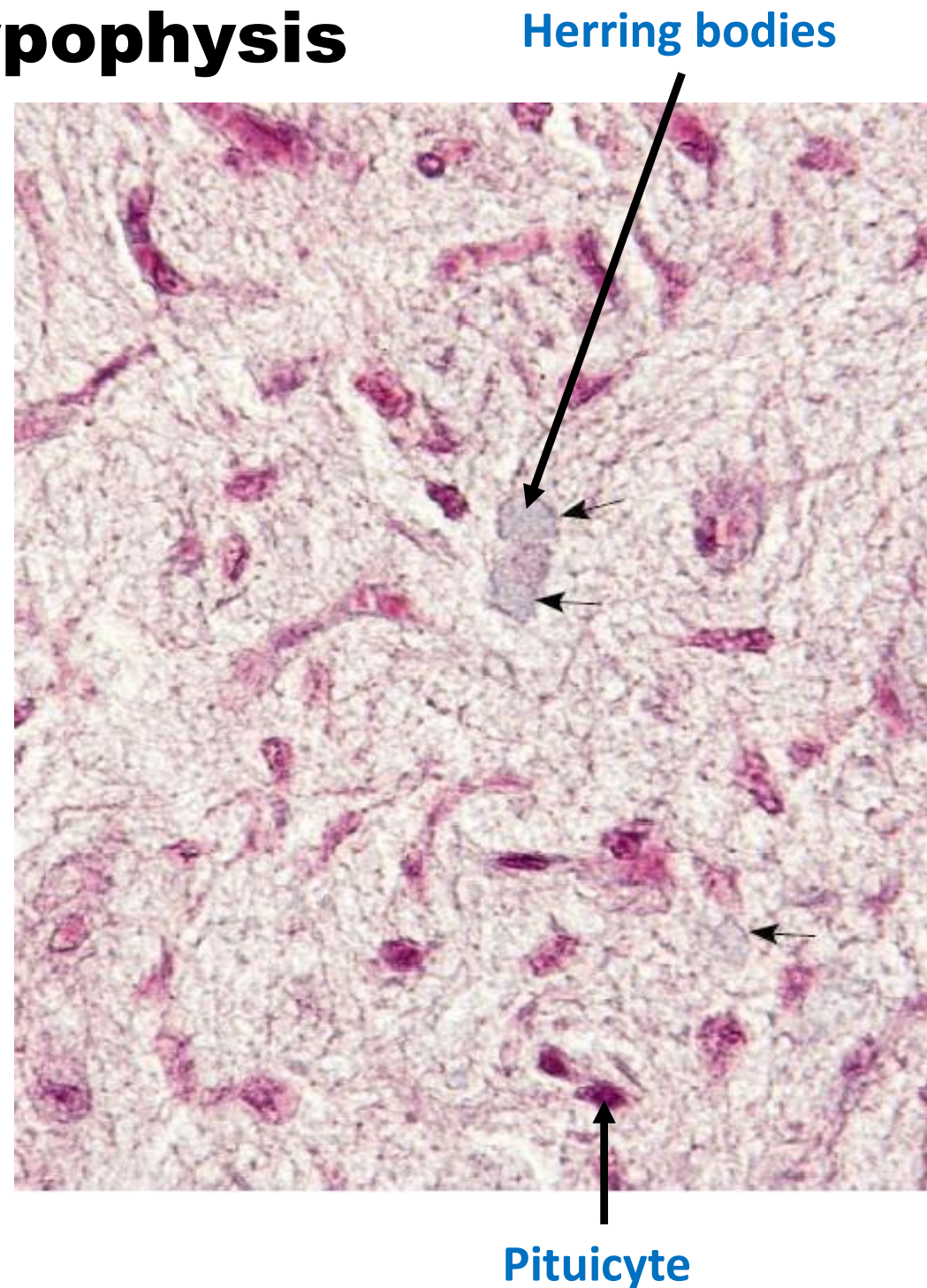




# Neurohypophysis



1. **Unmyelinated** axons
2. Herring bodies (ADH, Oxytocin)
3. Pituicytes. **modified glial cells** having supportive, nutritive and insulating function
4. Rich blood capillary plexus



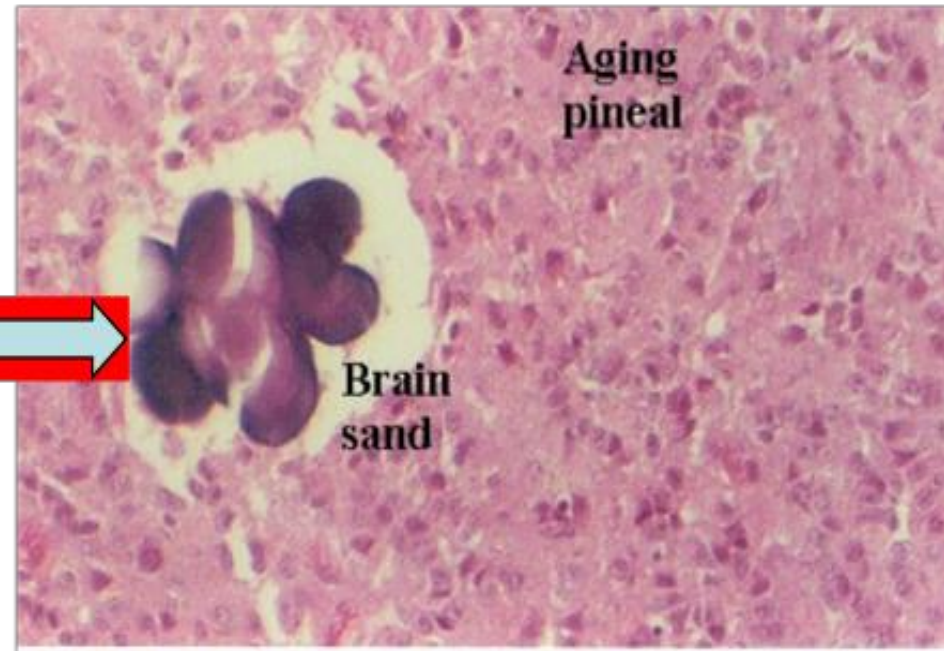
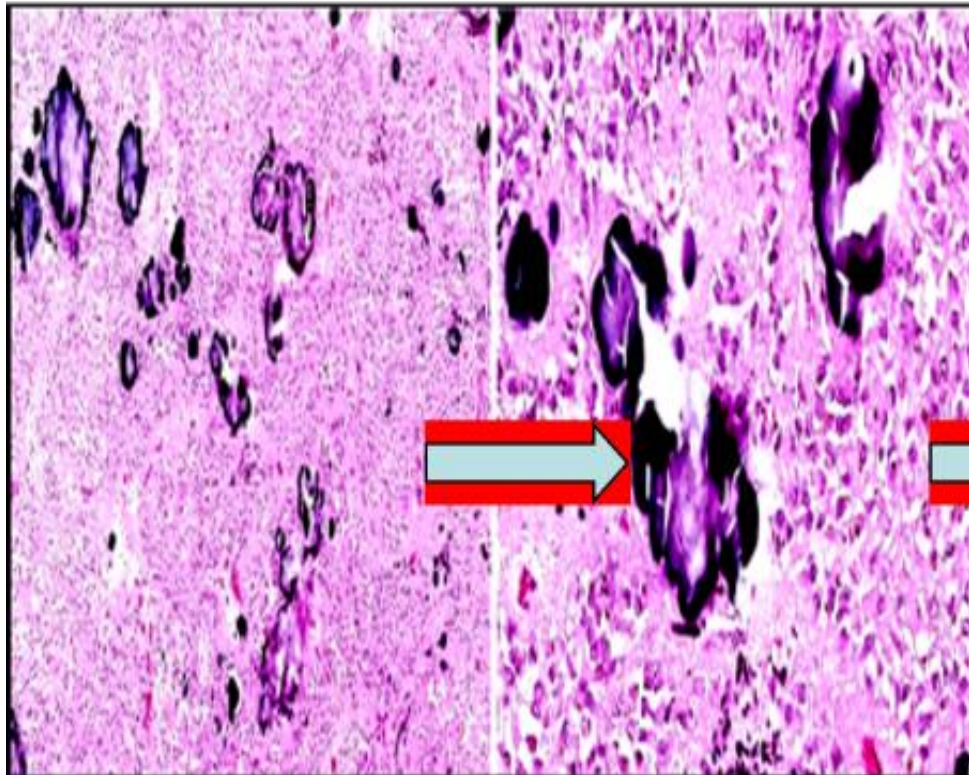
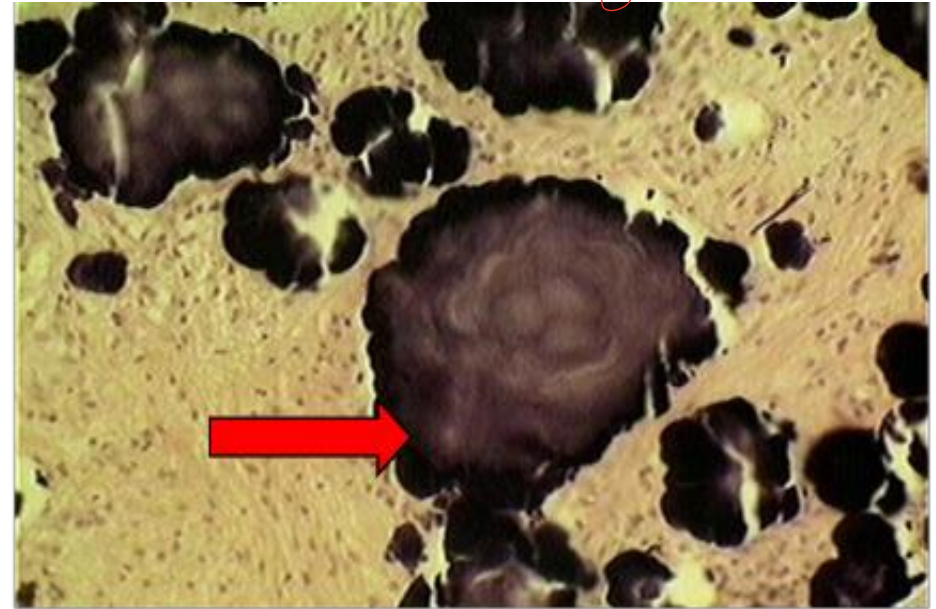


# Pineal gland (Epiphysis cerebri)

- 1- pinealocytes
- 2- Astrocytes
- 3- Blood vessel

**Brain sand with old age**

*with old age*

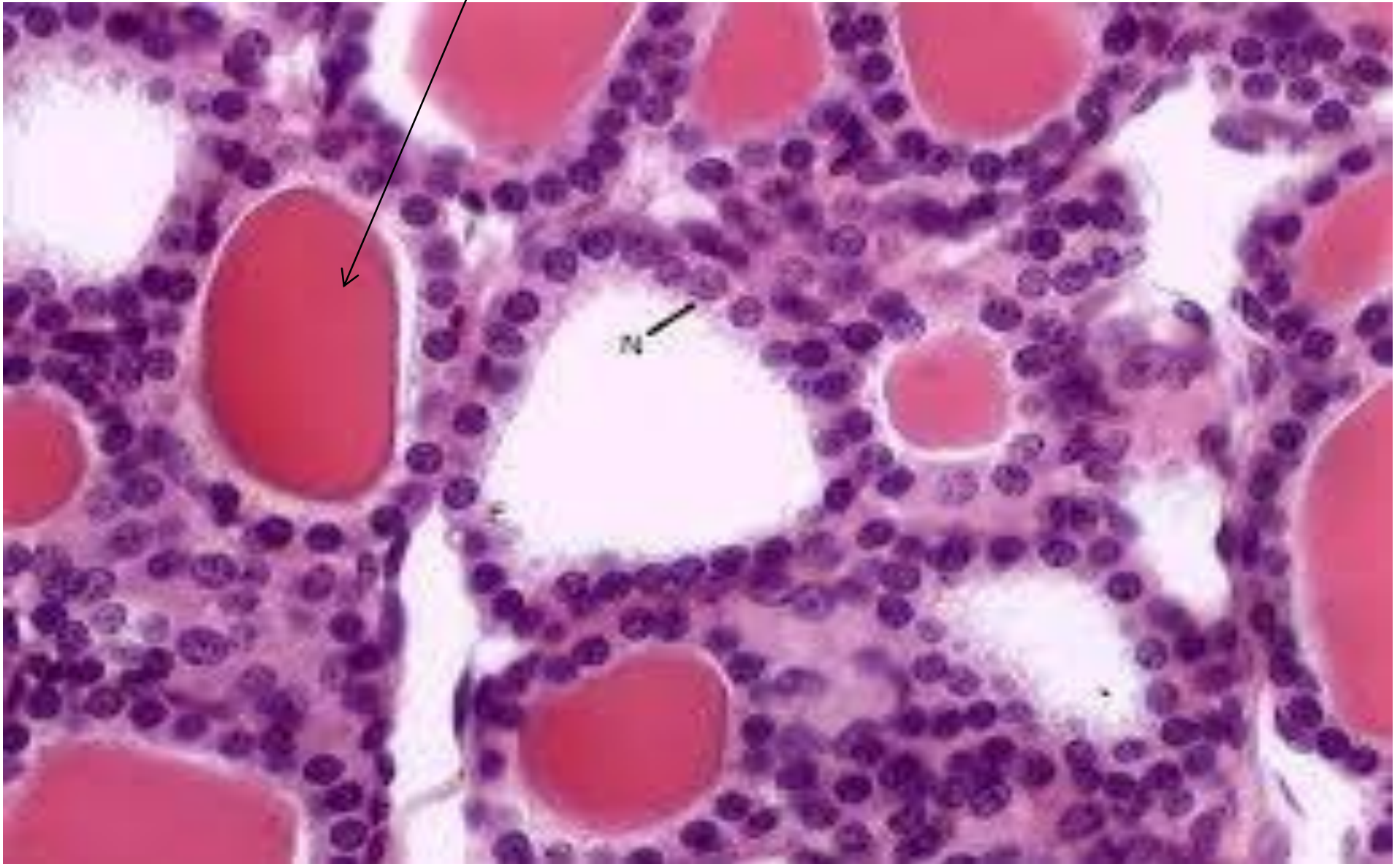




1. Follicular cells (most numerous produce T3, T4)
2. Parafollicular (clear) cells (few in num. produce calcitonin)
3. Interfollicular cell

# Thyroid

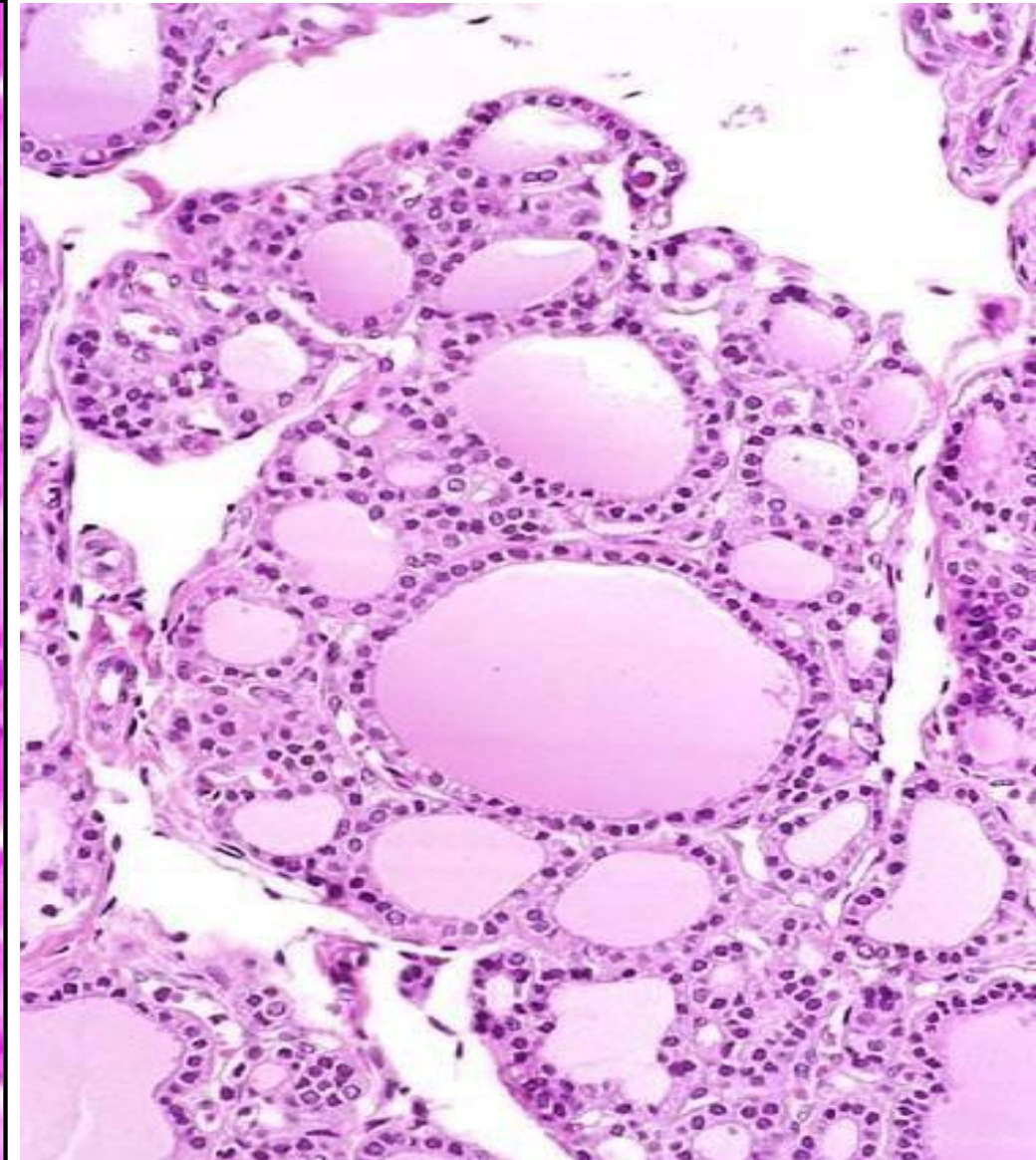
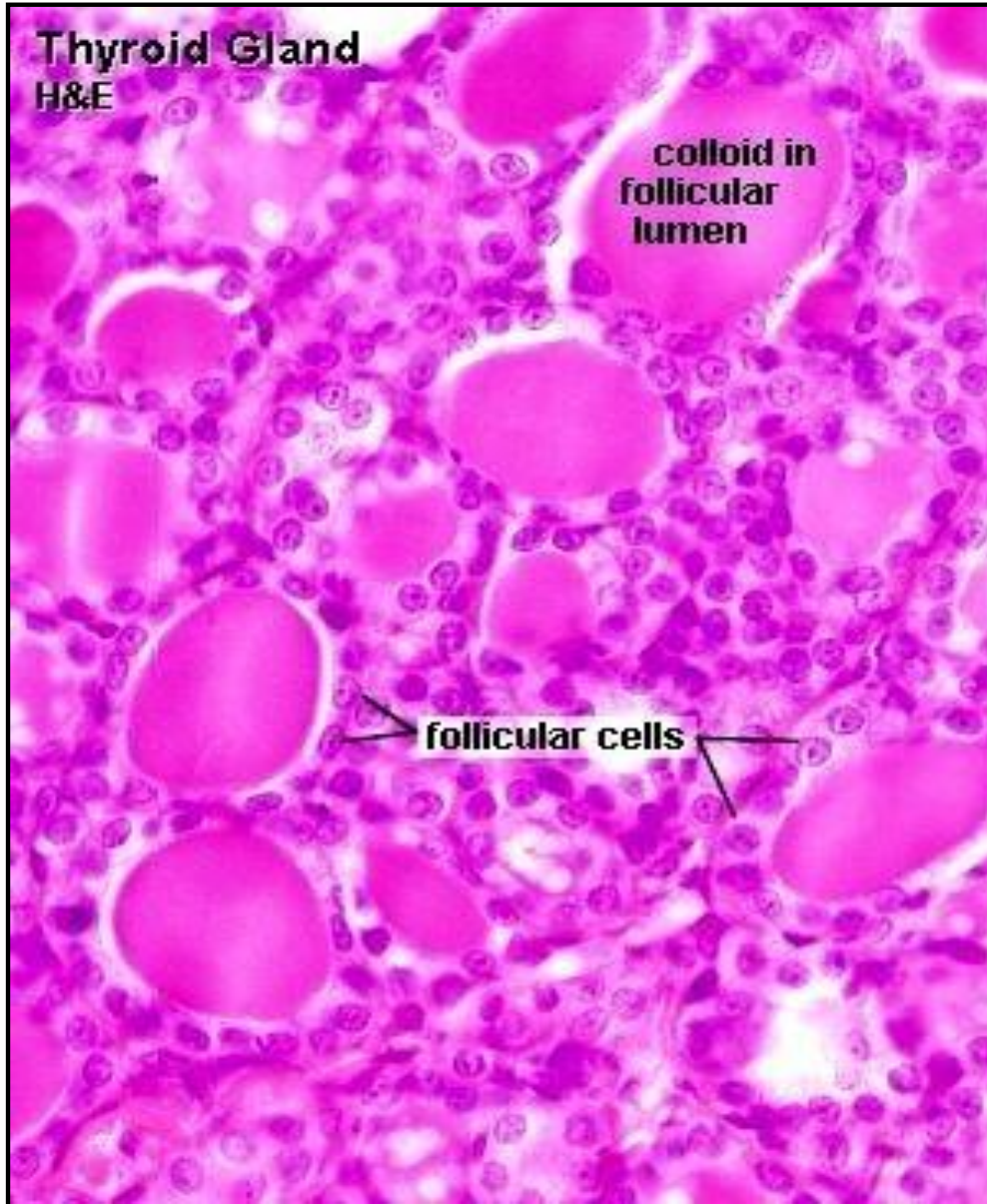
colloid



Thyroid gland → stroma is double capsule (false + true capsule), contain incomplete lobulation, cells arranged in follicles, secretion of follicular cells doesn't release directly to blood but stored in colloid until we need it, colloid released to blood by phagocytosis

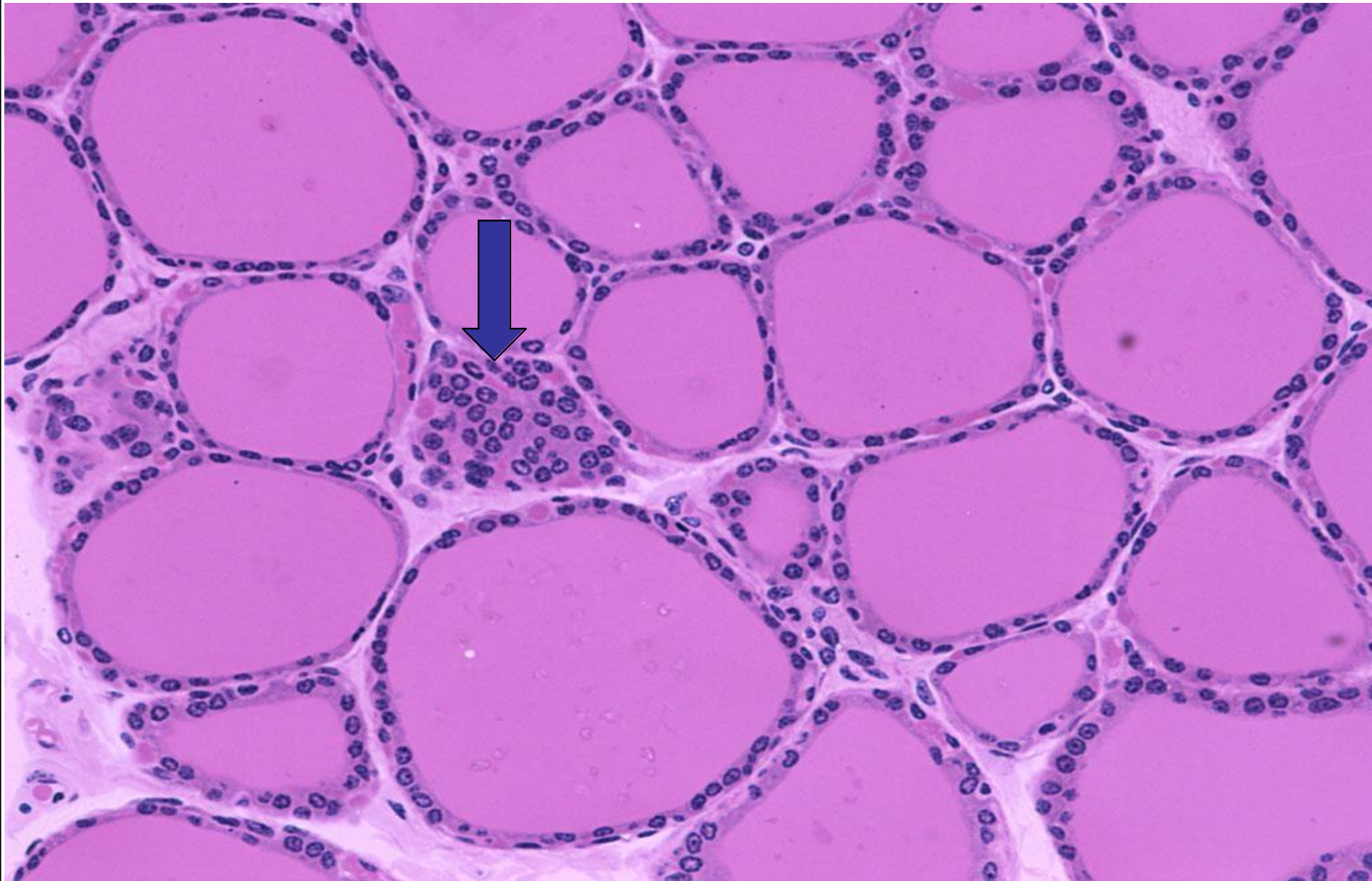


# Thyroid





# Interfollicular cells



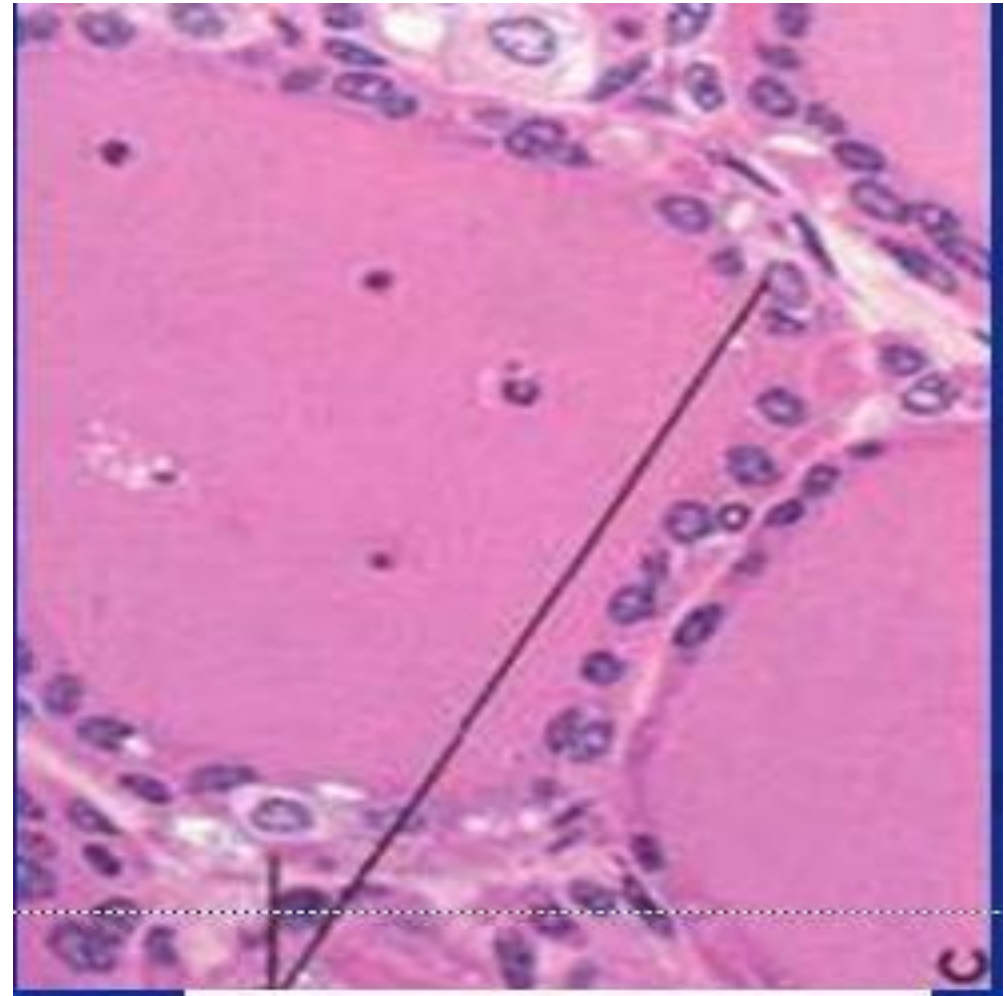
lining epithelium of follicular cells is cuboidal in normal state. in hypoactive state they become columnar in shape, in hyperactive state they become flattened



# Thyroid



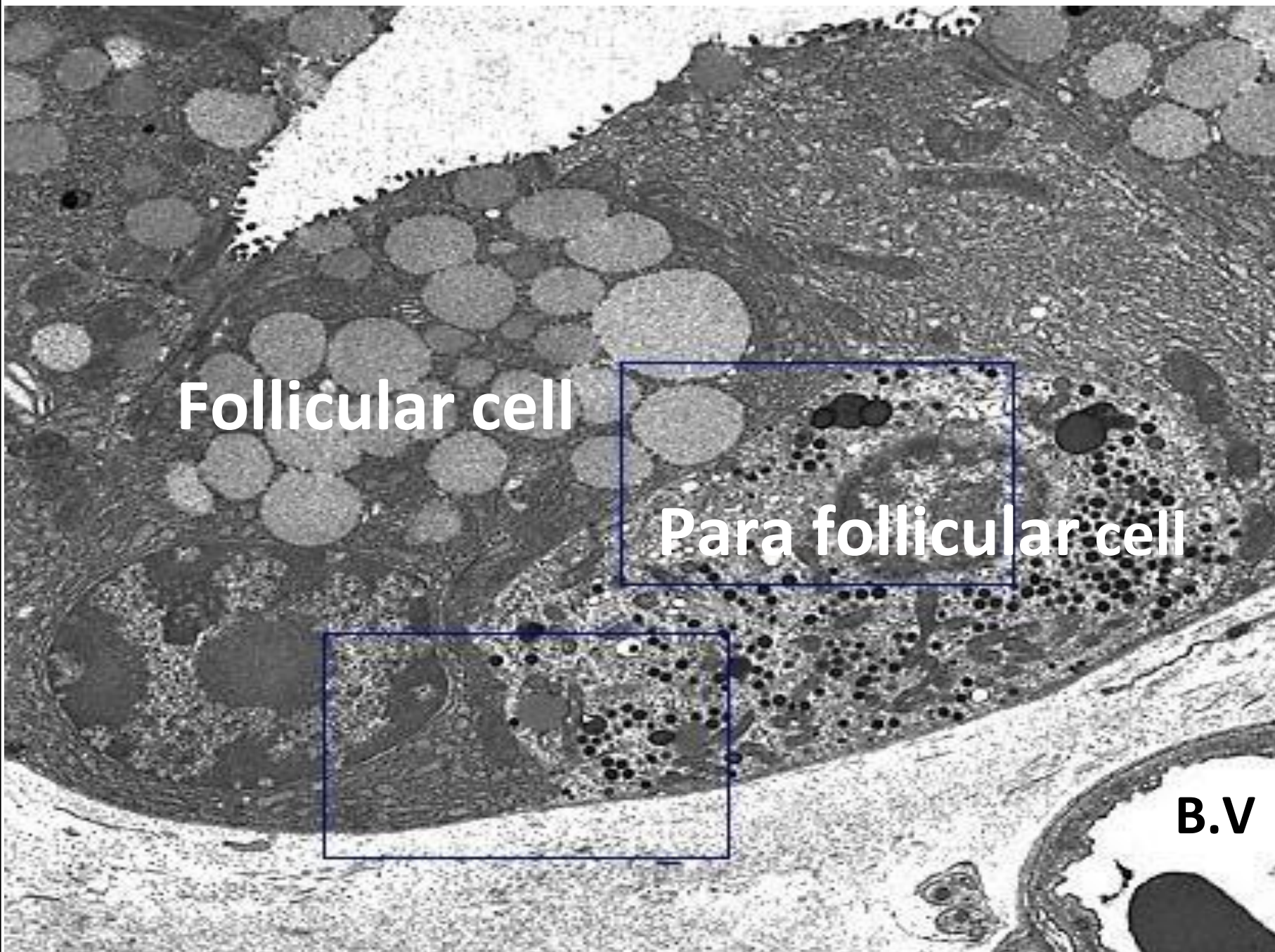
1. Follicular cells
  - Interfollicular cells
2. Parafollicular (clear = pale) cells



Para follicular cells



# EM of thyroid follicle



Follicular cell

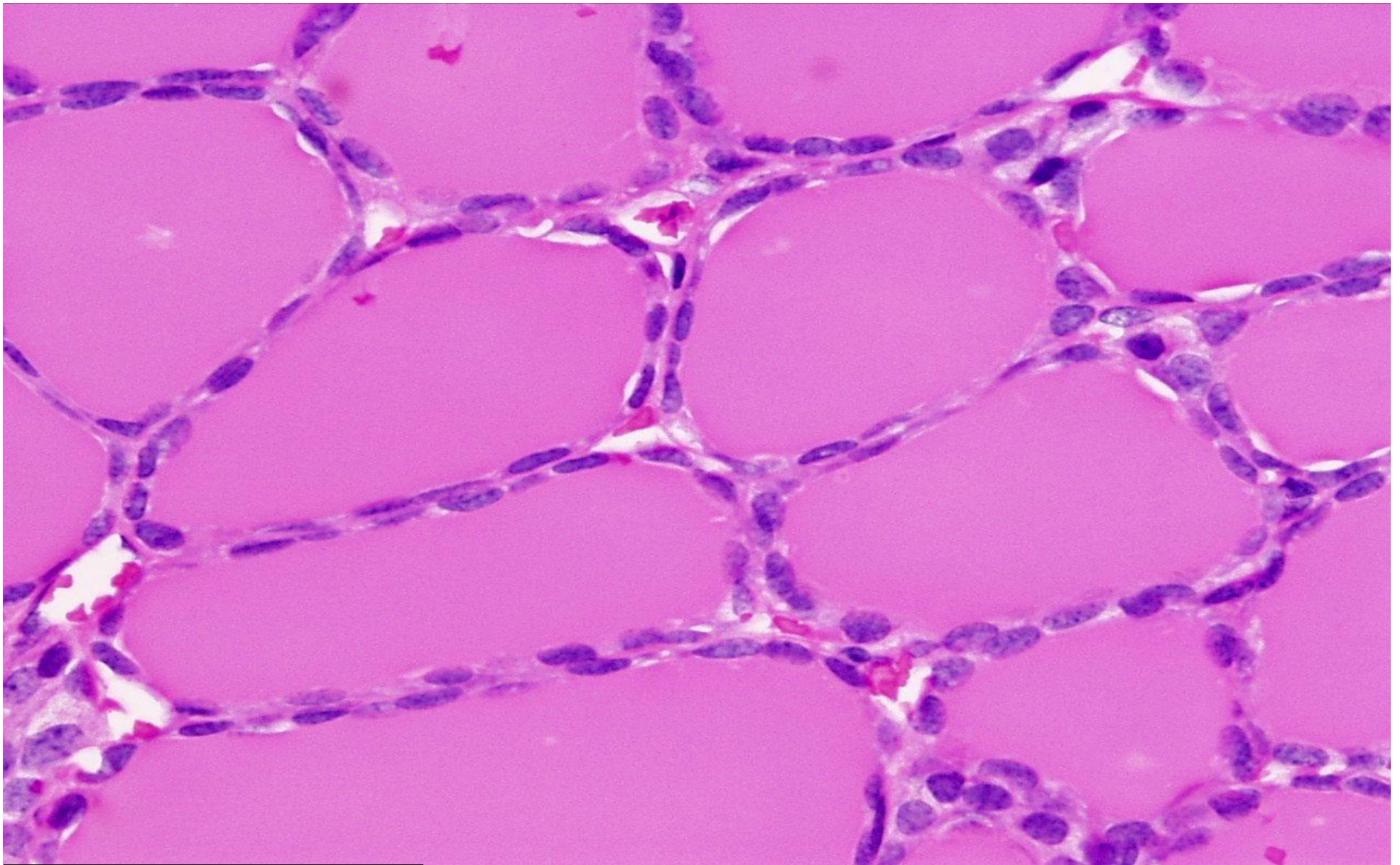
Para follicular cell

B.V

Granules of Para follicular cells present at the base near B.V to release its content directly to blood



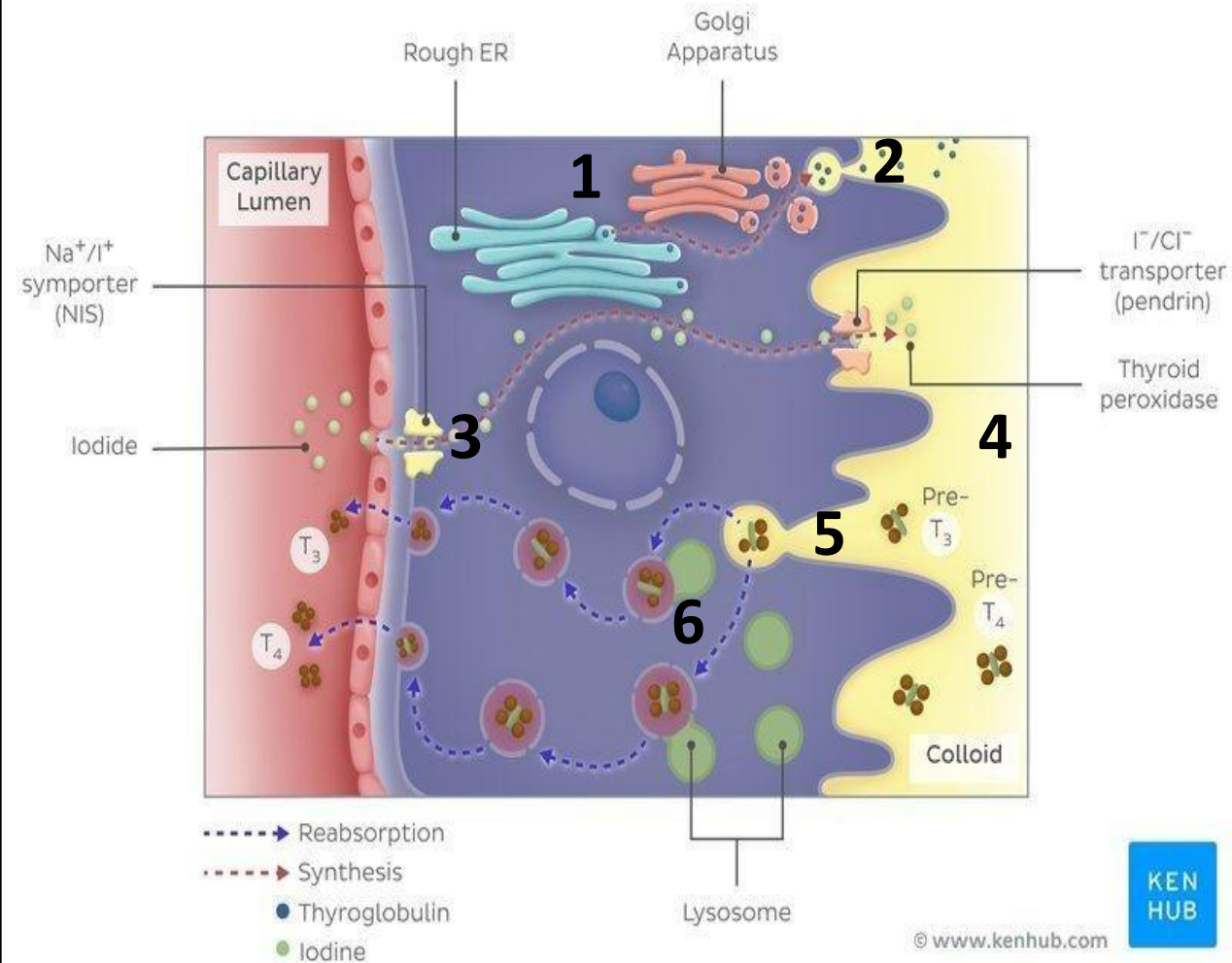
# Thyroid



Follicles of thyroid gland



# Formation of thyroid hormones



**1**-organelles of protein synthesis produce thyroglobulin hormone (precursor)

**2**-Tg transmitted by exocytosis to lumen of follicles to stored as colloid

**3**-iodine enter from the blood → cell → lumen, to iodinate the precursor

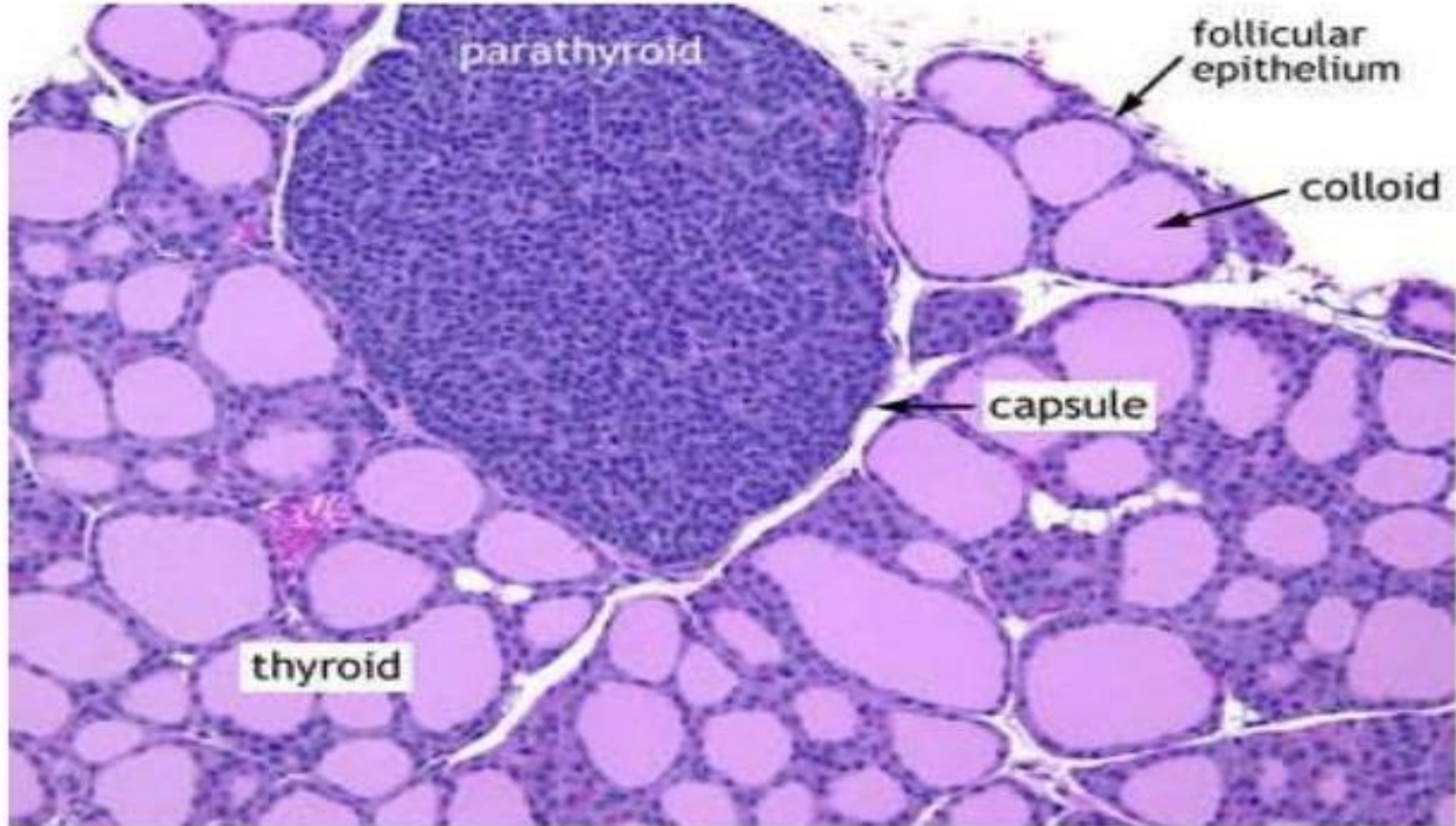
**4**-iodinated Tg stored in the lumen until we need it

**5**-when we need it, the iodinated Tg re-enter the cells by endocytosis

**6**-inside cells there is numerous lysosomes which will take the precursor and break it down, then it released to blood as T<sub>3</sub>, T<sub>4</sub>



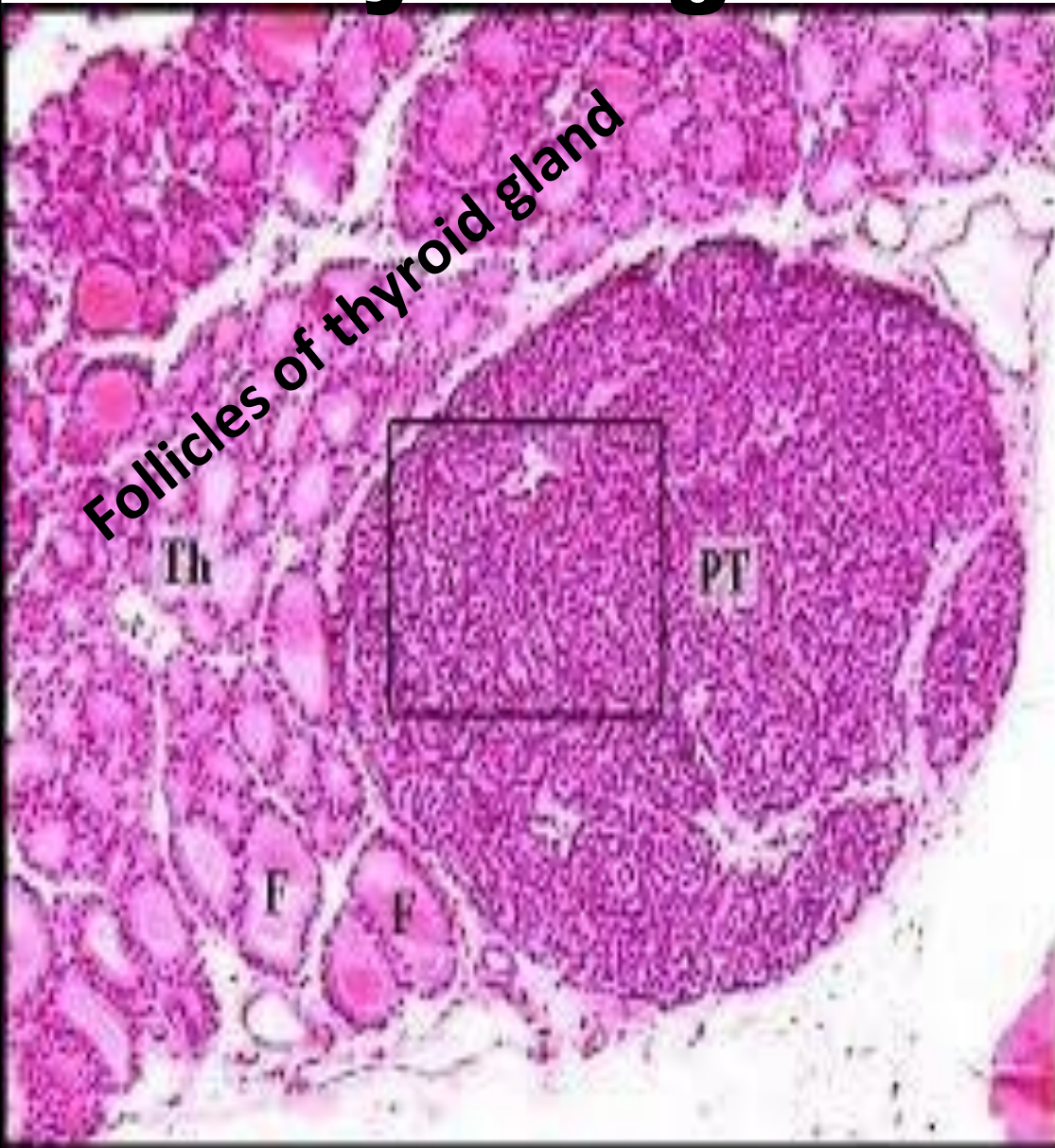
# Parathyroid gland



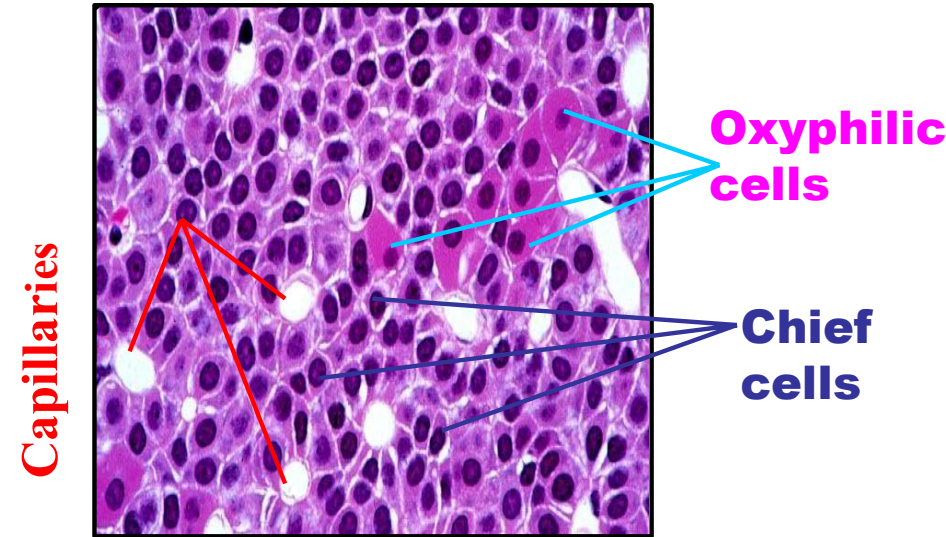
**Parathyroid** cells arranged in cords separated by B.Vs  
**Thyroid** cells arranged in follicles



# Parathyroid gland



- Two types of cells:
  1. Chief cells
  2. Oxyphil cells (degenerated chief cells)

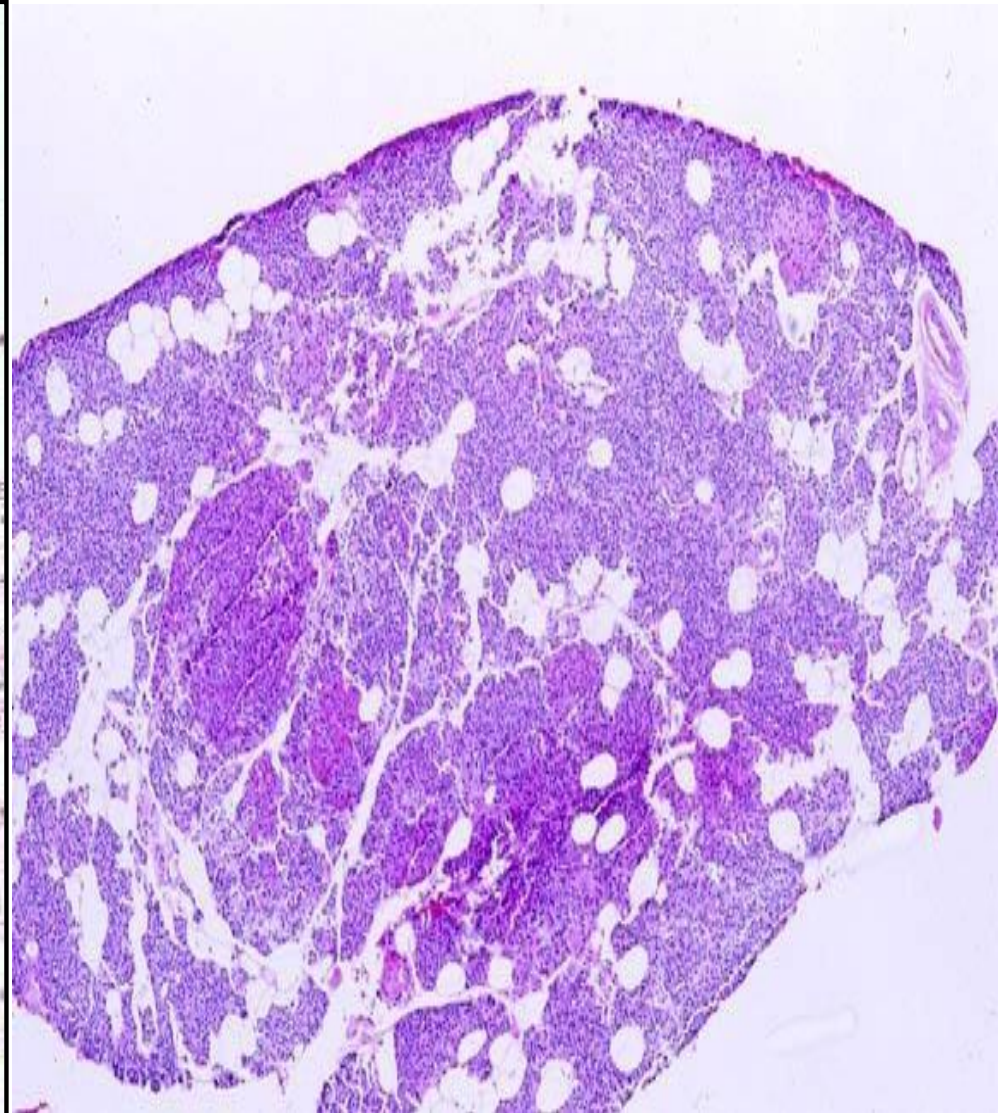
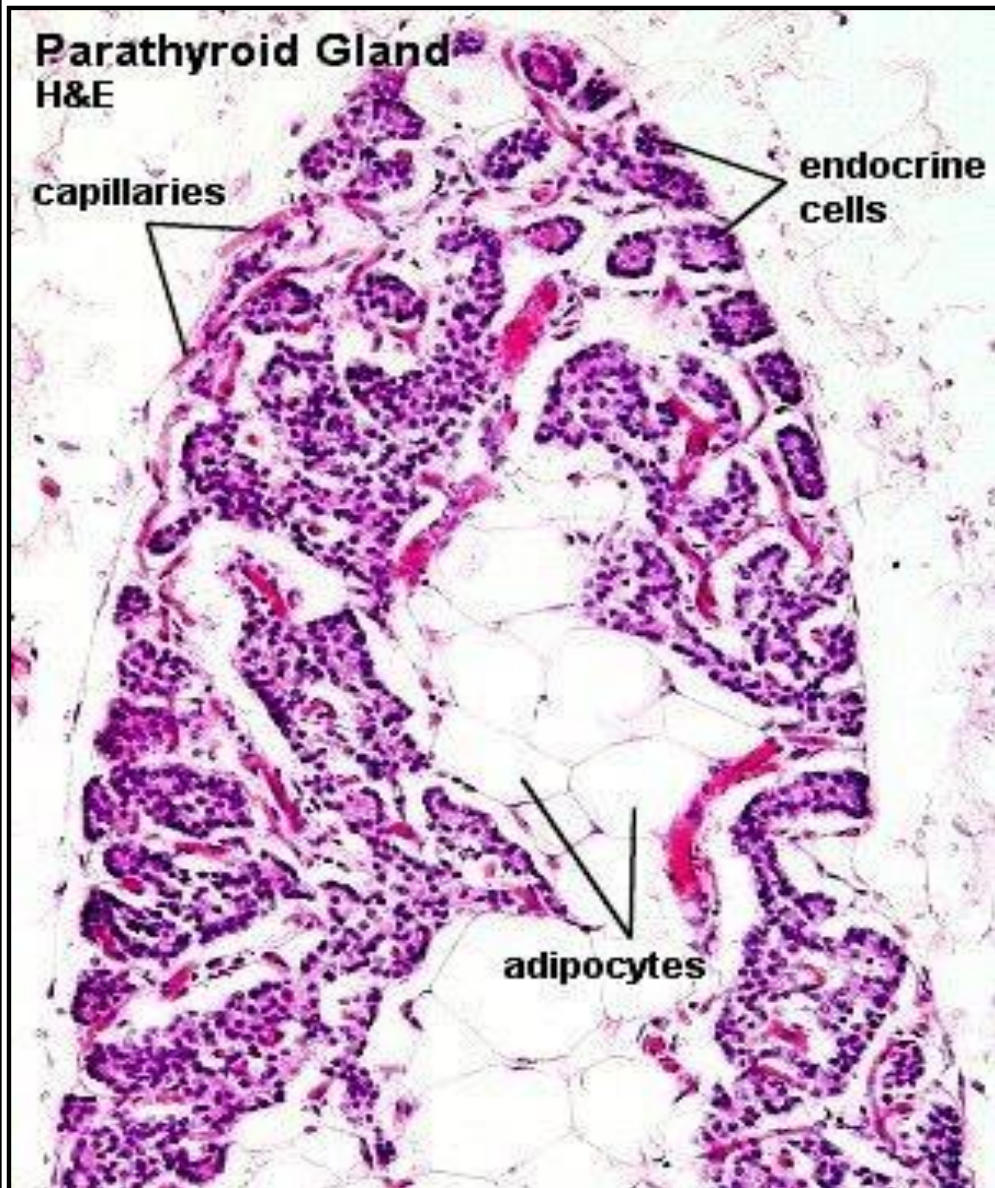


	<b>Chief cells (principal)</b>	<b>Oxyphil cells</b>
<b>size</b>	Small polygonal	Large polygonal
<b>number</b>	numerous	few
<b>Stain</b>	Faint acidophilic	Deep acidophilic
<b>nucleus</b>	<b>Active</b> , Large vesicular	<b>Inactive</b> , Small dense
<b>rER</b>	More (produce hormone protein in nature)	sparse
<b>Function</b>	Parathyroid hormone (↑ Blood Ca level)	<b>unknown</b>

Parathyroid gland → surrounded by a thin connective tissue capsule (stroma) + cells surrounded by B.Vs parenchyma



# Parathyroid gland in old people



Changes that occur in the gland with age:

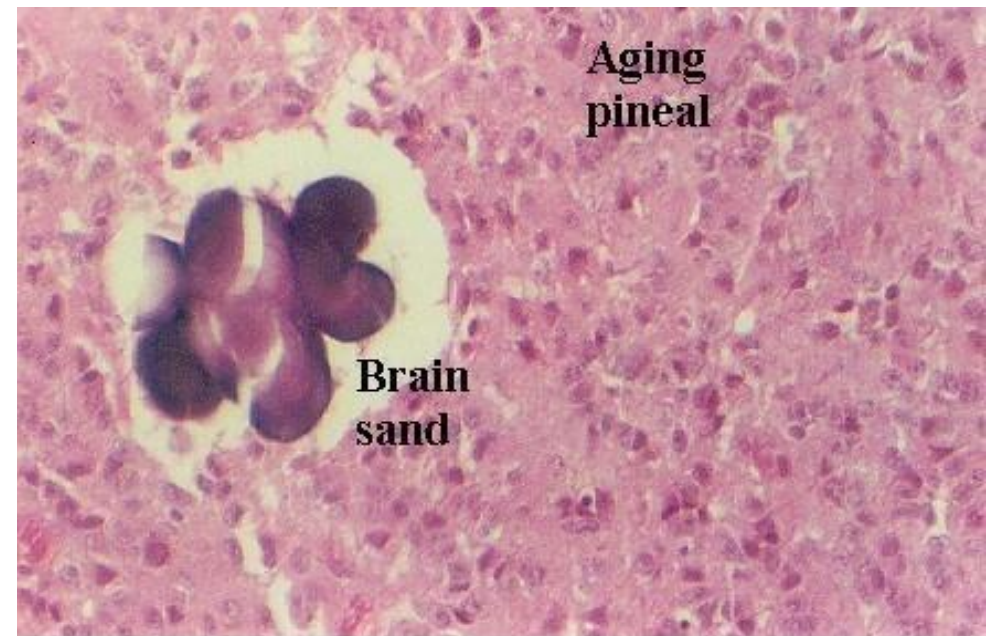
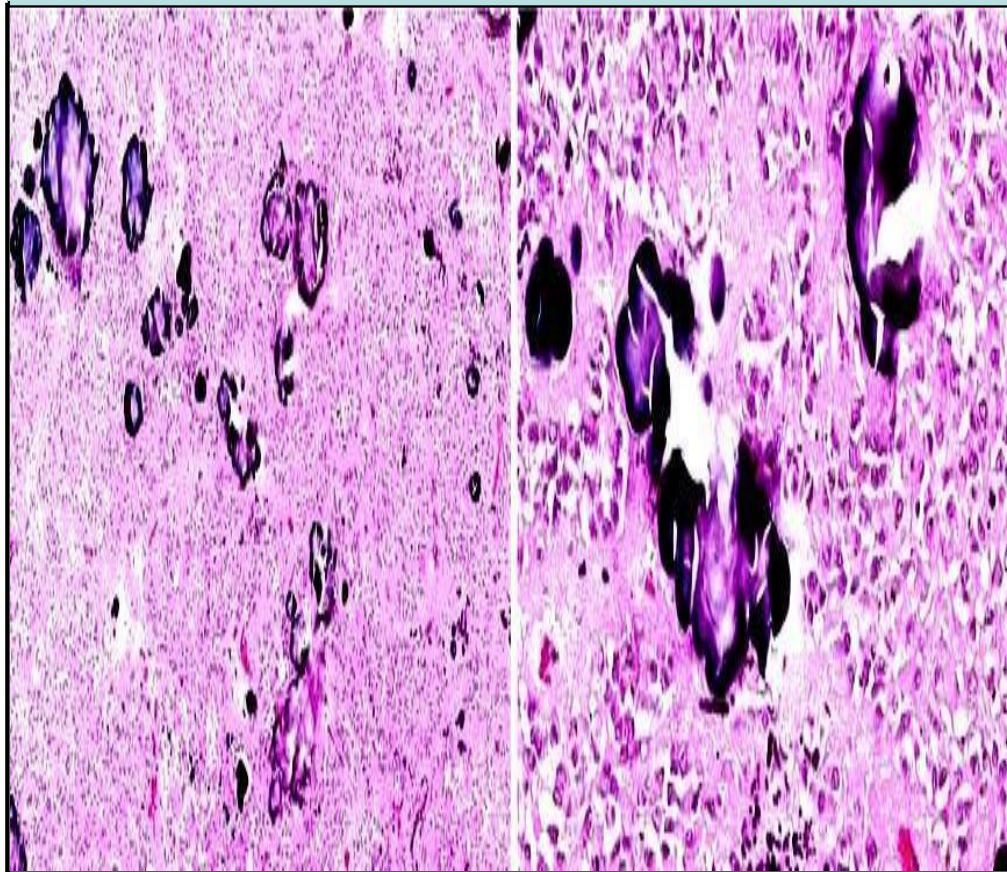
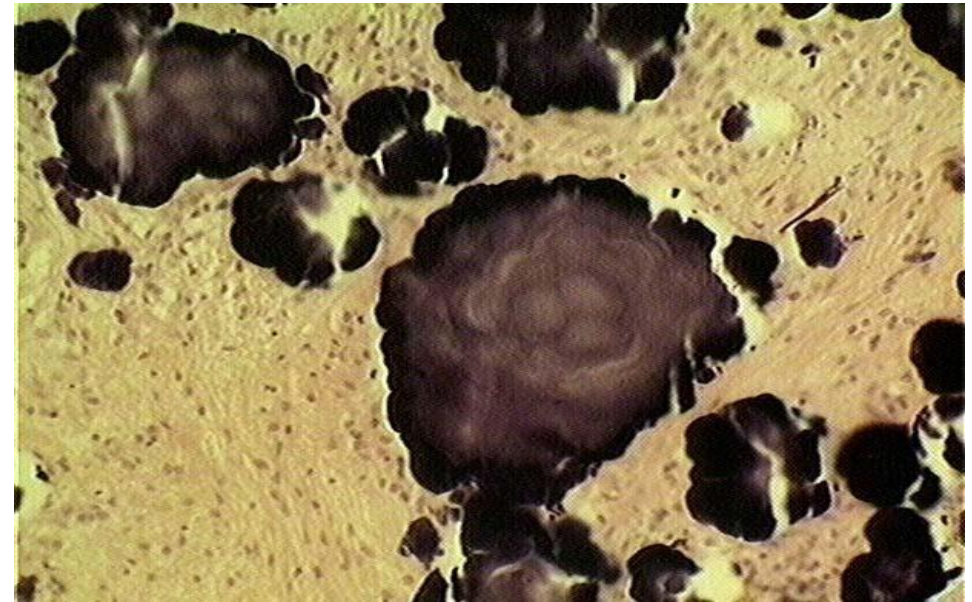
- 1) fibrosis,
- 2) ↑ fat cells,
- 3) ↑ oxyphilic cells,
- 4) ↓ chief cells



# Pineal gland (Epiphysis cerebri)

Pineal gland+ pars nervosa → nervous in origin

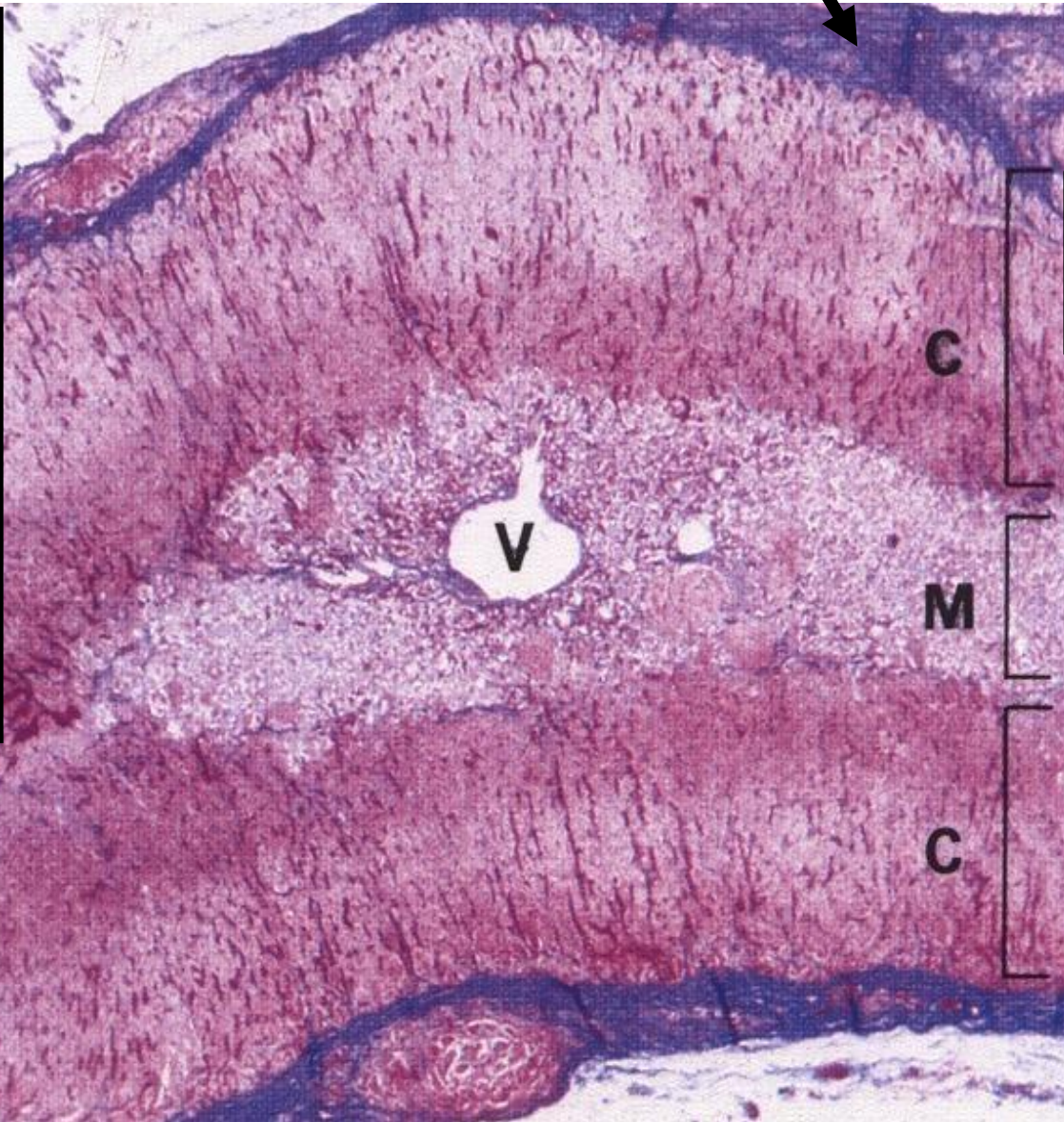
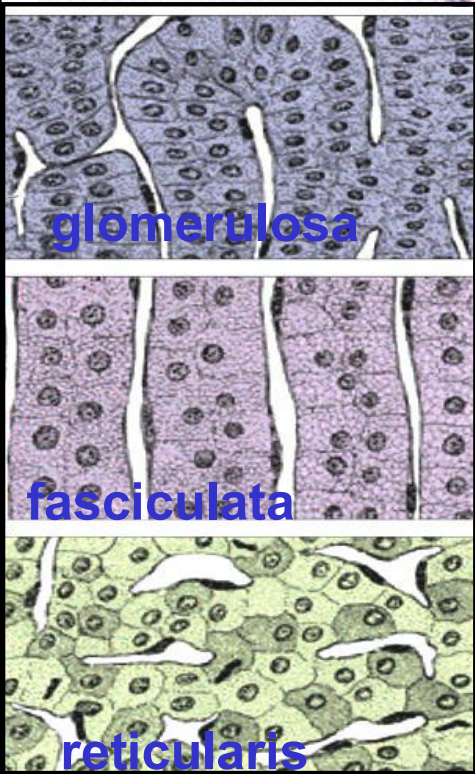
- 1 Pinealocytes (neurosecretory cells, secrete melatonin)
  - 2 Astrocytes (glial cells)
  - 3 Blood vessel
- Brain sand with old age** (calcification, These are not a degenerative change; not pathological)





# Suprarenal gland

Thick connective tissue capsule.



Medulla → ectodermal origin  
Cortex → mesodermal origin

**cortex** → yellow in fresh state , contain cells full of fat droplets (precursor)

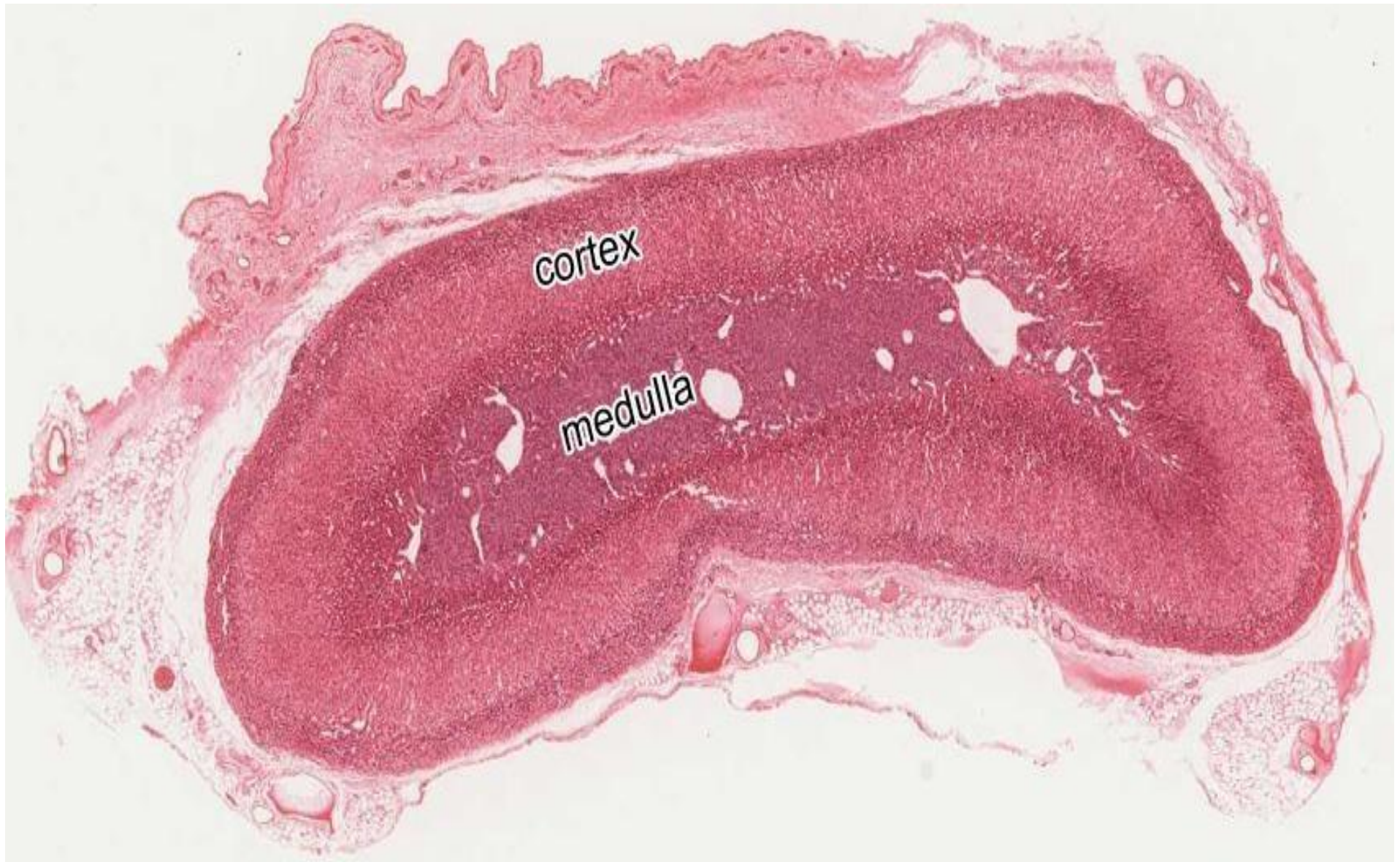
**Medulla** → Reddish-brown in fresh state, contain B.Vs

كيف اميز النخاع من القشرة وهو اصلاً ما في حد فاصل واضح بينهم؟

تختلف لونها: القشرة لونها أصفر، والنخاع بني



# Suprarenal gland

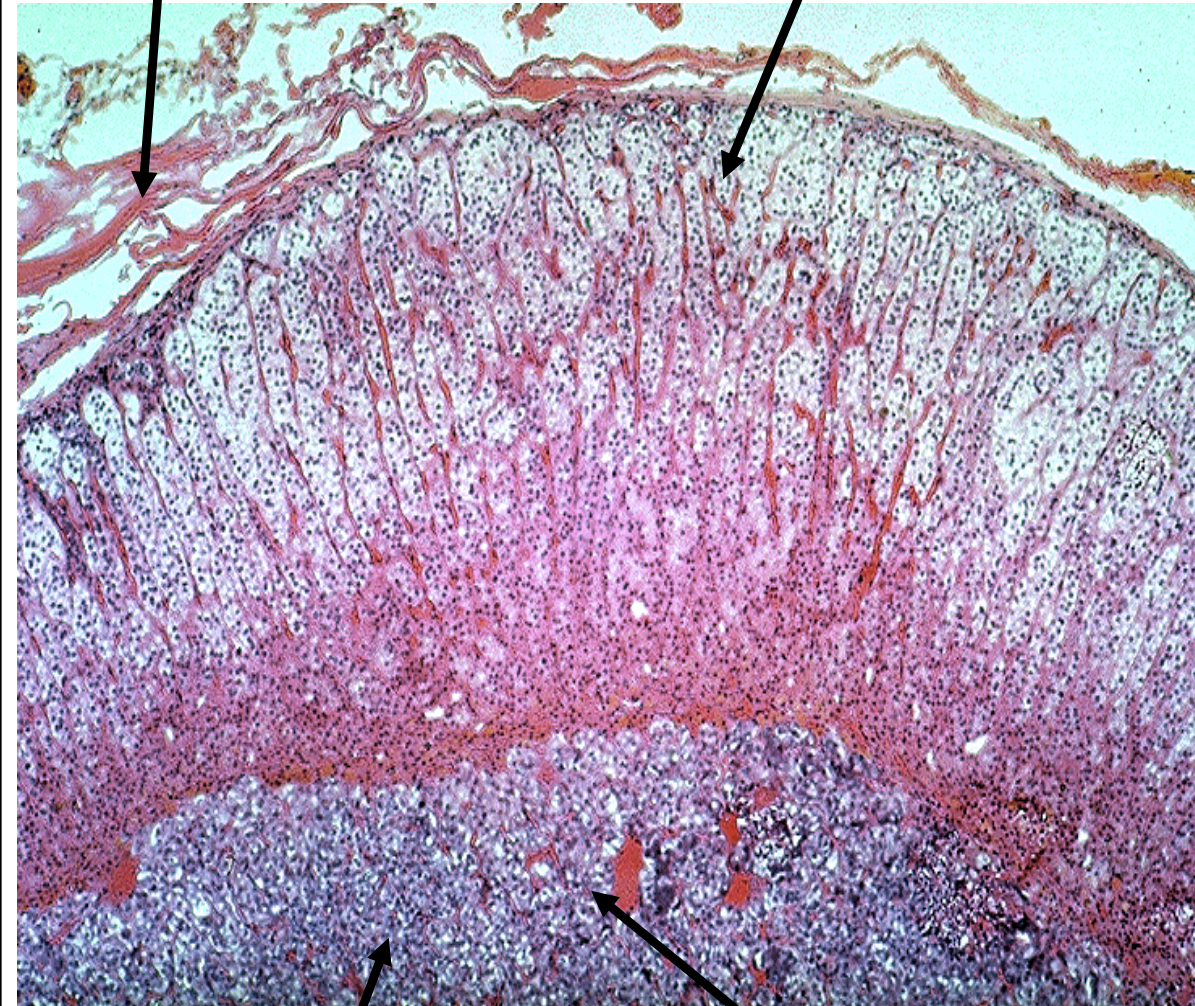




# Suprarenal gland

Acidophilic, vacuolated,  
cortical, steroid producing cells

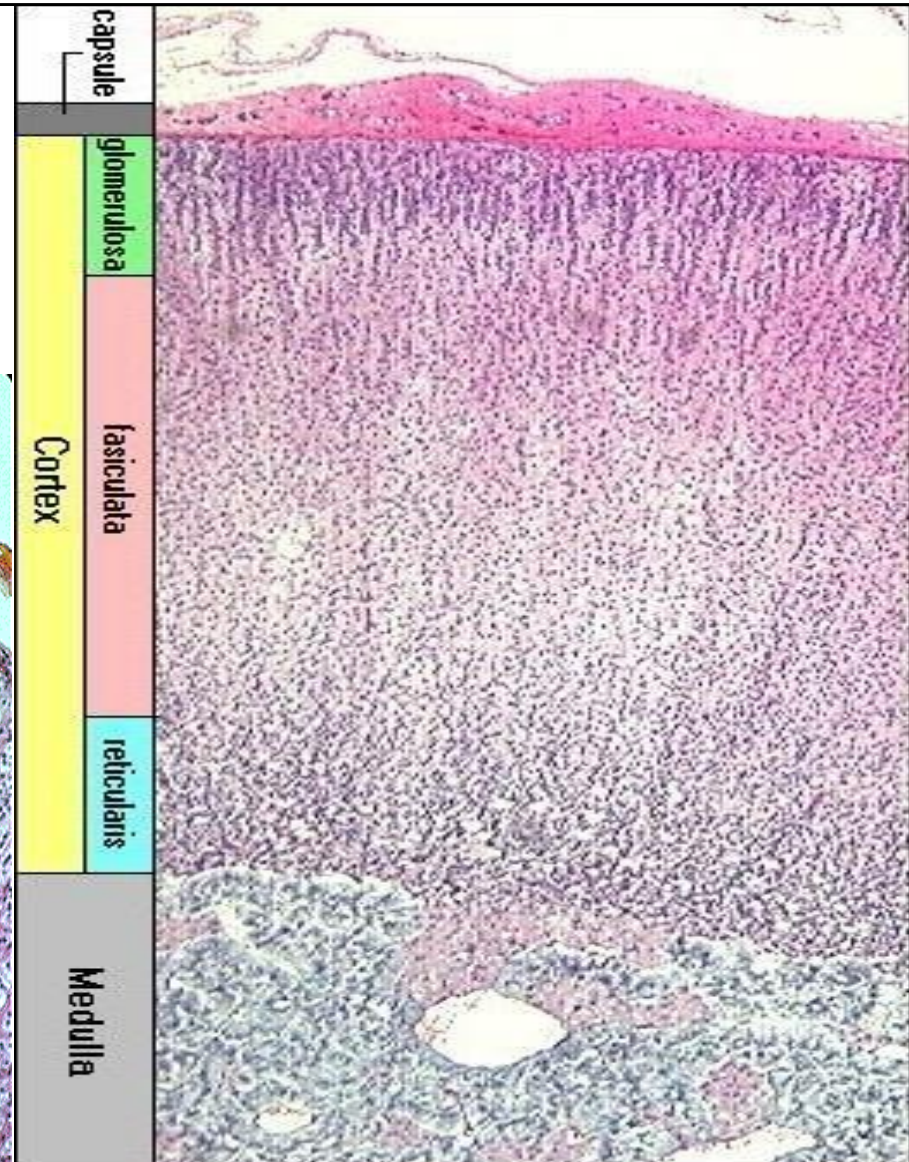
Capsule



Basophilic medullary cells

Large B.V

\*\*medulla → highly vascularized

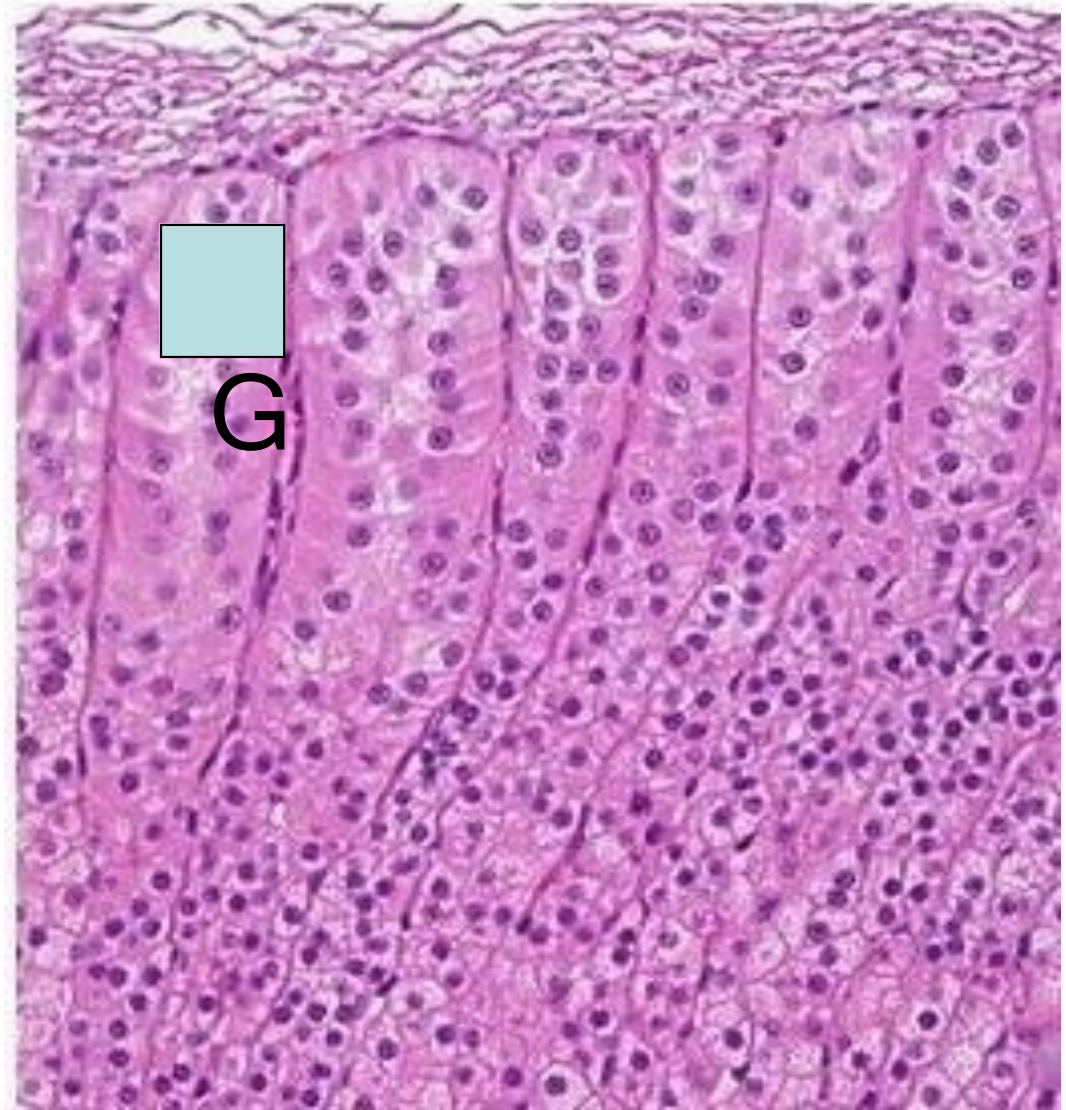
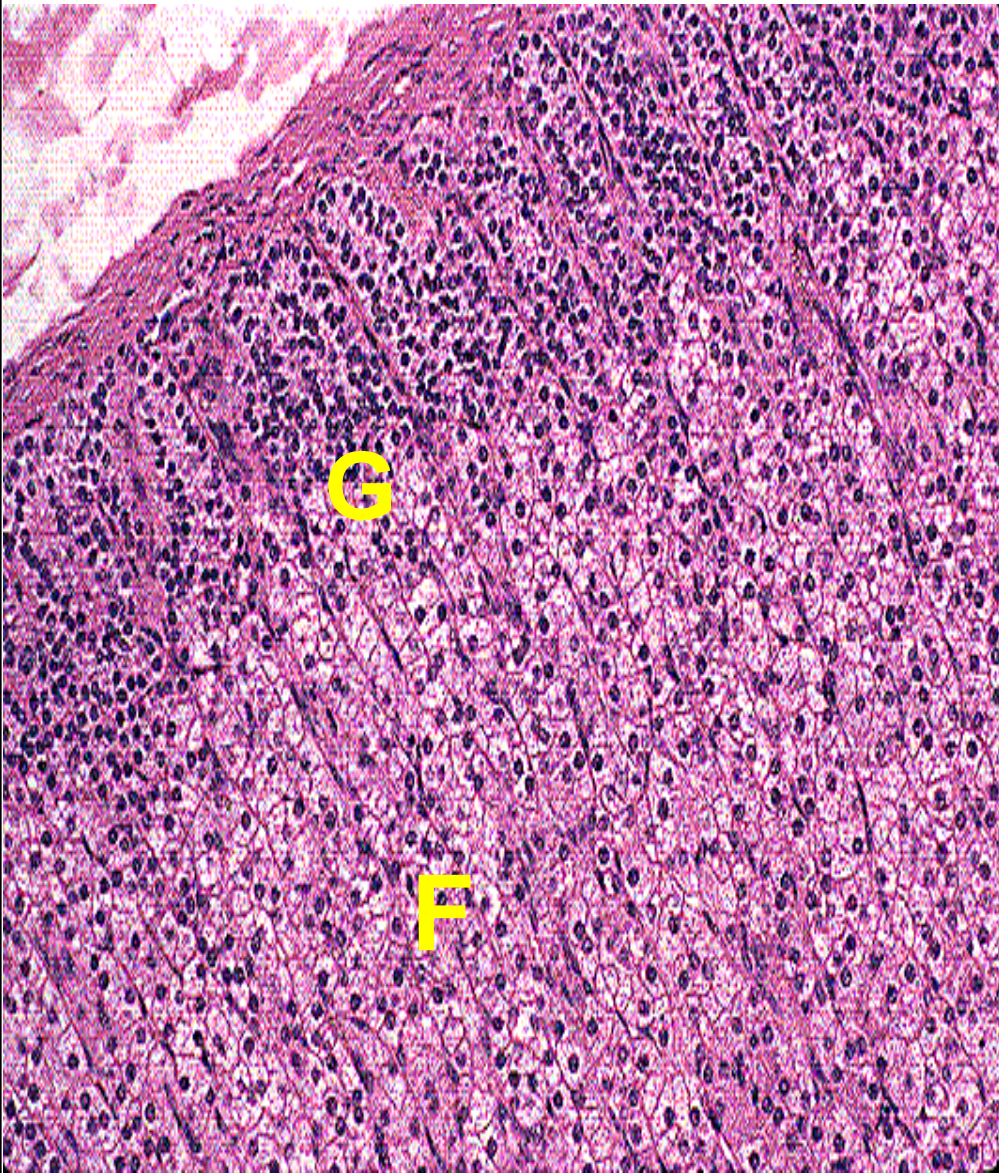


\*\*اسباب تسمية الطبقات:

- 1) Z. glomerulosa → presence of arches
- 2) Z. fasciculata → highly vacuolated
- 3) Z. Reticularis → cells for irregular anastomosing cords (reticulum)



# Suprarenal gland

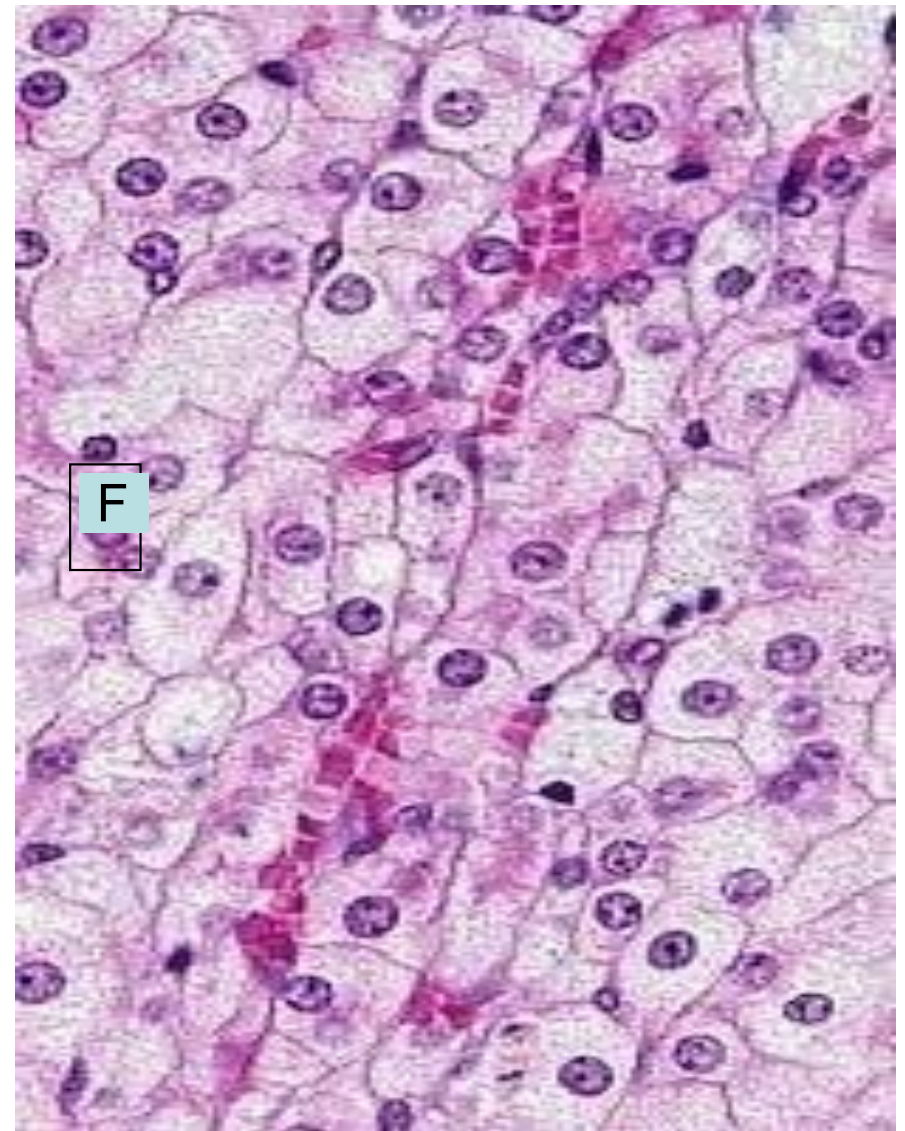
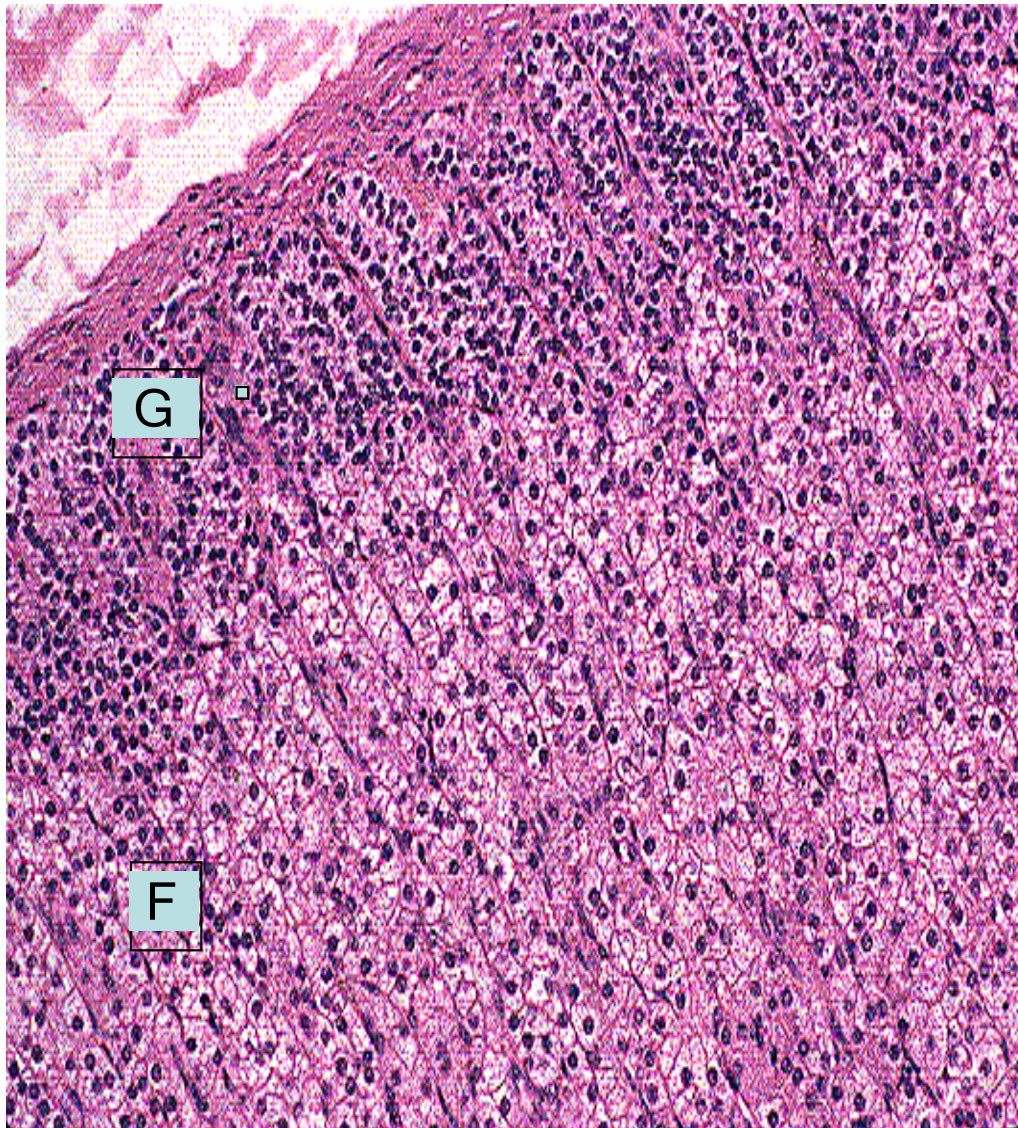


**Zona glomerulosa** → 15%, curved columns, produce aldosterone hormone.

**Zona fasciculata** → 65%, regular Cords, 1 or 2 cell thickness, separated by B.Vs, highly vacuolated with spongy appearance (lipid droplets) → spongiocytes, produce cortisone hormone

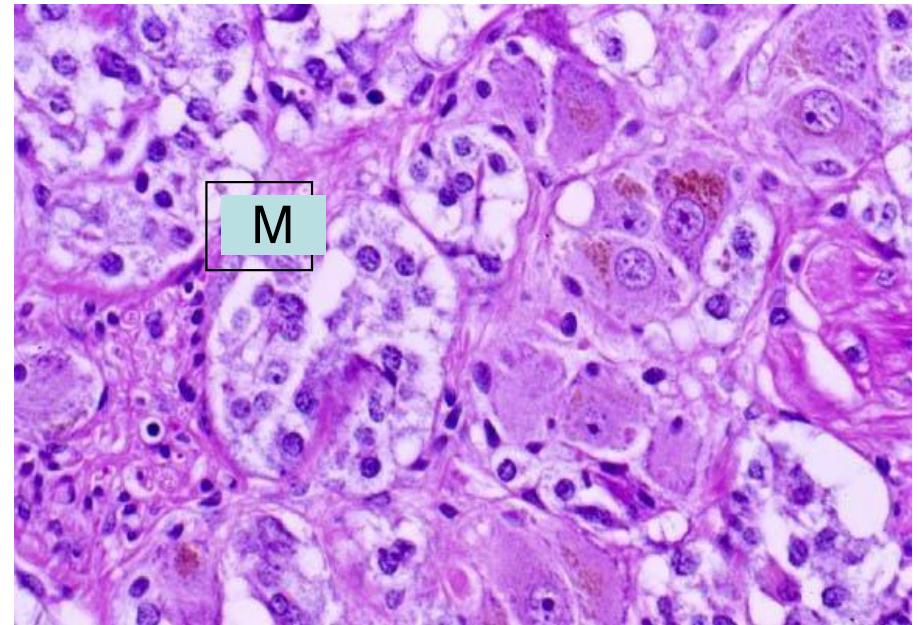
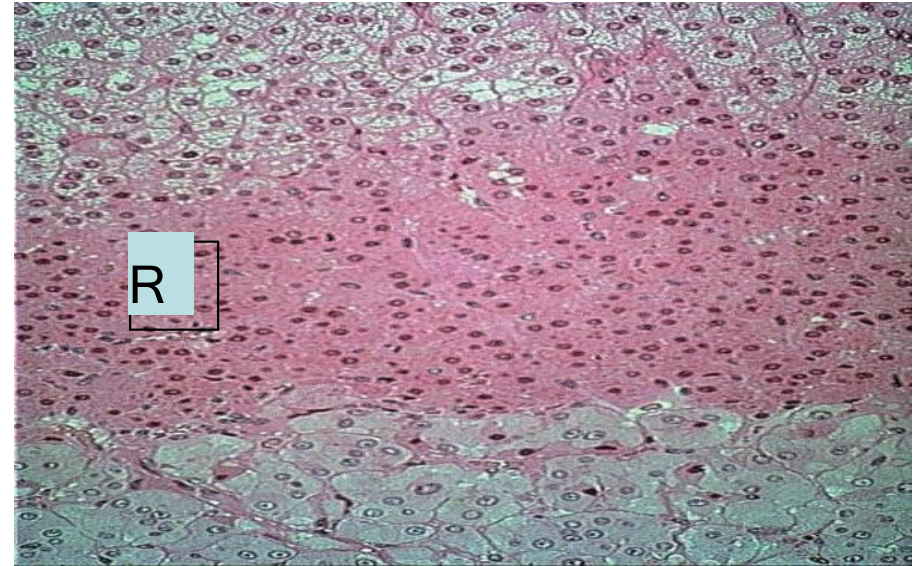
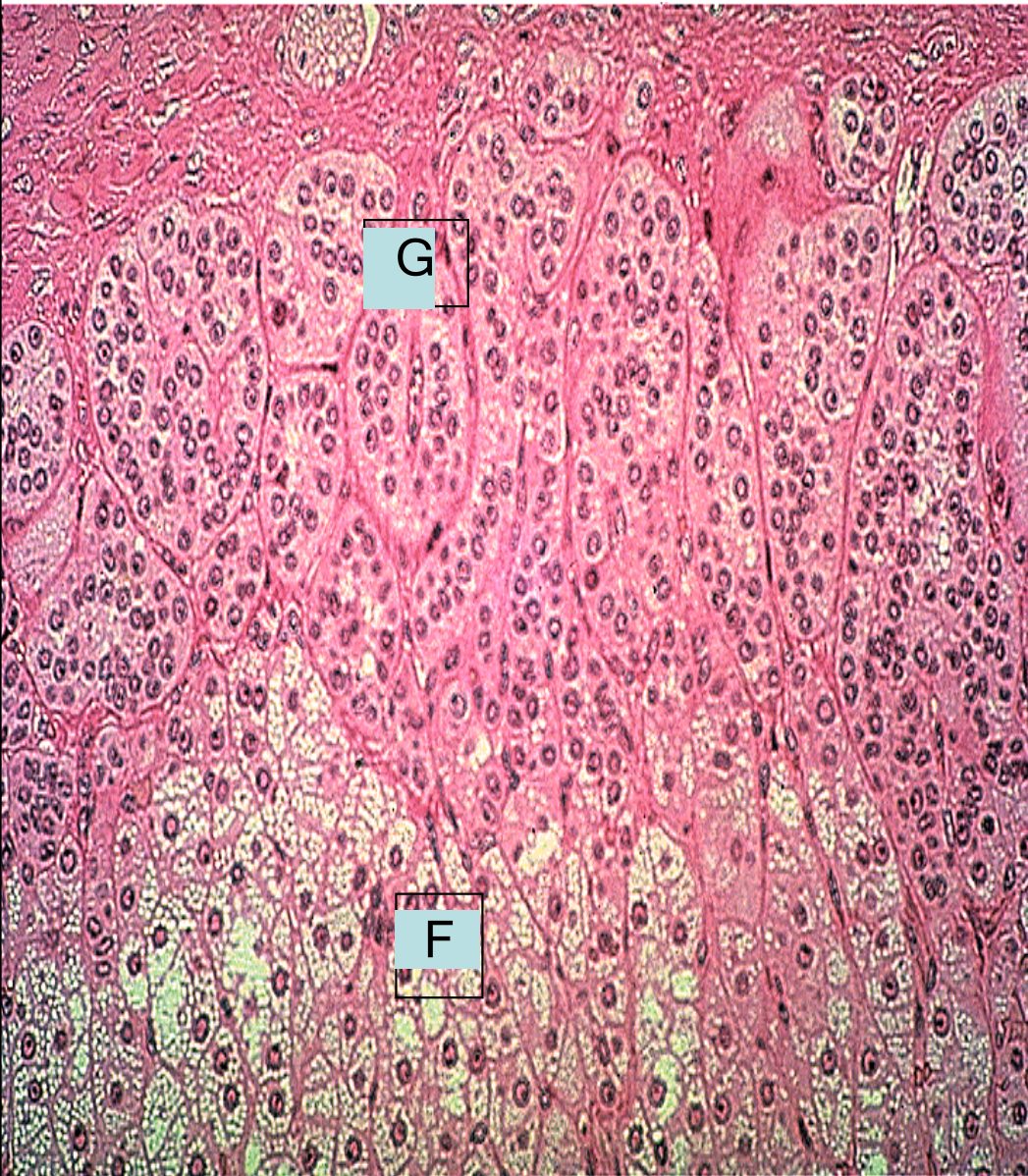


# Suprarenal gland





# Suprarenal gland



**Zona Reticularis** → 7%, irregular anastomosing cords, form a reticulum, produce androgen hormone

**Medulla** → basophilic cells arranged in groups, contain **1)** protein secreting cells called chromaffin cells produce A+ NA, **2)** Sympathetic ganglion cells, **3)** Lymphocyte like cells



# PANCREAS

islets of langerhan  
pale in color

## Stroma:

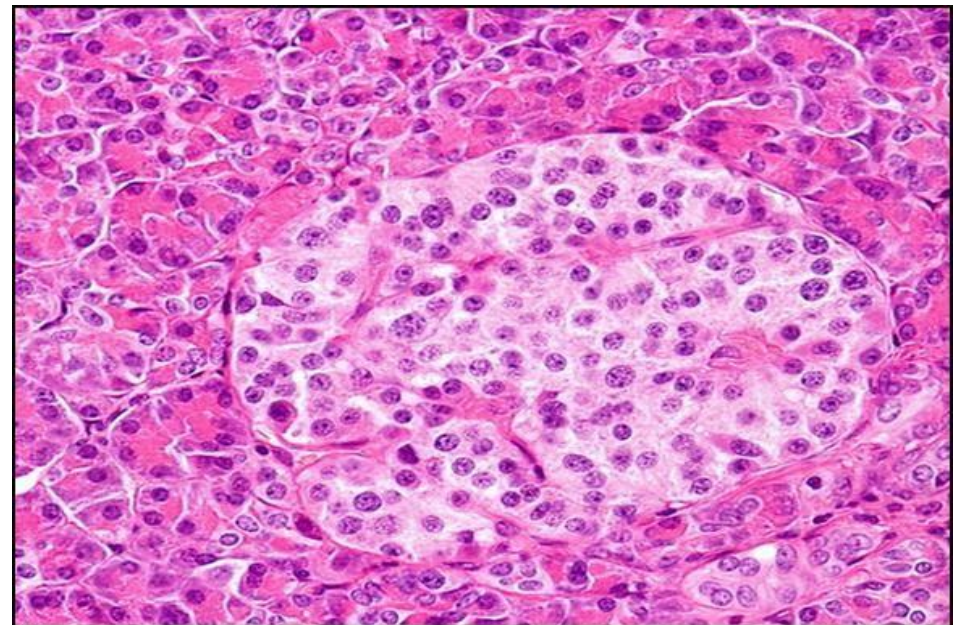
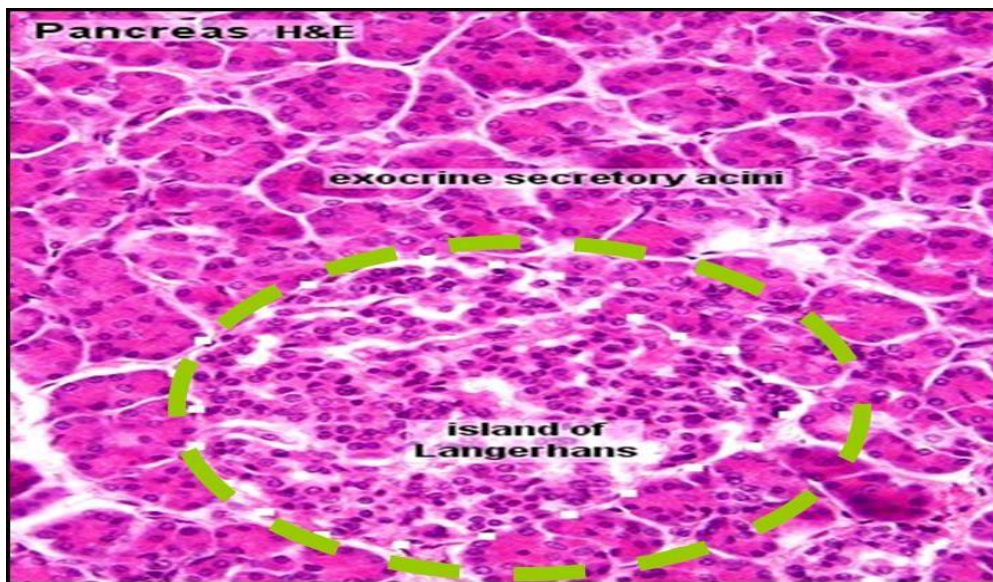
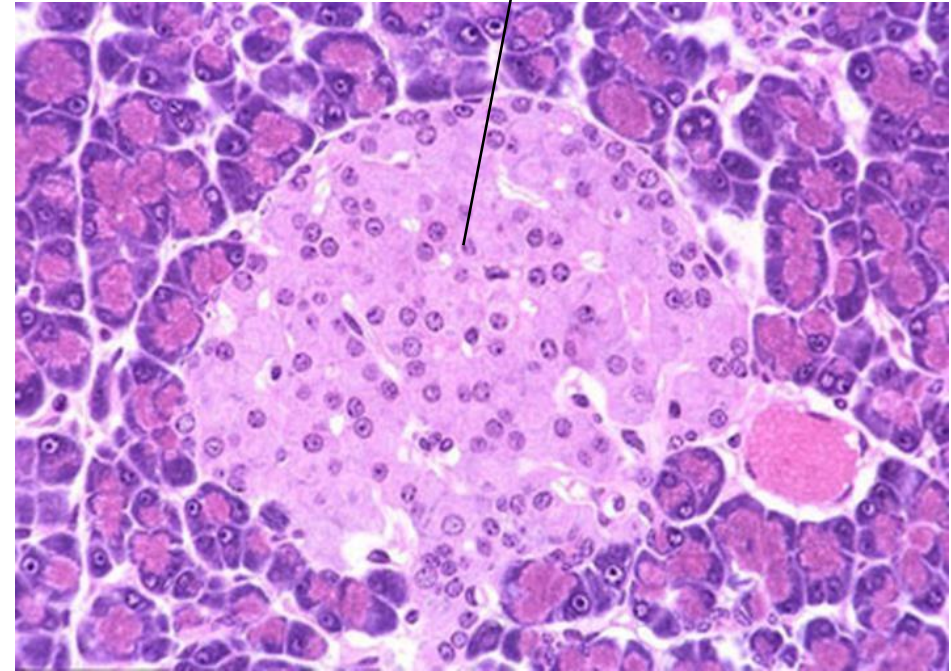
Surrounded by **thin** capsule

## Parenchyma

**cellular composition of the islands**

- ❑ 70% beta-cells, insulin.
- ❑ 20% alpha-cells, glucagon.
- ❑ 5- 10 % delta-cells, somatostatin
- ❑ F- cells (PP)

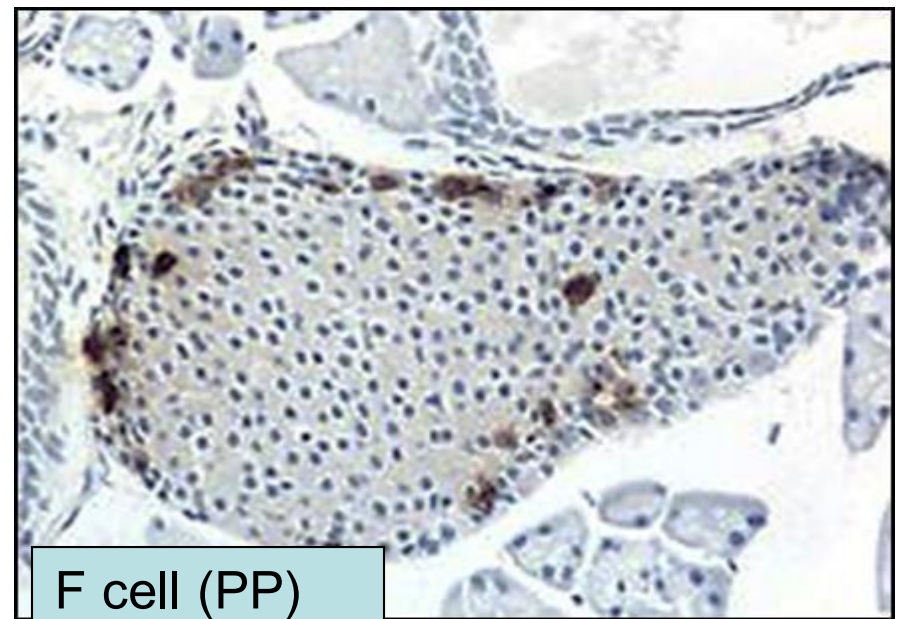
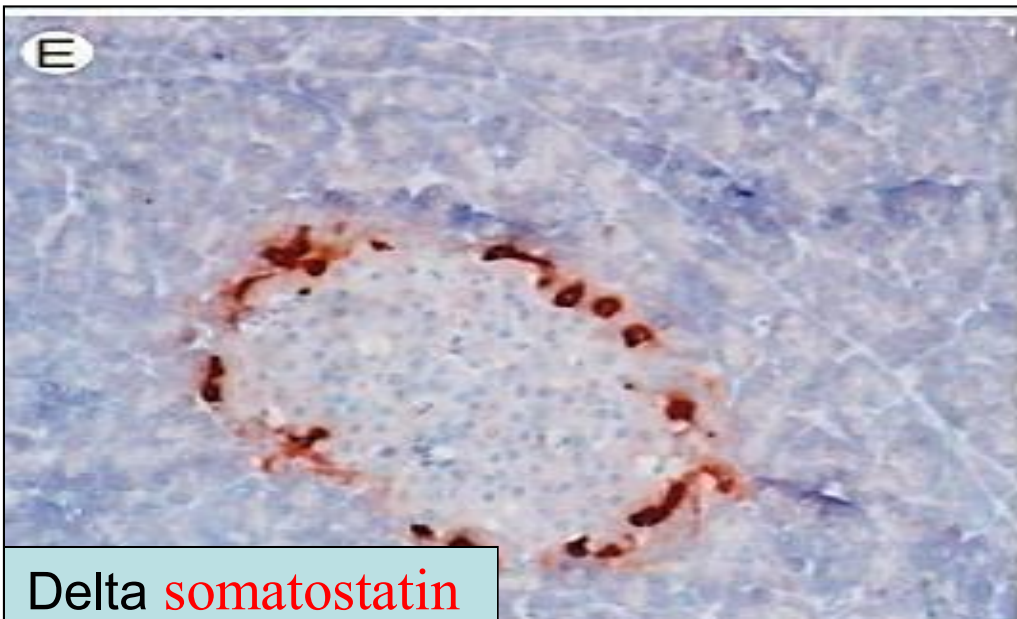
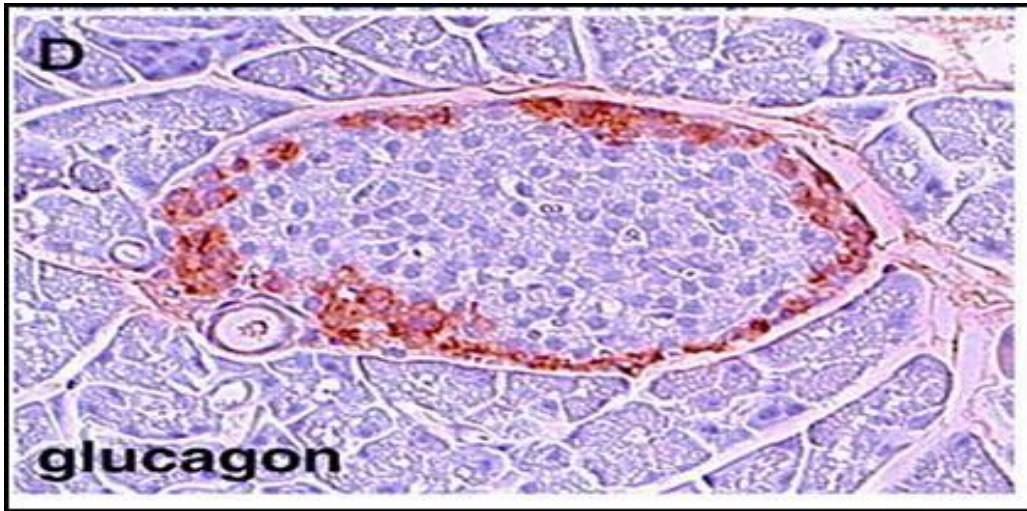
**pancreatic polypeptides**





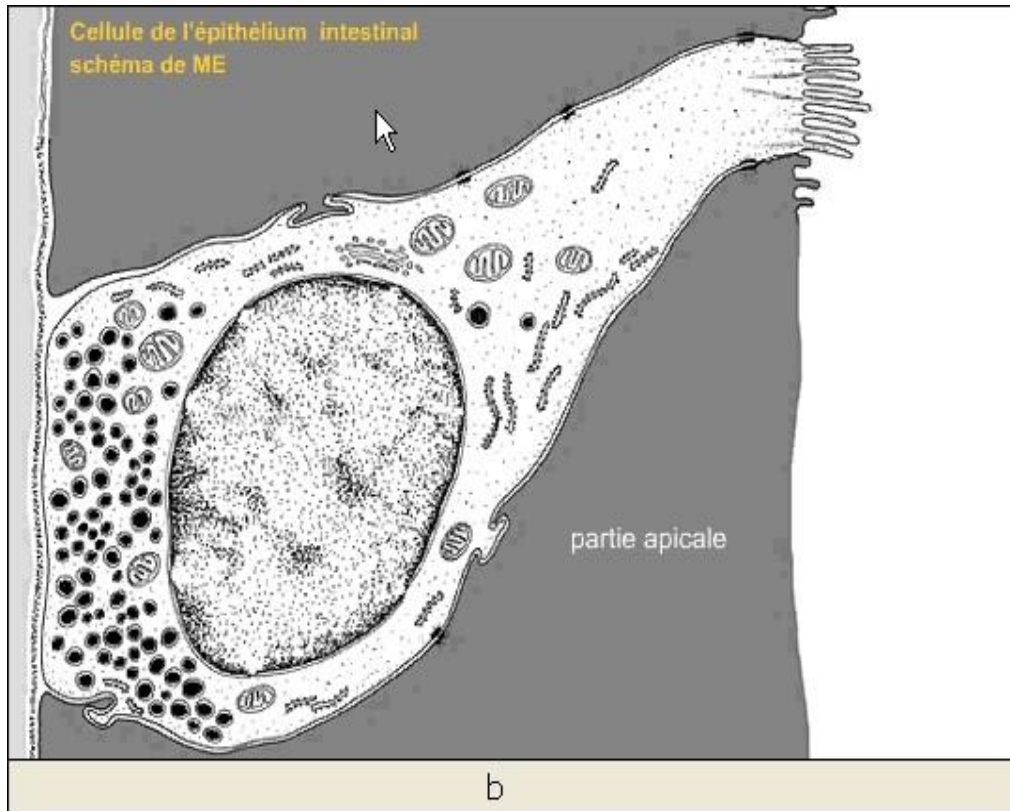
alpha cells are fewer in number than beta cells. in the periphery of island

beta cells in the center of the island



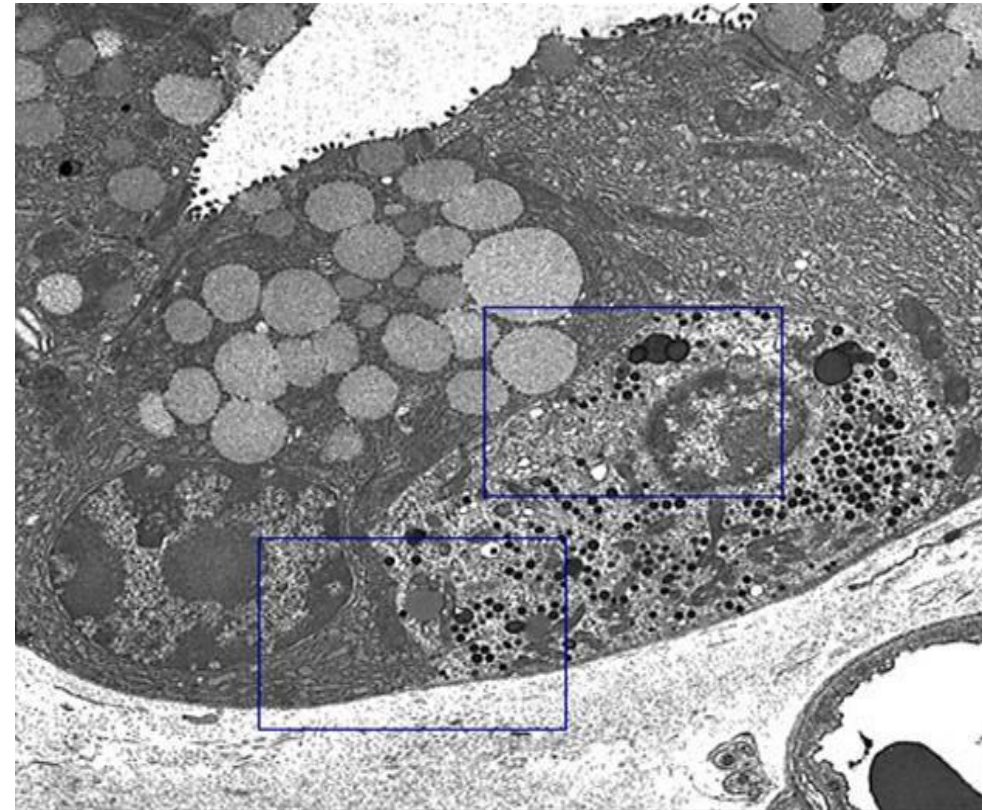


# Microscopic features



Open type

e.g. follicular cells  
they have apical  
surface that reaches  
the lumen.

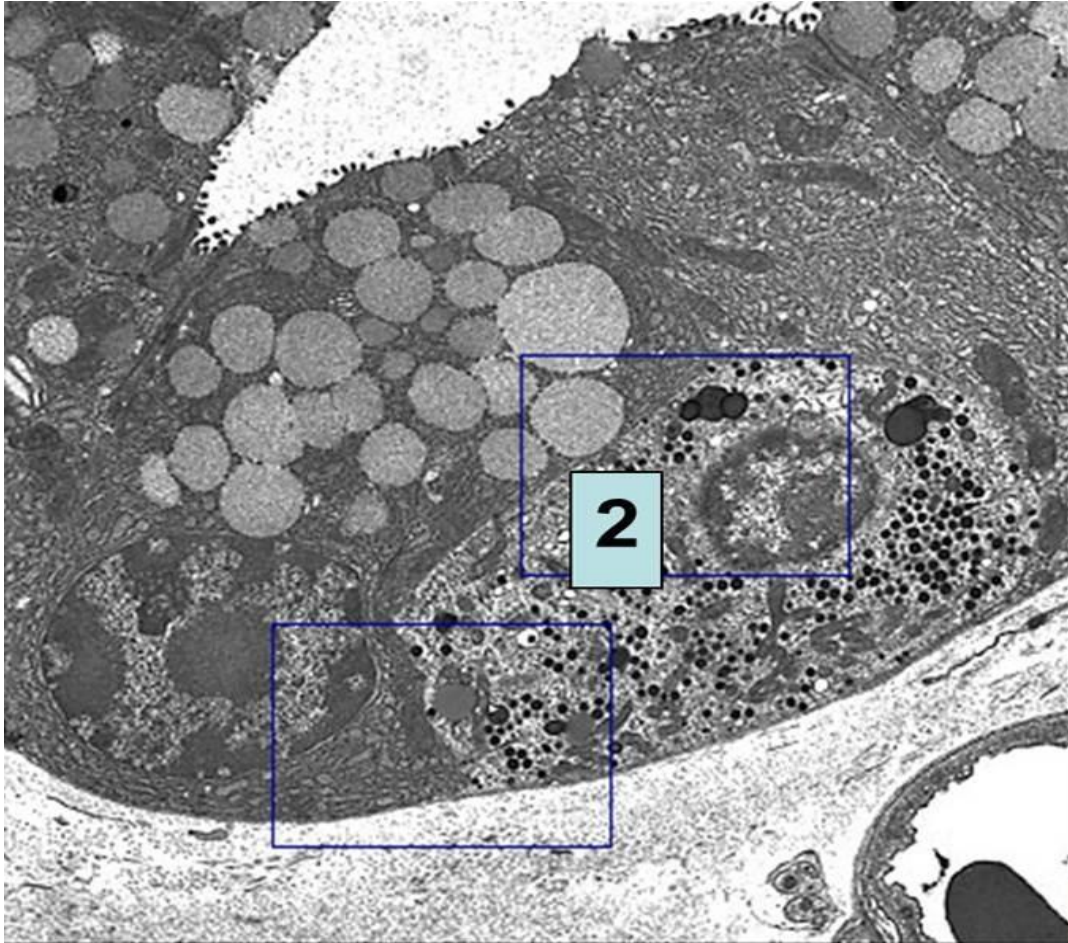


Closed type

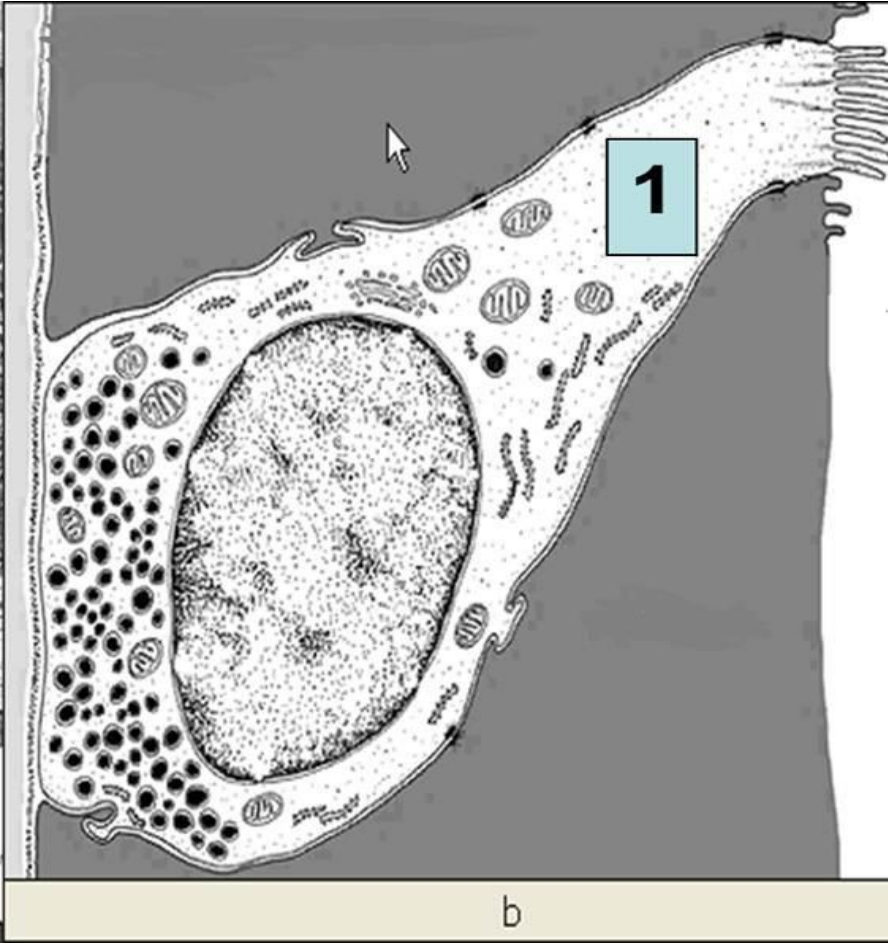
e.g. C-cells  
they do not reach  
the lumen of gland



# Closed type



# Open type





# Entero- endocrine cells

their granules  
are basal

