Histology

The **HEMATOXYLIN** stains ***nucleic acids***
(plus calcium deposits and bacteria) blue.

The **EOSIN** stains ***most proteins***
(actually, arginine and lysine) pink.

Clear areas represent

water,

carbohydrate

lipid,

gas

Nuclei

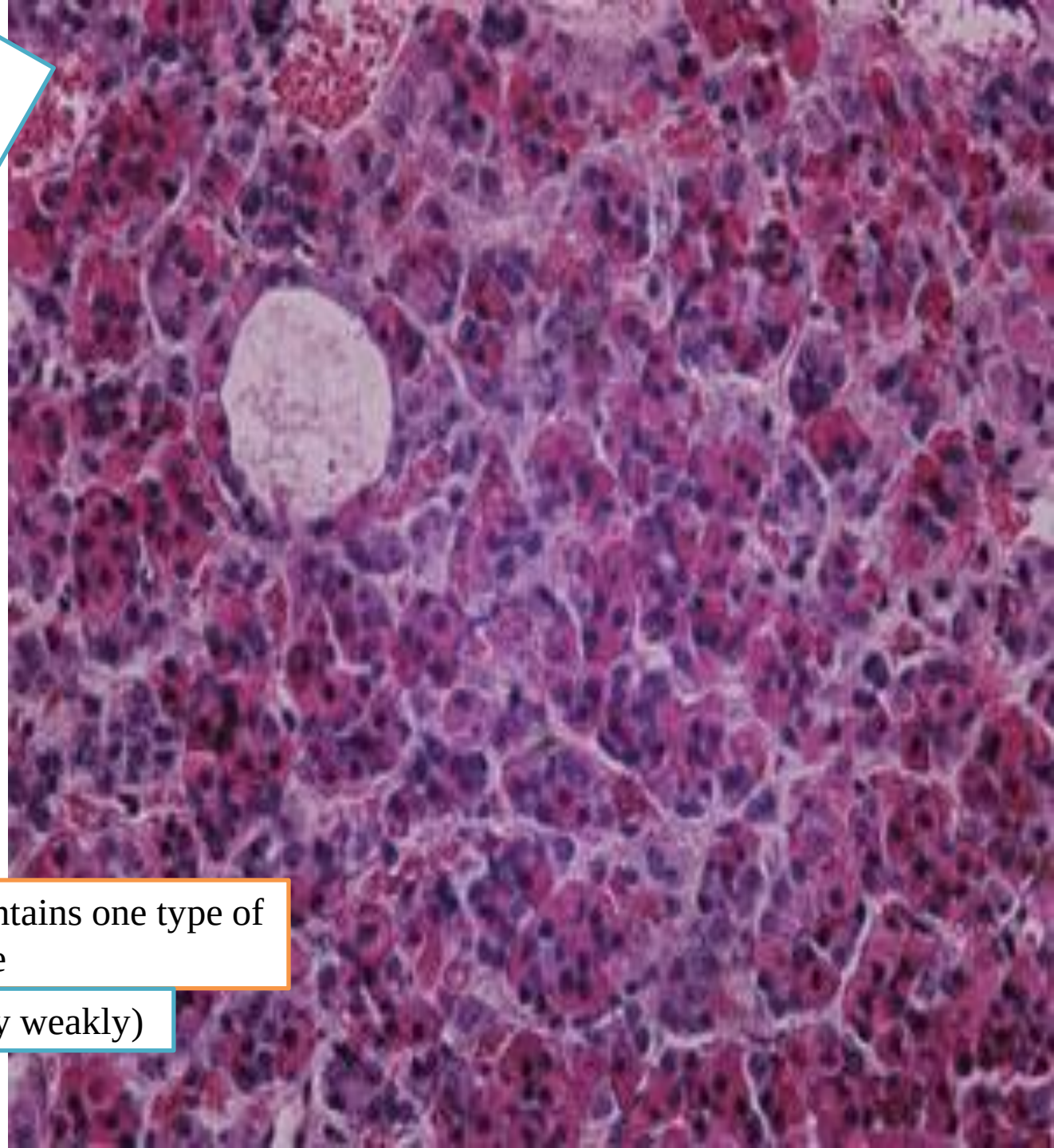
will always stain

Blue with the

Hematoxylin.

The cytoplasm of cells

will stain according to its composition.

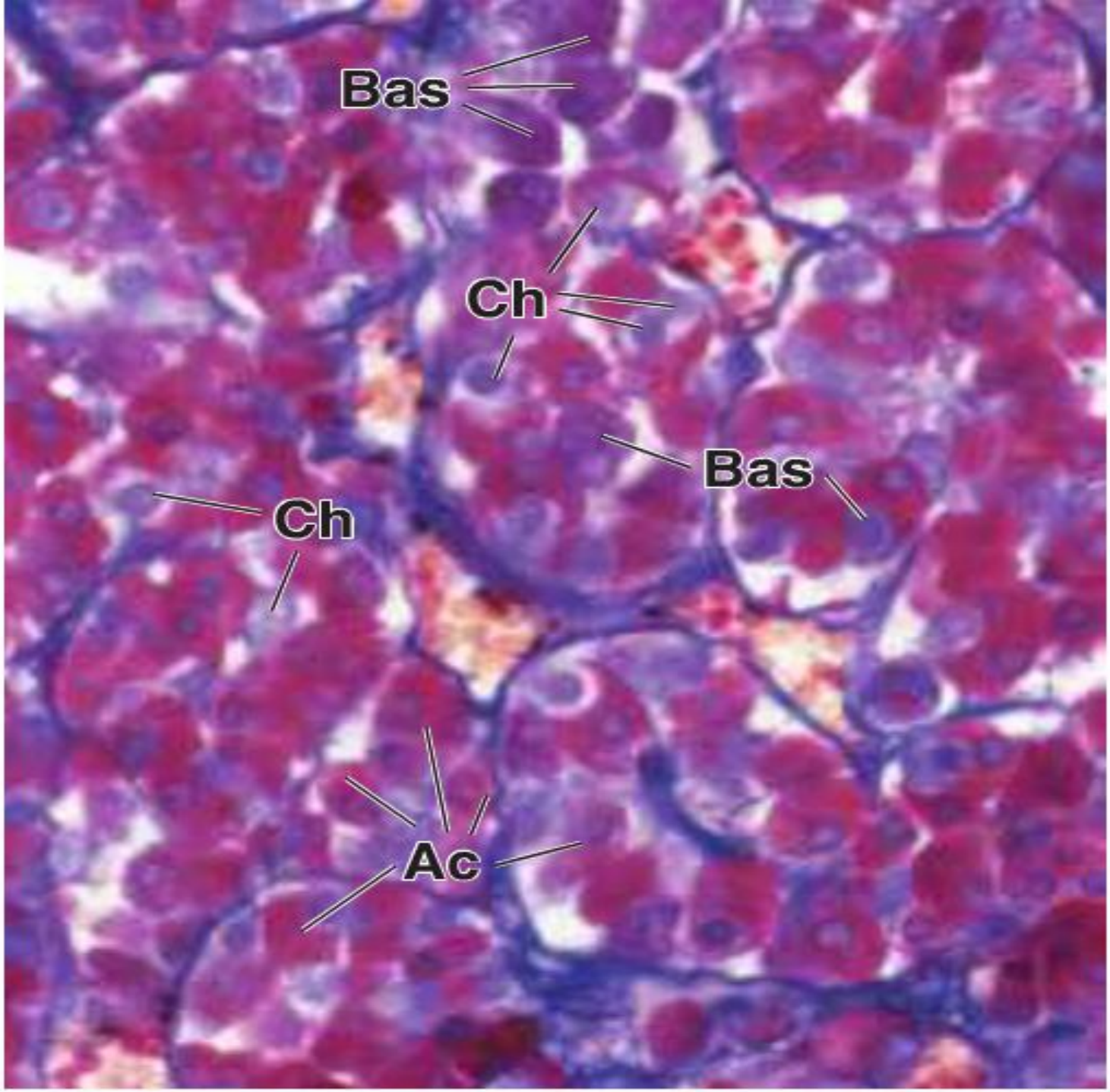


Two types of chromophils (cells which take up stain) called **acidophils** and **basophils**.

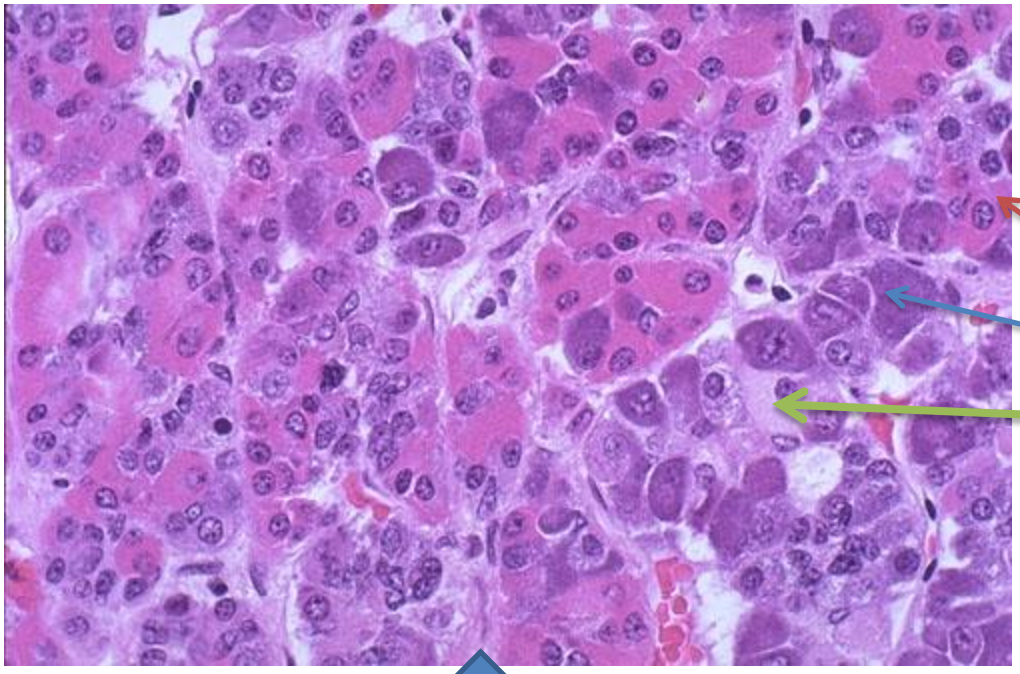
The anterior pituitary also contains one type of chromophobe

(cells which stain only weakly)

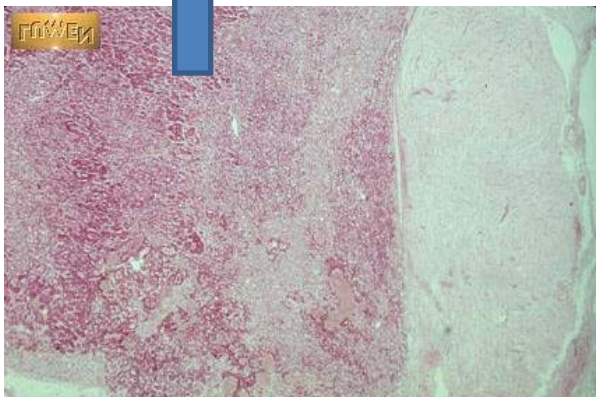
Histologists identified three types of cells according to their staining reaction, namely
Basophils (10%)
Acidophils (40%)
Chromophobes (50%)



Adenohypophysis – high power



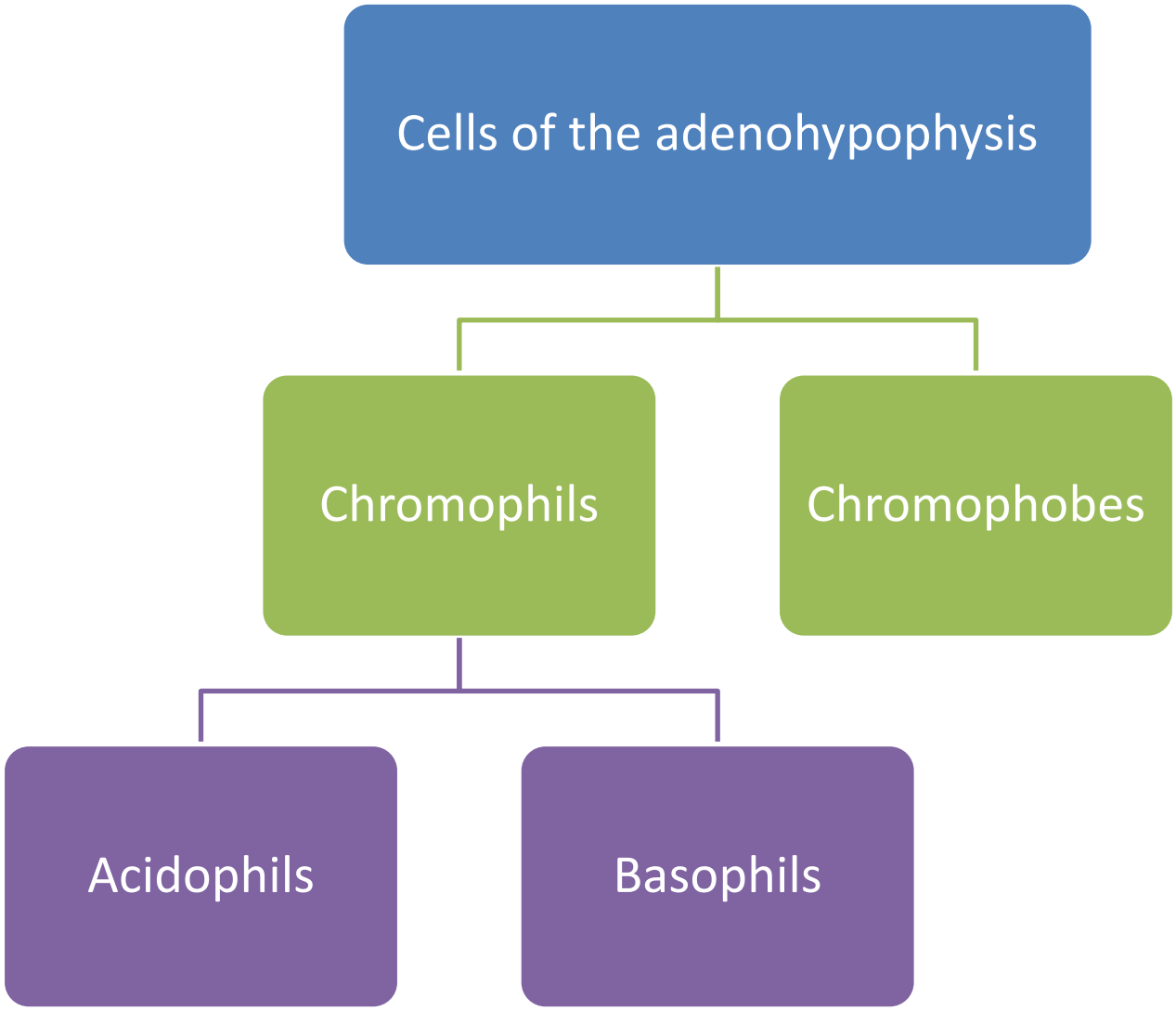
The adenohypophysis contains 3 cell types:
-acidophils (stain red)
-basophils (stain blue)
-chromophobes (pale stain)



The adenohyphysis stains red-blue on low power because of the acidophils and basophils

Importance of different colors?

- Acidophils secrete growth hormone and prolactin
- Basophils secrete TSH, LH and FSH and ACTH
- Chromophobes are undifferentiated cells

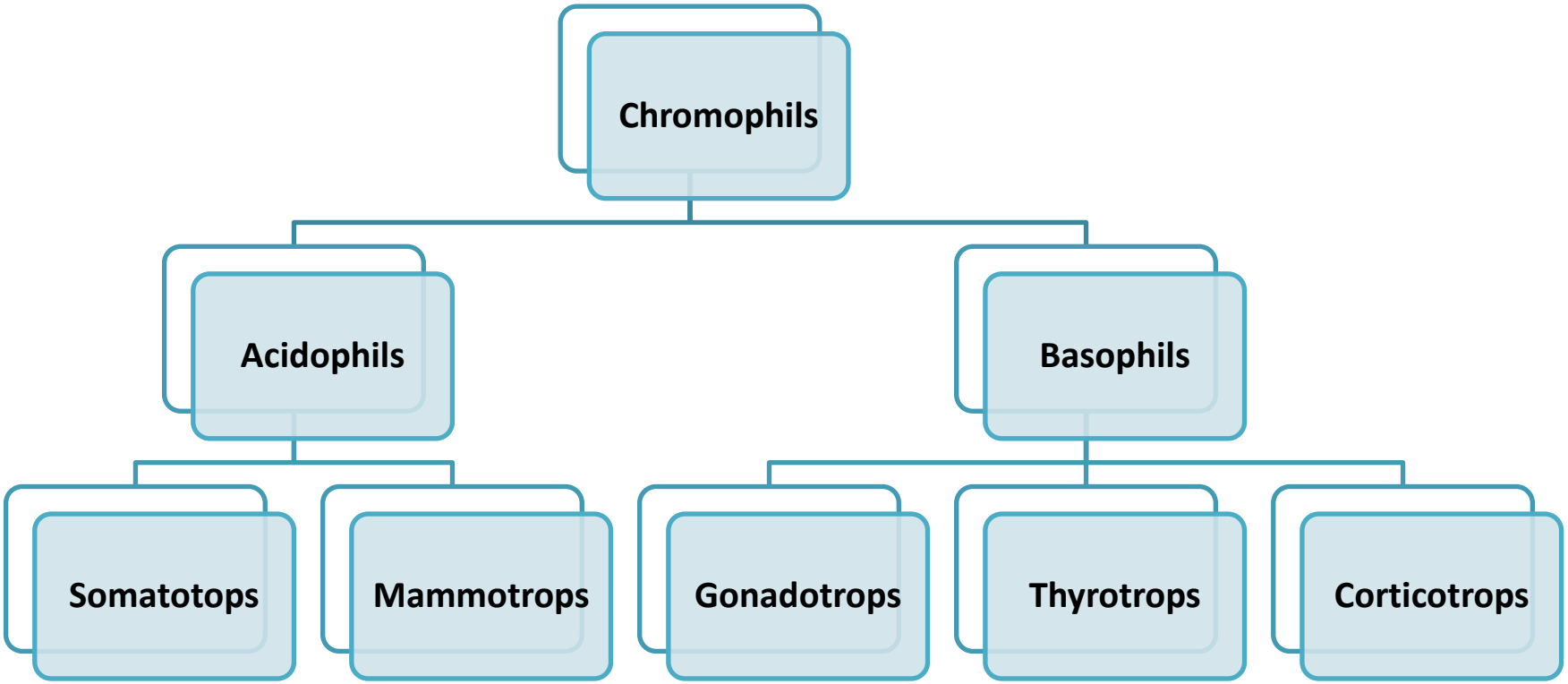

Cells of the adenohypophysis
Chromophils
Chromophobes
Acidophils
Basophils

Cells of the Adenohypophysis

1- **Chromophobes**

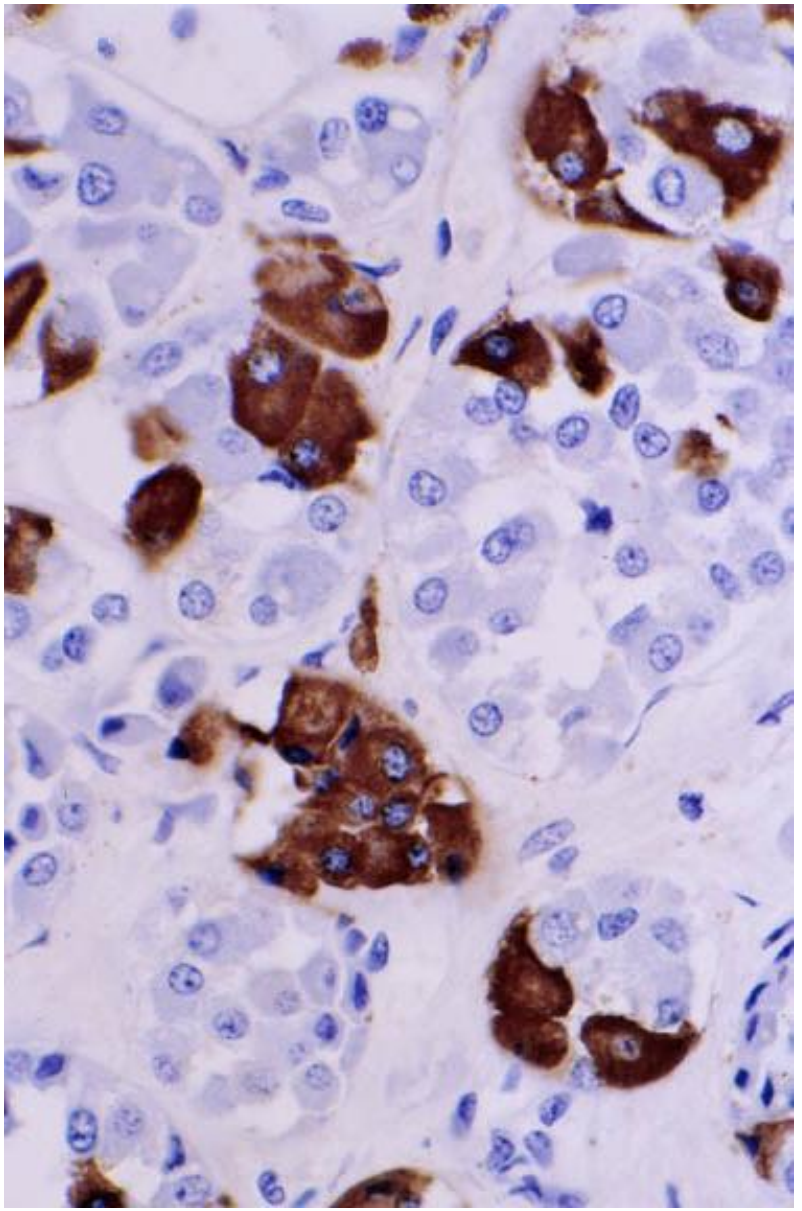
- small weakly stained cells
- represent stem cells or (most likely)
- partially degranulated chromophils

* Folliculostellate cells: large cells with many processes of unknown function


Chromophils
Acidophils
Basophils
Somatotops
Mammotrops
Gonadotrops
Thyrotrops
Corticotrops

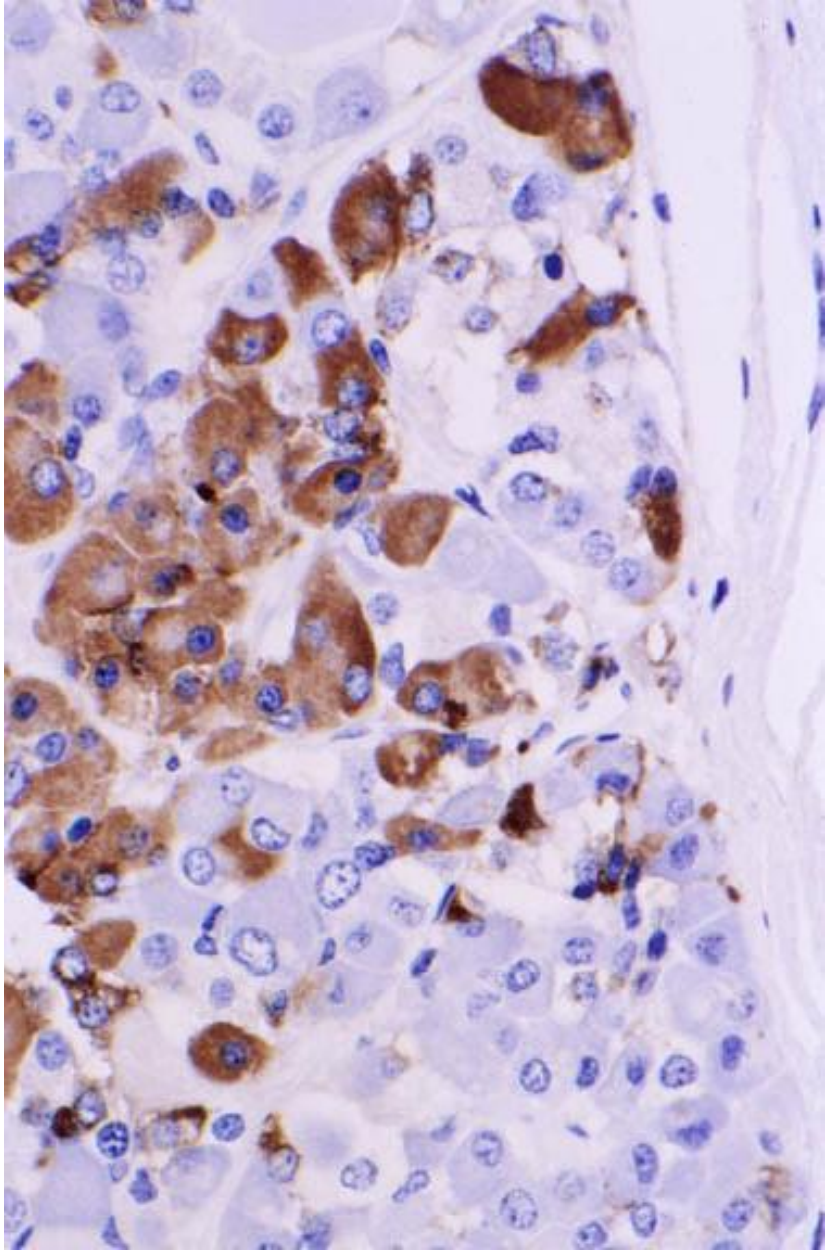
1- Somatotrops:

- Form ~ 50% of the total number of chromophils.
- Occur in clumps and clusters
- Central nucleus
- Rod shaped mitochondria
- Many rER
- Many secretory granules (secrete GH)
- Moderate Golgi
- ***Action of GH***: acts on growth of long bones via insulin-like growth factors synthesized in the liver.



2- Mammotrops

- Form 15-20% of chromophils
- Occur singly
- Small polygonal cells
- Organelles are ill-defined
- During lactation organelles increase in size and number
- Secrete prolactin
- ***<u>Action of prolactin</u>***: promotes milk secretion.



3- Gonadotrophs

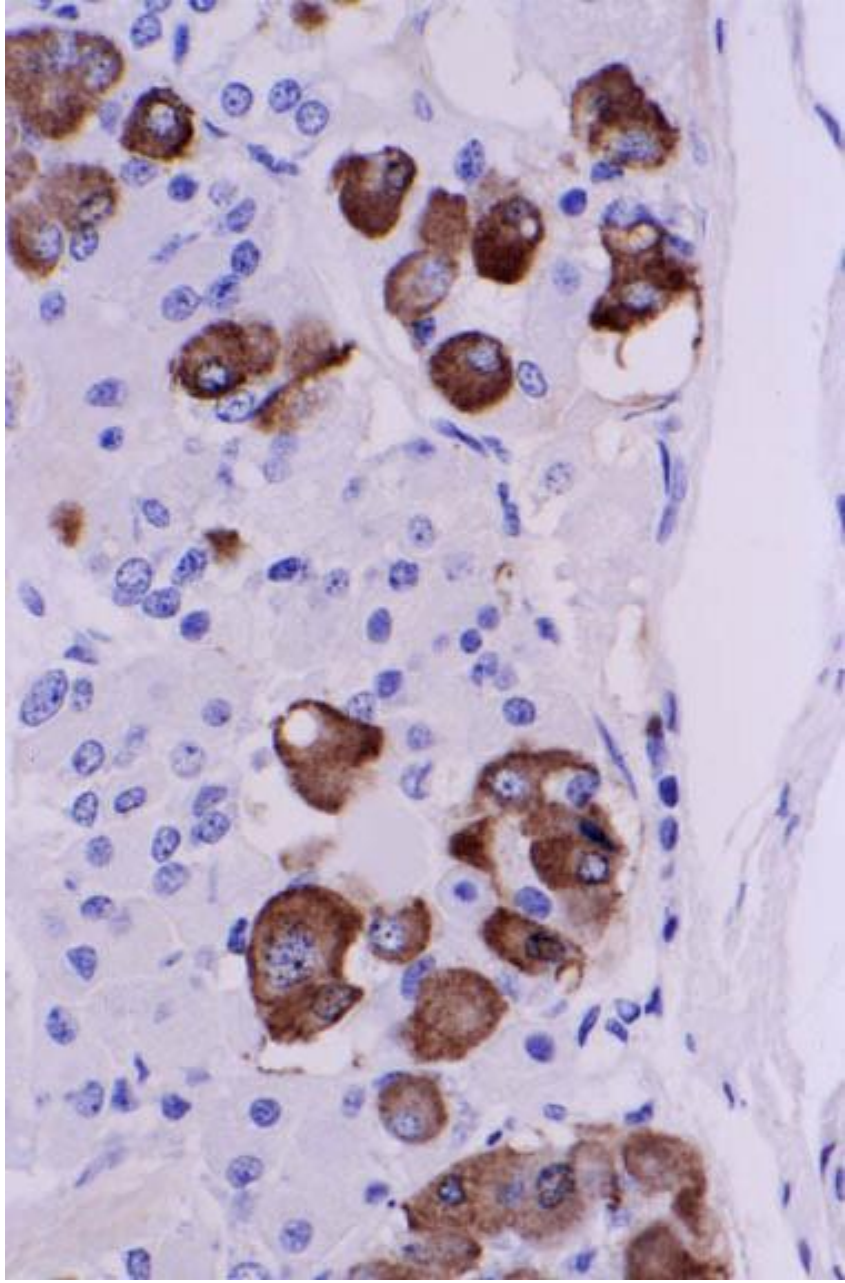
- Form ~ 10% of chromophils.
- Rounded cells.
- Prominent nucleus.
- Many granules with variable size.
- Cytoplasm contains well developed Golgi, many RER.
- Secrete FSH and LH.
- ***Action of FSH***: promotes ovarian follicle development and estrogen secretion in women, and spermatogenesis in men.
- ***Action of LH***: promotes follicular maturation and progesterone secretion in women and Leydig secretion in men.

4- Thyrotrops

- Form ~ 5% of chromophils.
- Located away from sinusoids.
- Cytoplasm contains many small organelles.
- Secrete TSH.
- ***Action of TSH***: stimulates thyroid hormone synthesis, storage, and liberation.

5- Corticotrops

- Form 15-20% of chromophils.
- Round-ovoid cells scattered through pars distalis.
- Eccentric nucleus with few organelles.
- Secrete ACTH.
- ***Action of ACTH***: stimulates secretion of adrenal cortex hormones and regulated lipid metabolism.

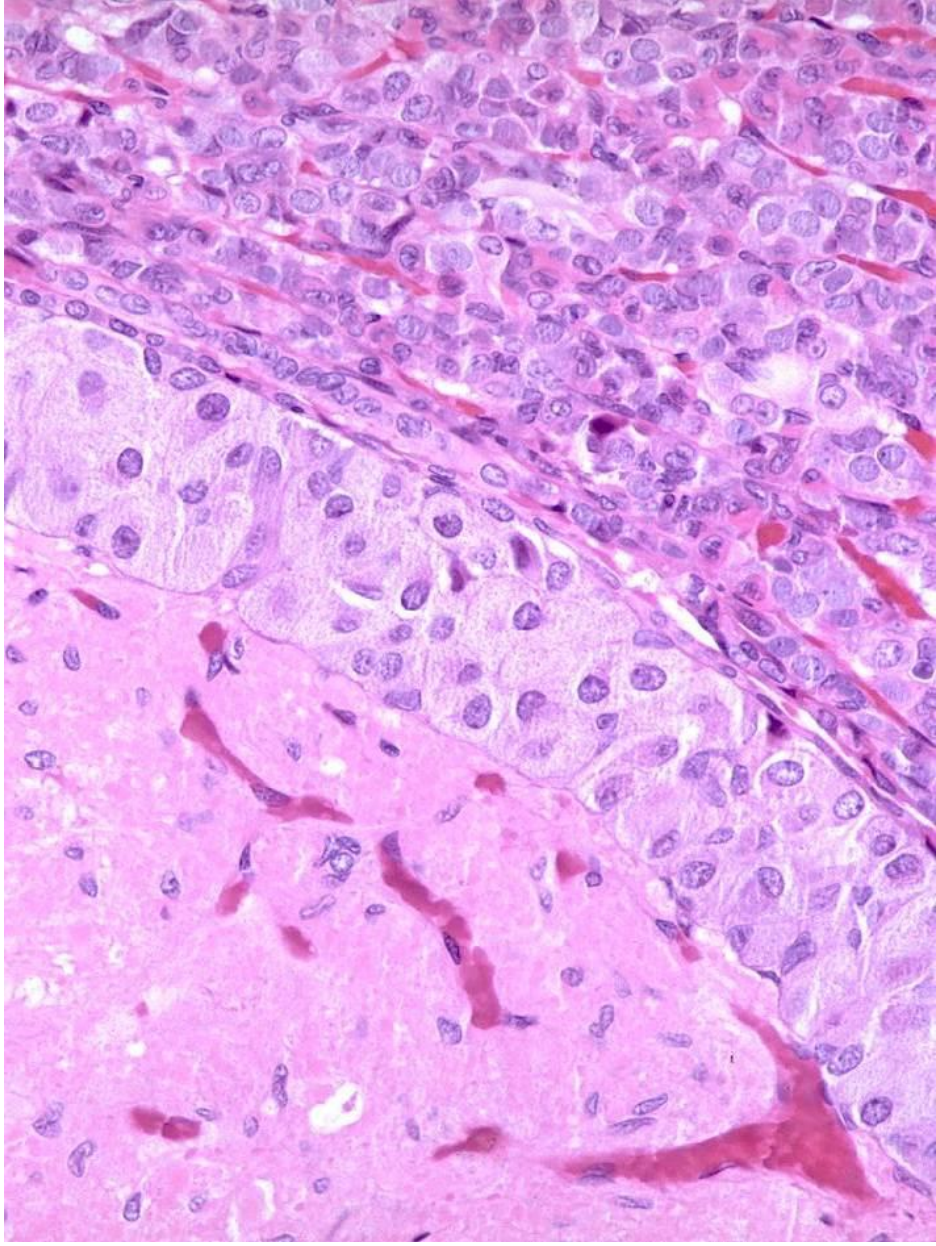


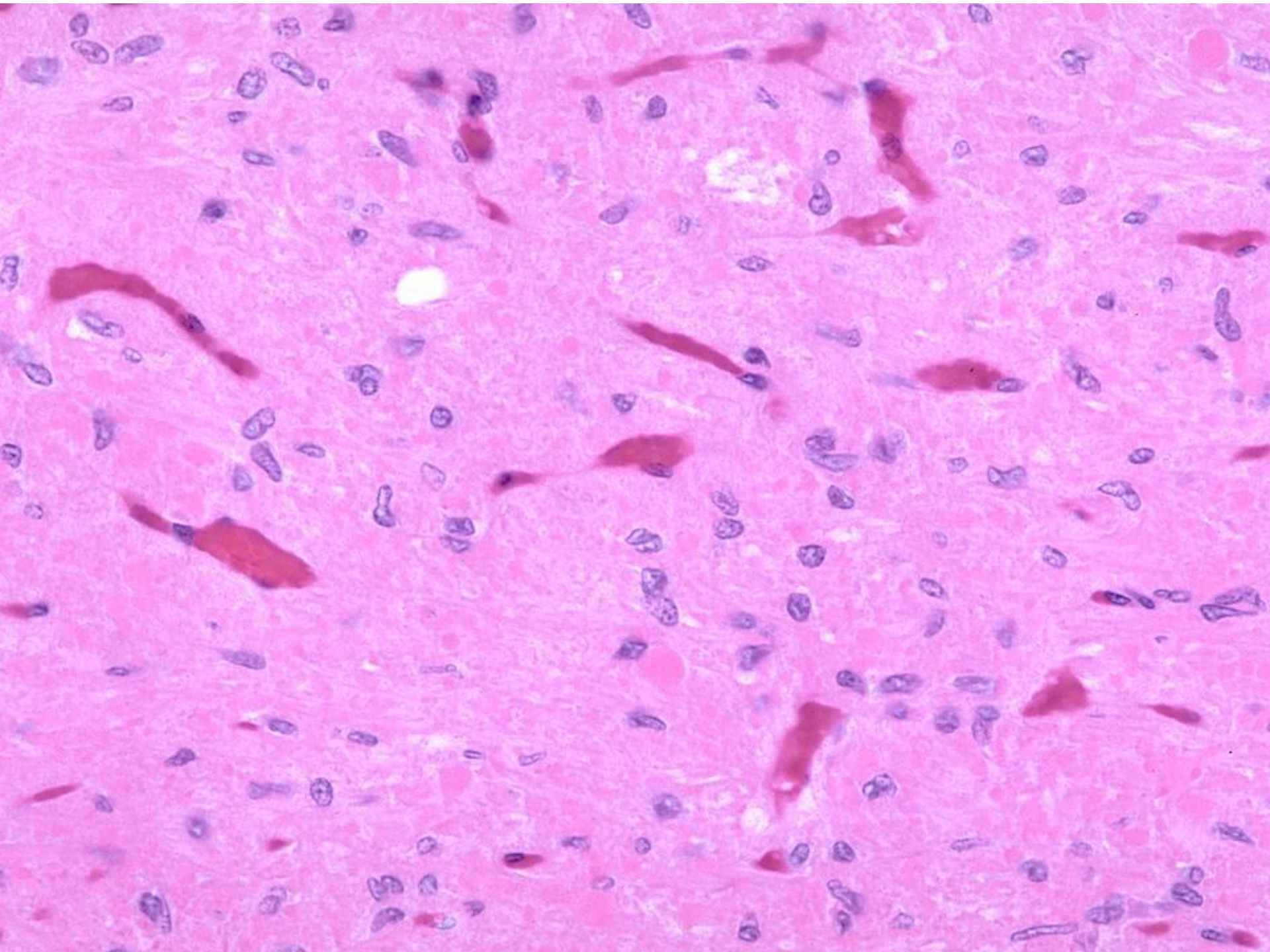
Does not contain secretory cells.

Contains axons of secretory nerves; their mother cells are present in the paraventricular and supraoptic hypothalamic nuclei.

Pituicytes are the most numerus cells.

Pituicytes resemble astrocytes.

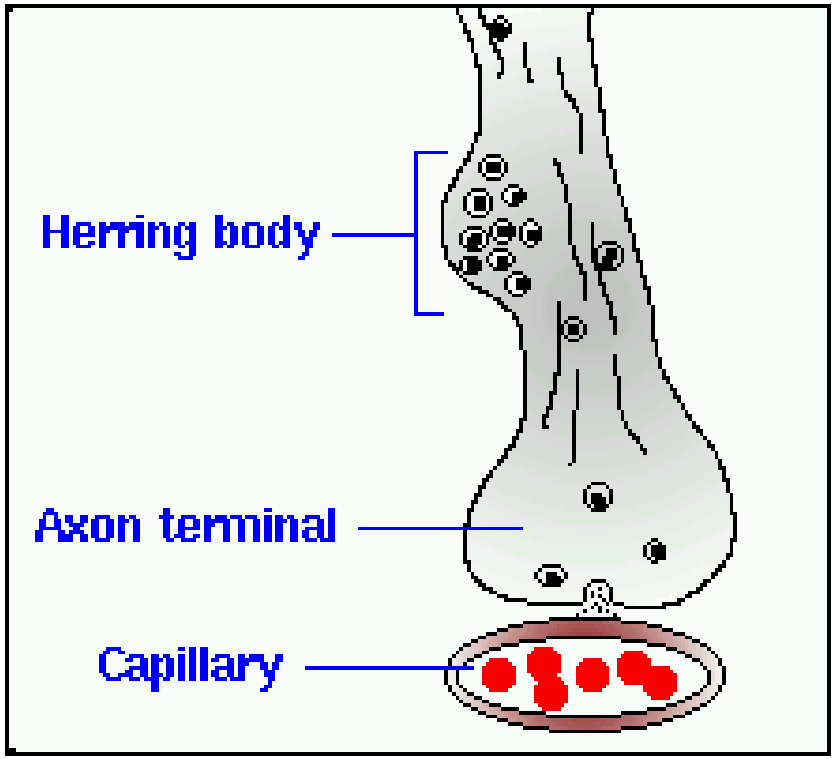




Secretory neurons have larger diameter but are histologically and functionally similar to other neurons.

Axons of neurons transport ADH and oxytocin into the pars nervosa.

- Secretory products accumulate in the distal part of the axon in Hering bodies.
- Hering bodies appear slightly acidophilic.
- Secretory products are surrounded by a membrane and bound to neurophysin.
- Nerve impulses trigger the release release of peptides from neurosecretory bodies.



Most Oxytocin is released from paraventricular nuclei.

Most ADH is released from supraoptic nuclei.

Tumours of the pituitary, as well as forming intracranial space-occupying lesions, may have two special features; their endocrine disturbances and their relationship to the optic chiasma.

Read only

Chromophobe adenoma is the commonest pituitary tumour. As it enlarges it expands the pituitary fossa (sella turcica) and this may be demonstrated radiologically. Compression of the optic chiasma produces the very rapid typical bitemporal hemianopia.
The tumour itself is non-secretory and gradually destroys the normally functioning gland.
The patient develops hypopituitarism with loss of sex characteristics, hypothyroidism and hypoadrenalism

Read only

The eosinophil adenoma secretes the pituitary growth hormones. If it occurs before puberty, which is unusual, it produces gigantism; after puberty it results in acromegaly.

Read only

The basophil adenoma is small, produces no pressure effects and may be associated with Cushing's syndrome, although this more often results from hyperplasia or tumour of the suprarenal cortex.