شروع اللہ کے نام سے جو بڑا مہربان نہایت رحم والا ہے۔

HISTOLOGY OF PITUITARY GLAND

BY

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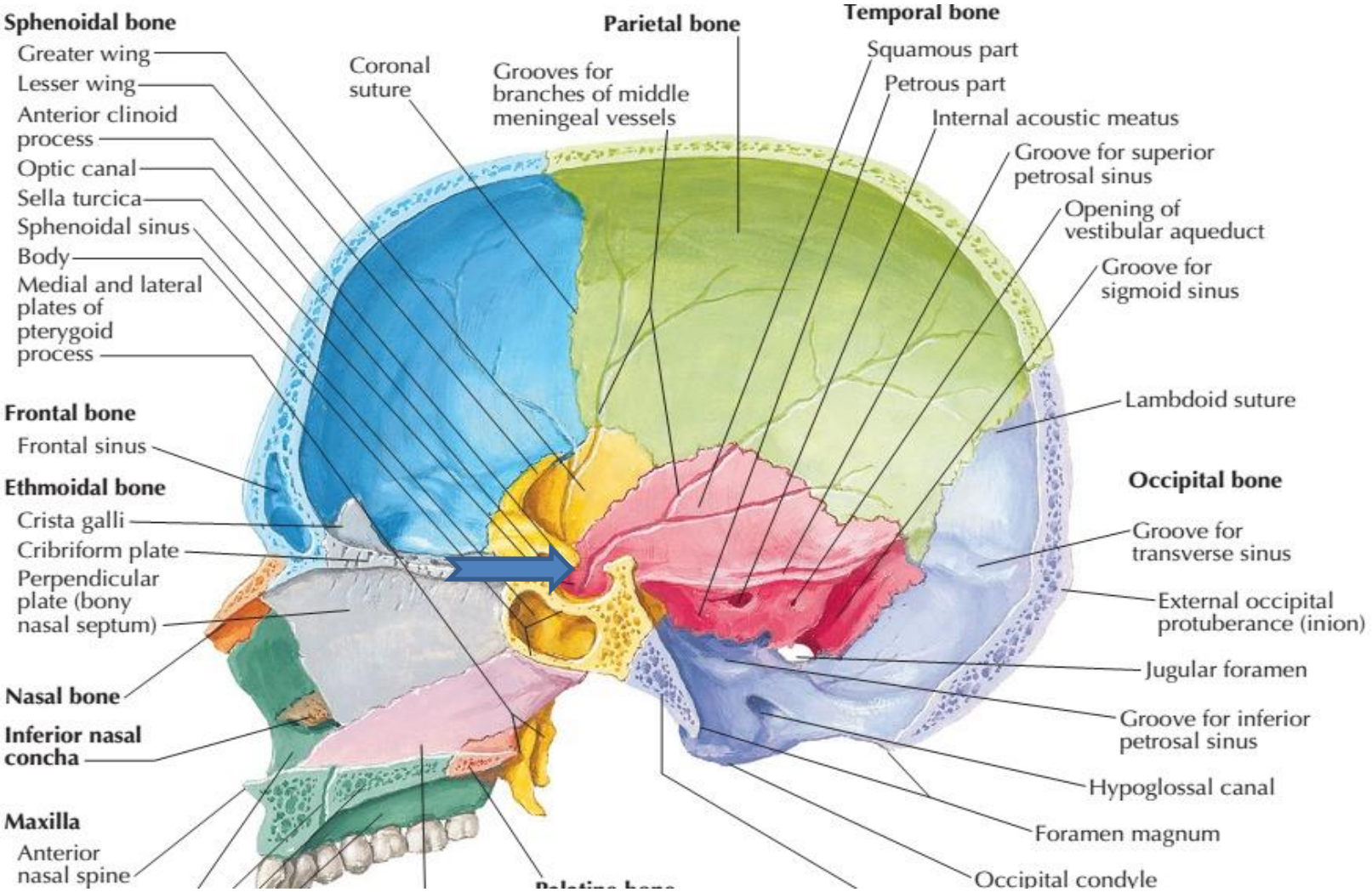
Learning Objectives

At end of the session we should be able to:

- Describe normal anatomical position of the pituitary gland
- Describe main division of pituitary gland
- Differentiate between ant and post pituitary gland histology
- Recognized different cells in pituitary gland
- Known functions of these cells in the pituitary gland
- Clinical correlation

Pituitary gland location



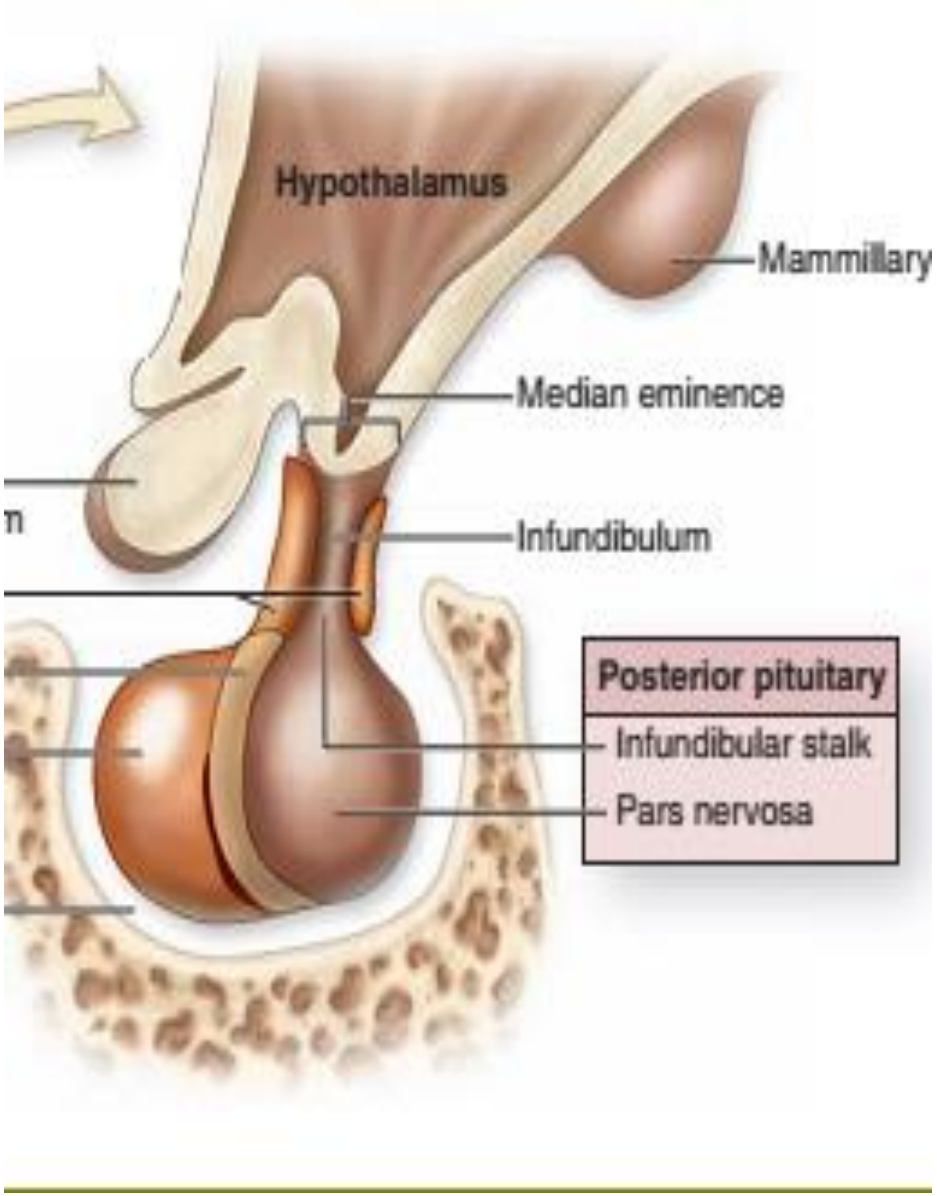
PITUITARY GLAND (HYPOPHYSIS)

Weight:-

- 0.5 g in adults
- Dimensions 10 × 13 × 6 mm.

Lies:-

Below the brain in a small cavity on the sphenoid bone, the sella turcica .



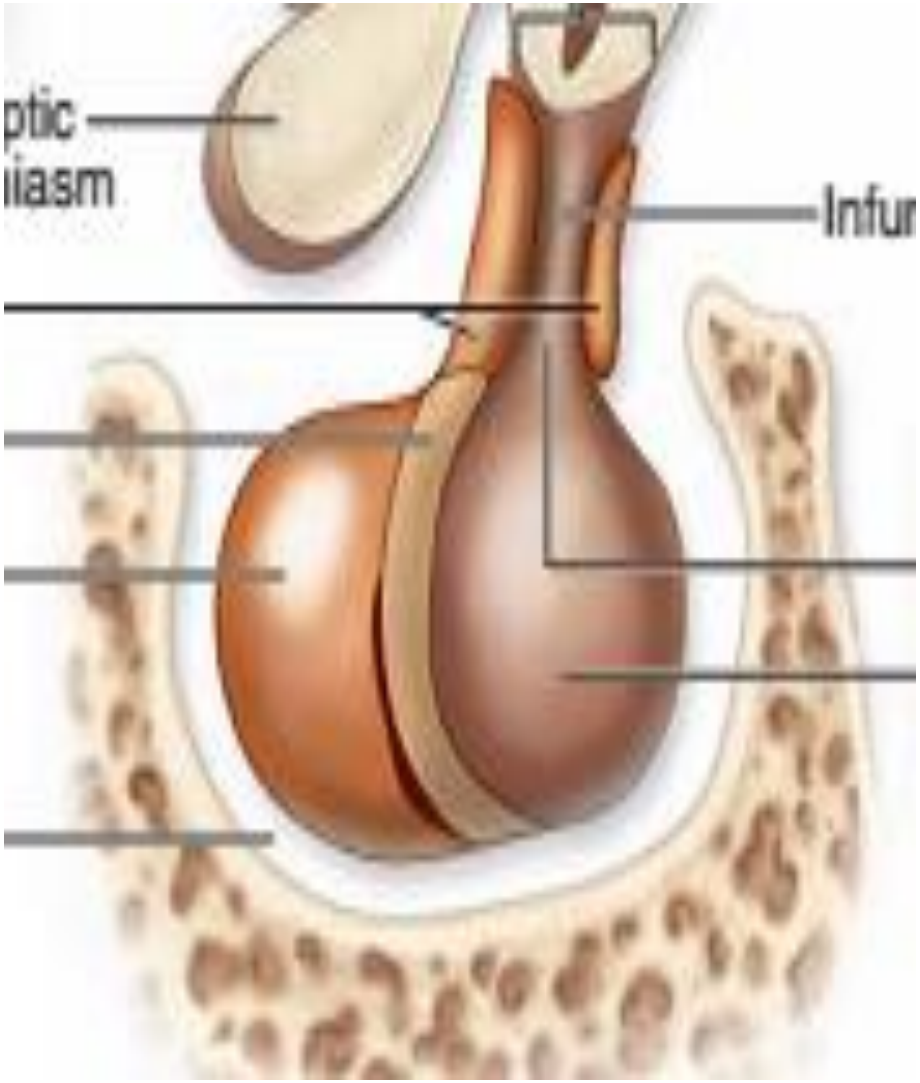
PITUITARY GLAND (HYPOPHYSIS)

Dual origin

It consists of two part of the gland

- **posterior neurohypophysis and**
- **anterior adenohypophysis**

—united anatomically but with different functions.



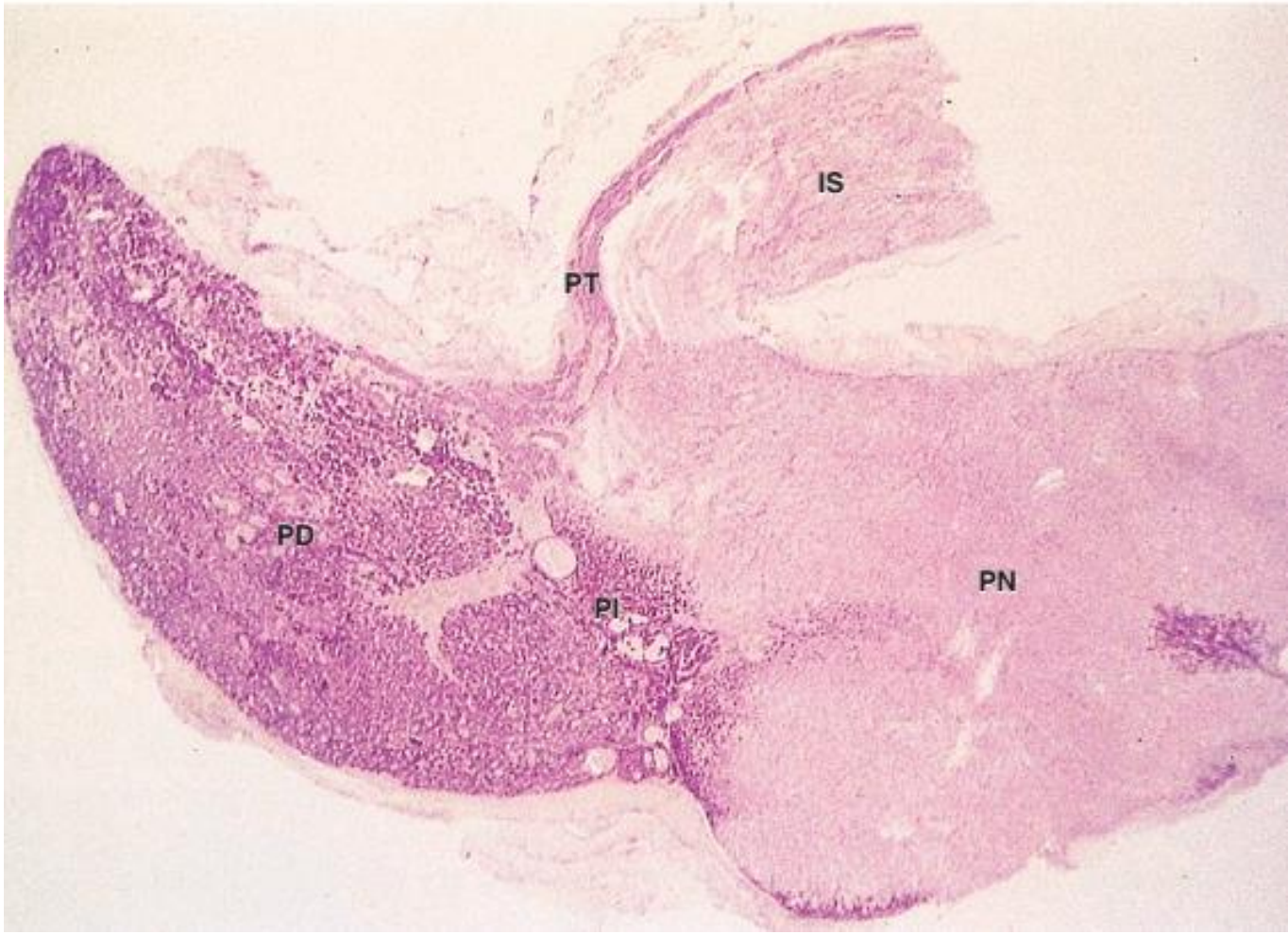
PITUITARY GLAND (HYPOPHYSIS)

Neurohypophysis

- Retains many histologic features of brain tissue.
- Consists of a large part, the pars nervosa(PN)
- Infundibulum stalk(IS) attached to the hypothalamus at the median eminence

Adenohypophysis

- Derived from the Ectoderm

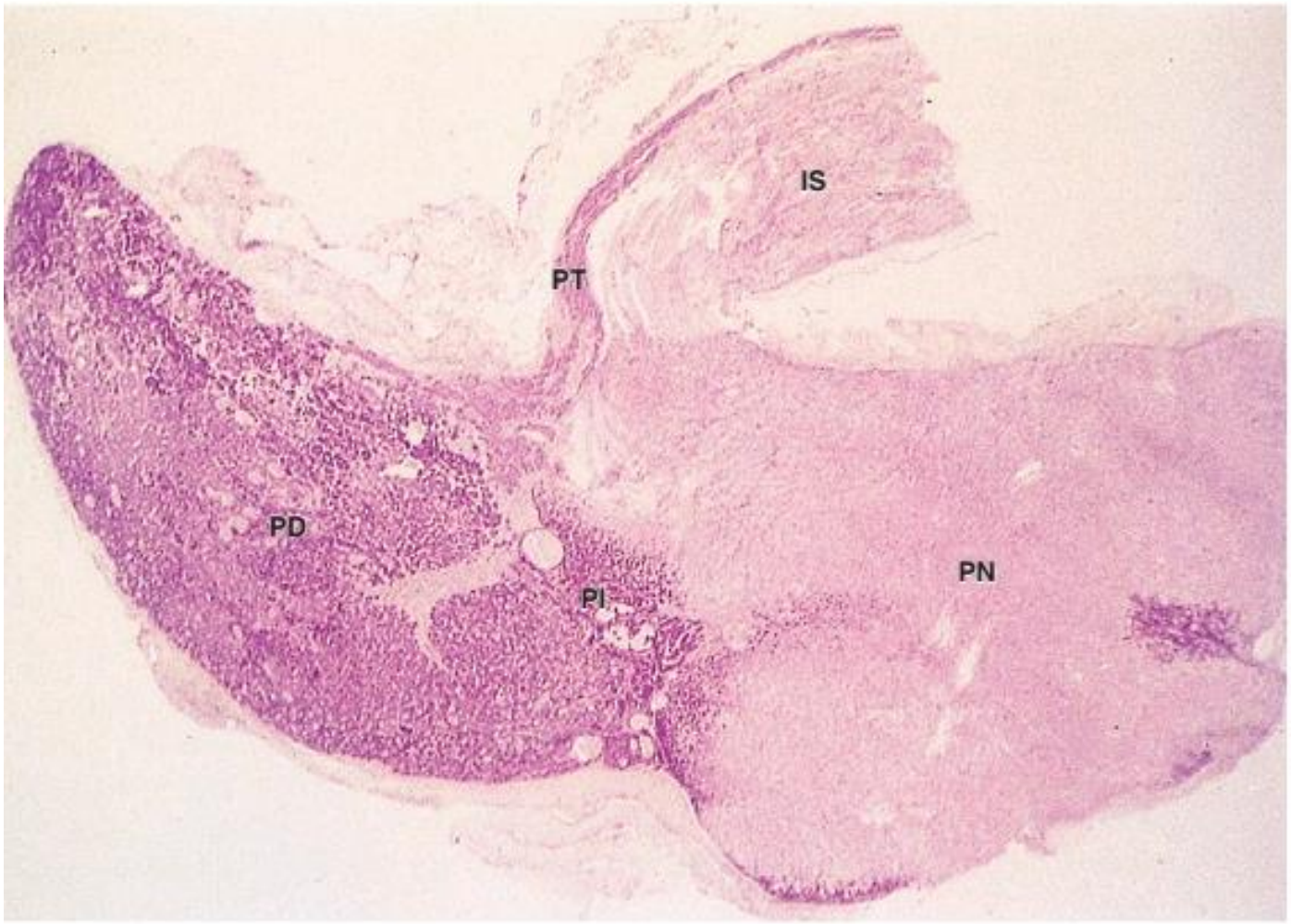


Adenohypophysis (Anterior Pituitary)

Three parts of the adenohypophysis .

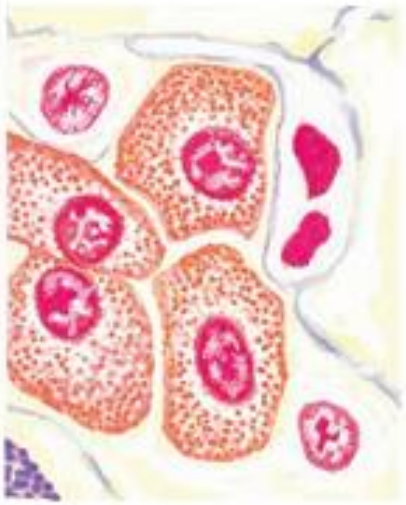
Pars Distalis
Pars intermedia
Pars tuberulas

The pars distalis accounts for 75% of the adenohypophysis and has a thin fibrous capsule.

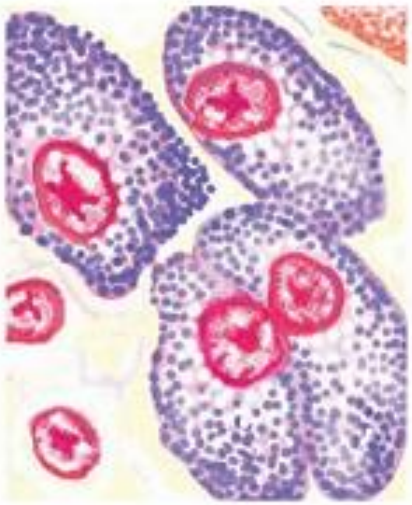


Types of cells in hypophysis

a. Chromophobes



b. Acidophils
(alpha cells)

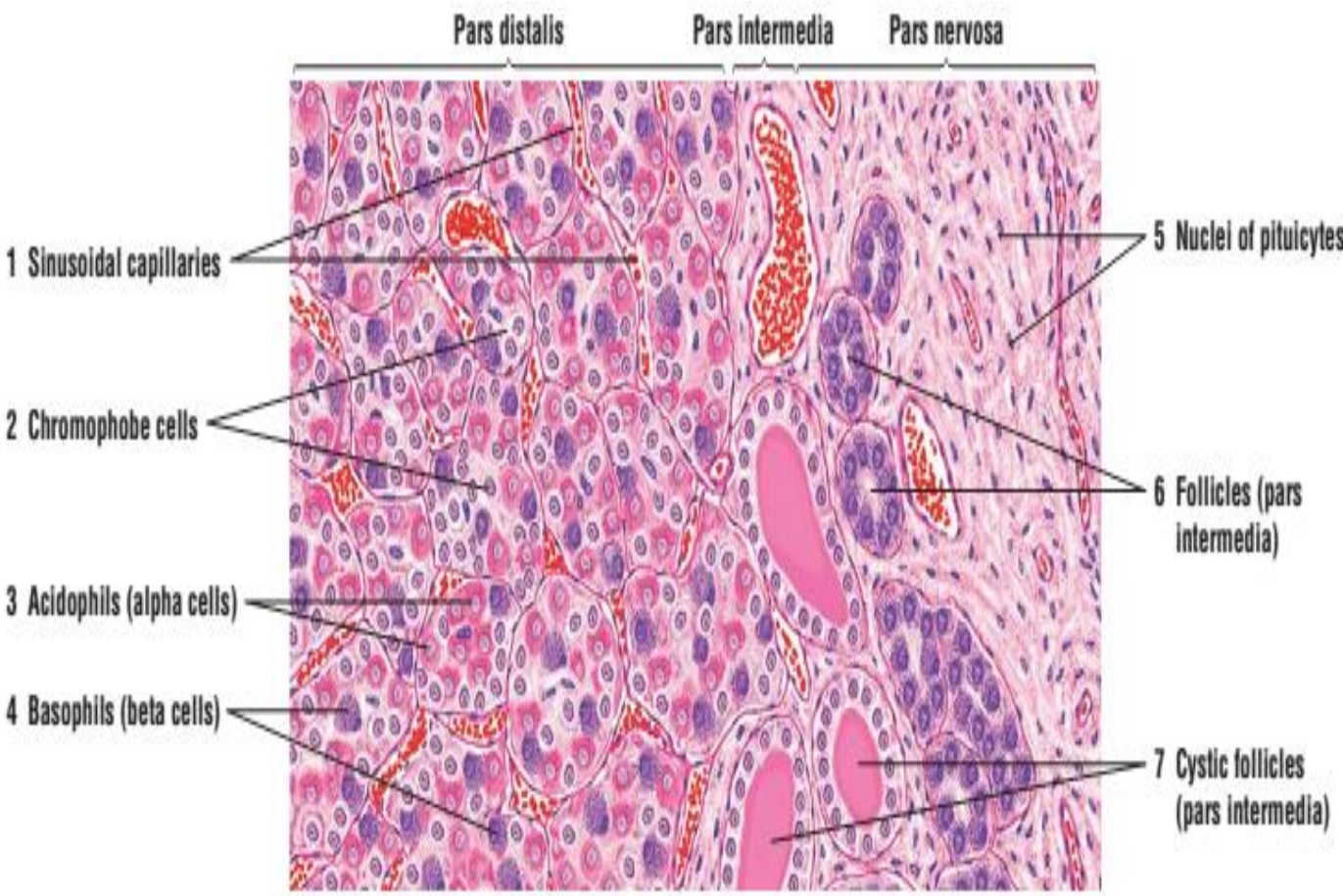


c. Basophils
(beta cells)

d. Pituicytes

Cells in the Pars Distalis

- Well-stained endocrine cells
- Interspersed with fenestrated capillaries and
- Supporting reticular connective tissue



Cells in the pars distalis

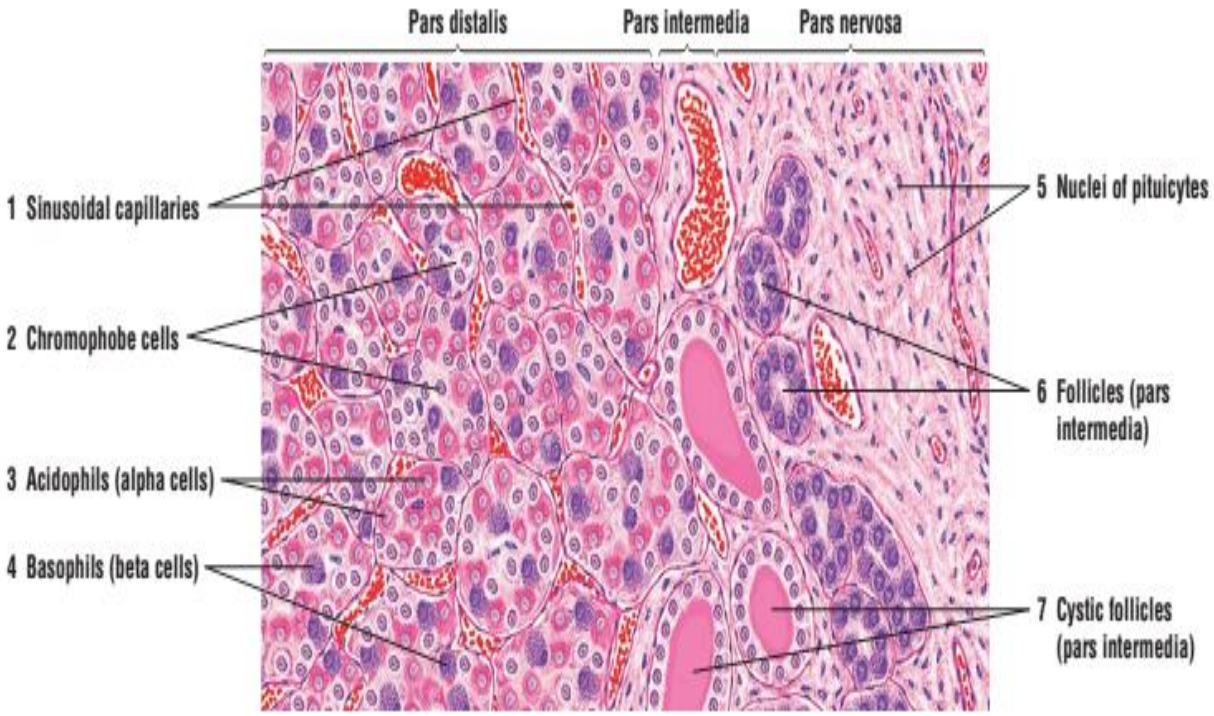
Staining affinities Cells

A-chromophils

B-chromophobes

A-Chromophils Cells:-

- These are secretory cells in which hormone is stored in cytoplasmic granules.
- They are also called basophils and acidophils, based on their affinities for basic and acidic dyes, respectively .



Cell Types in the Pars distalis at higher magnification

B-Chromophobes:-

Cytoplasm:-

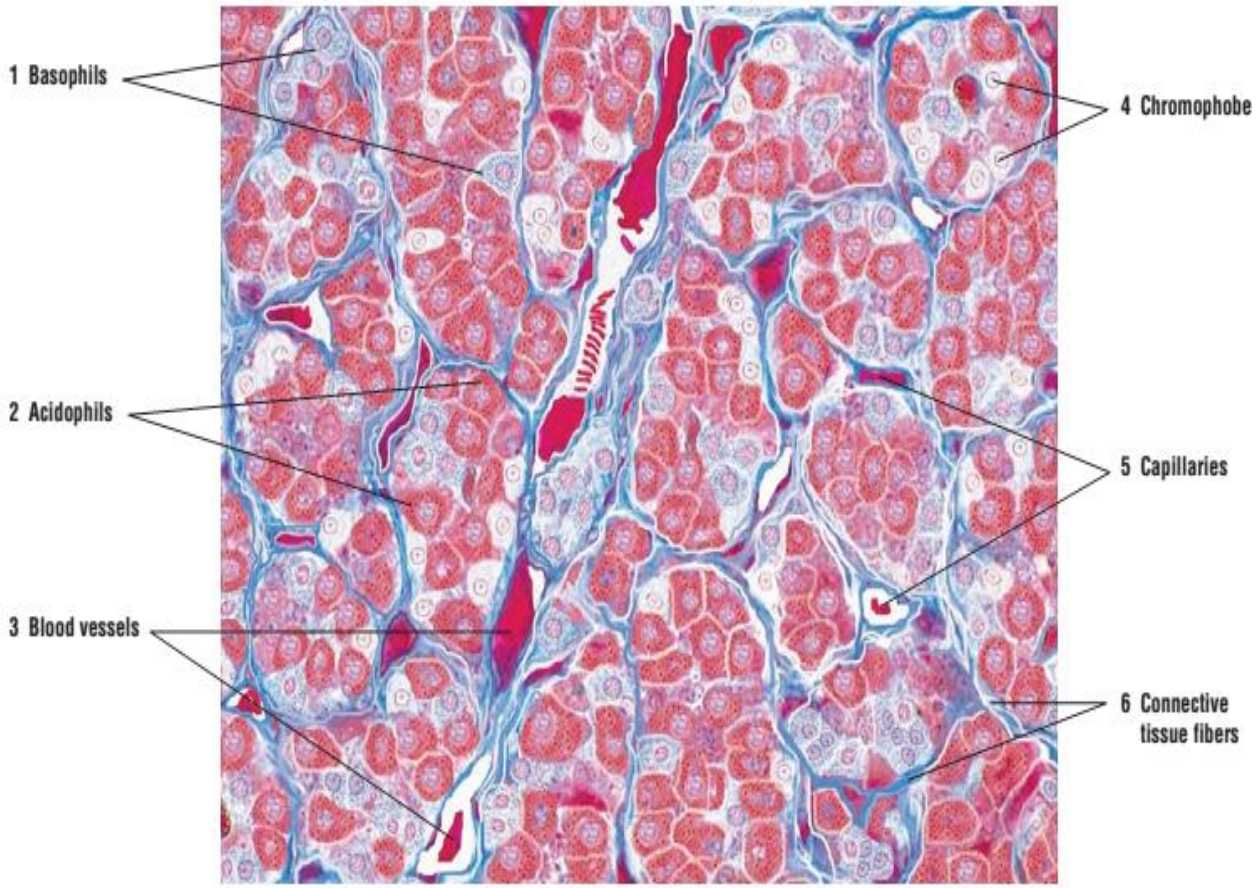
A clear and very light orange

Chromophils:-

a) Cytoplasmic granules of **acidophils** stain intensely red.

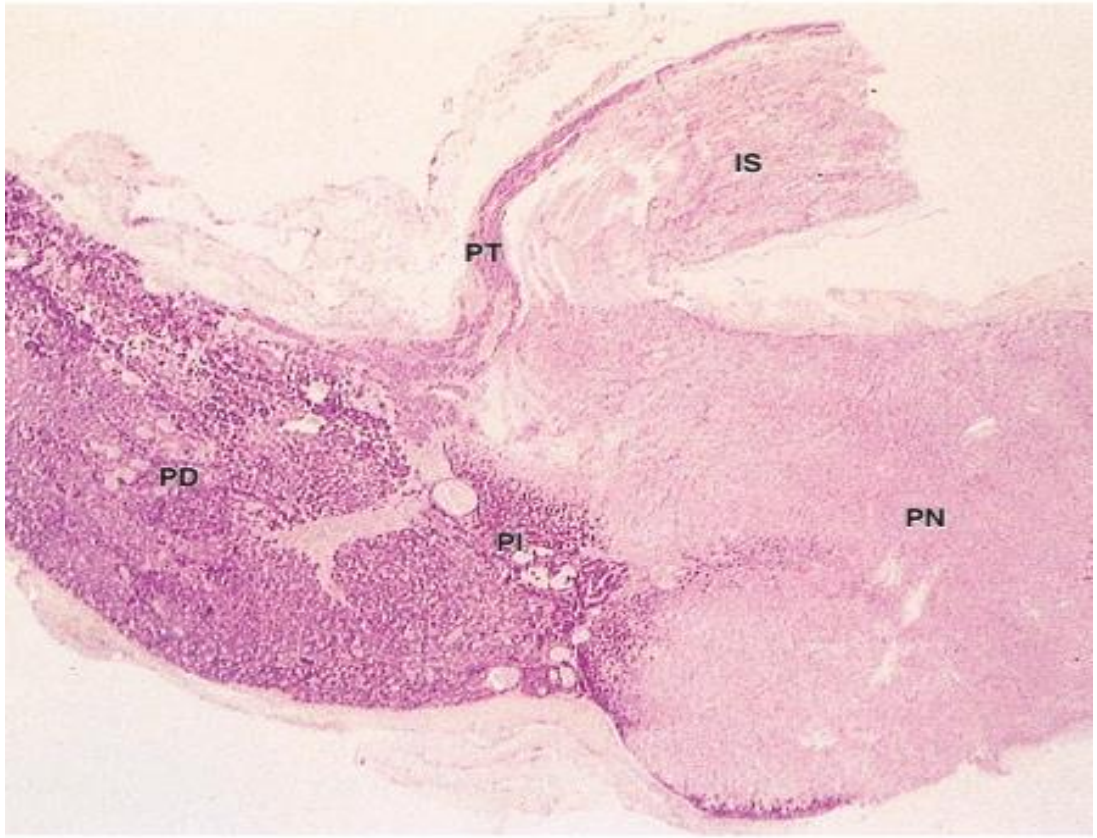
b) Basophils

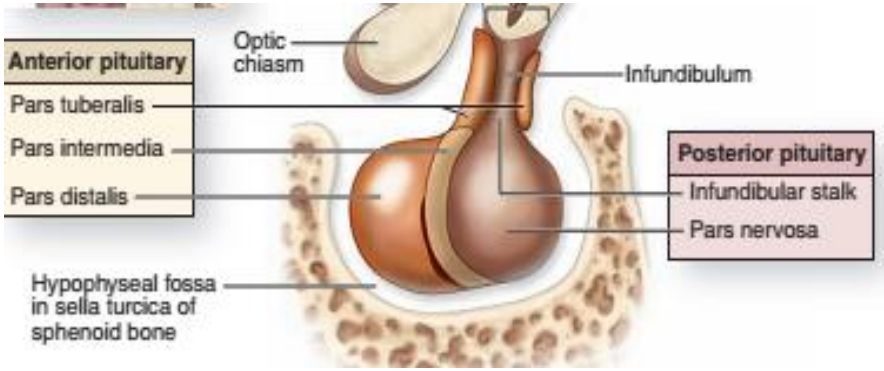
Exhibit variable cell shapes and granules that vary in size.



Pars Tuberalis

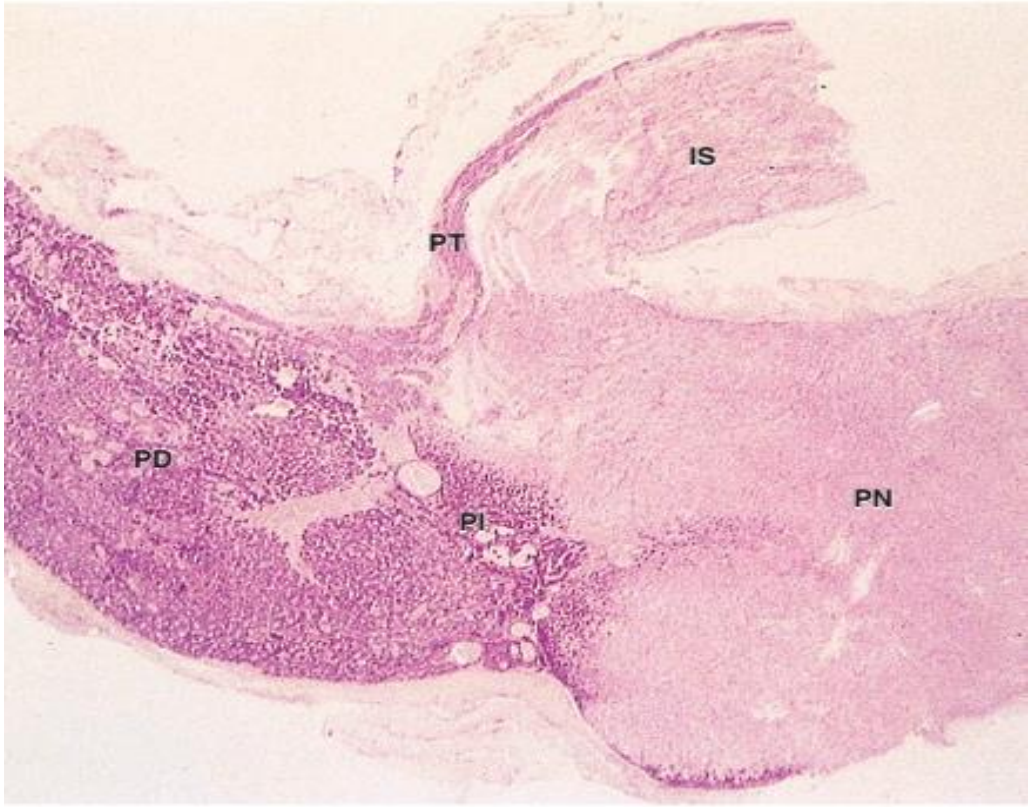
- Is a smaller funnel-shaped region
- Surrounding the infundibulum of the neurohypophysis.
- Most of the cells of the pars tuberalis are Gonadotrophs.

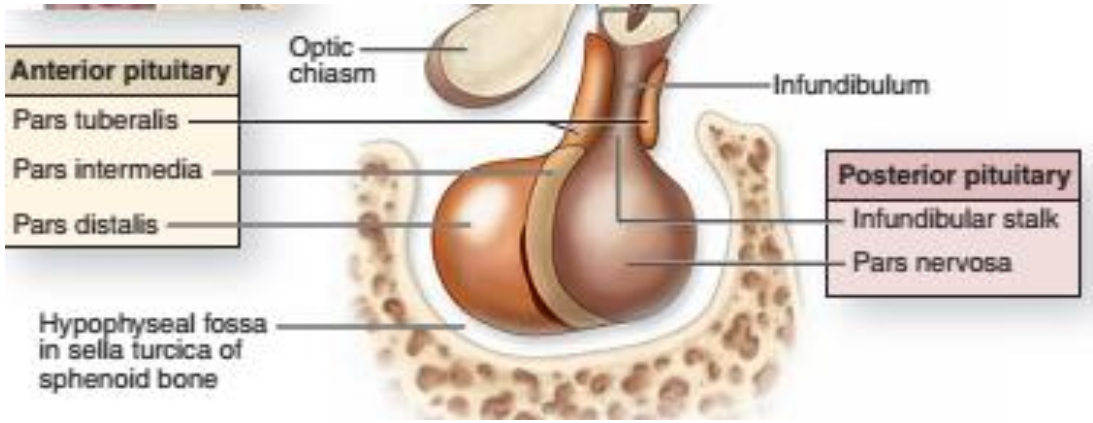




Pars Intermedia

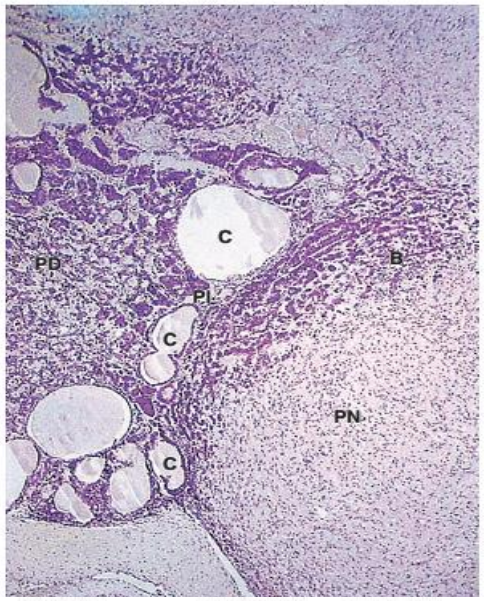
- Is a thin zone of basophilic cells
- B/W the pars distalis and the pars nervosa.

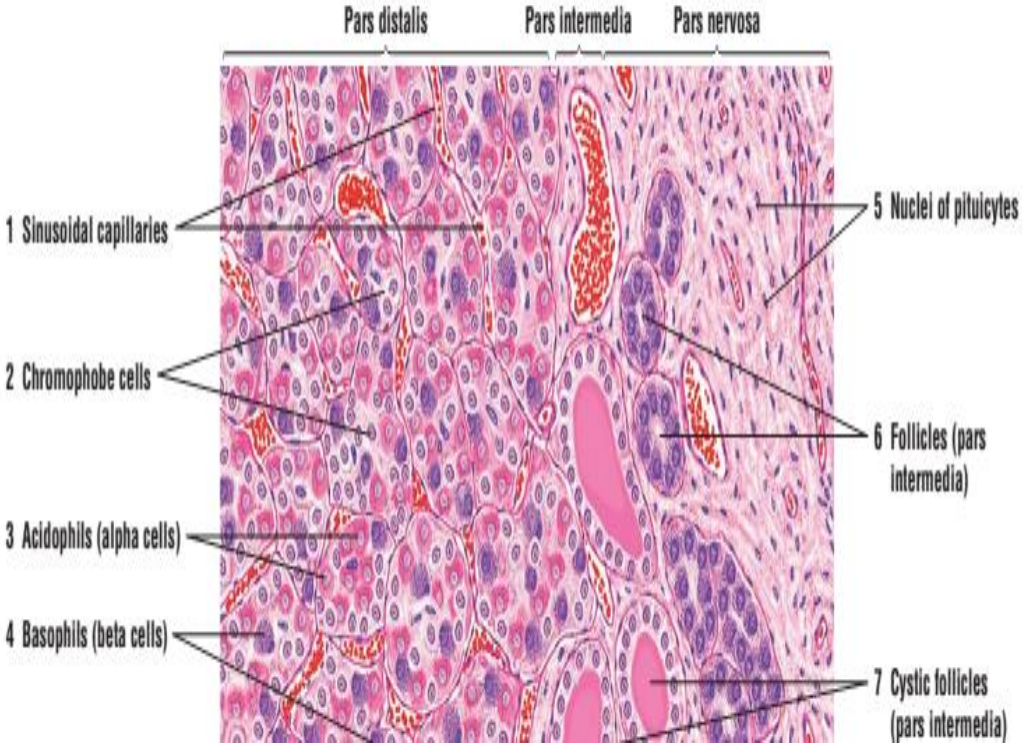




Pars Intermedia

- Usually contains colloid-filled cysts of various sizes.
- During fetal life cells of this region, express POMC.
- However, in these cells POMC (pre-pro-opiomelanocortin) is cleaved by different proteases to produce smaller peptide hormones,
- Including two forms of melanocyte-stimulating hormone (MSH), γ-LPH, and β-endorphin.
- MSH increases melanocyte activity, but the overall functional signifiance of this region remains uncertain, especially in adults





MEDICAL APPLICATION

Benign pituitary adenomas

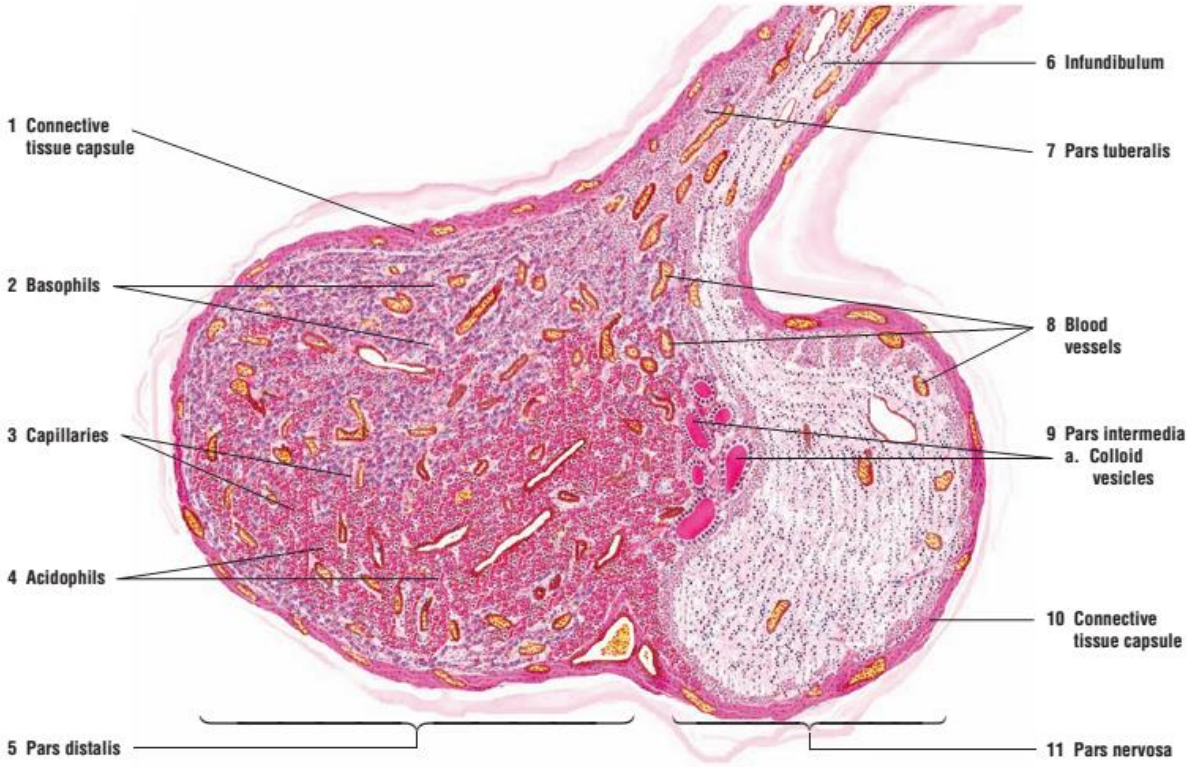
- Often produce excessive numbers of functional acidophils or basophils.
- Adenomas involving somatotropic cells can cause gigantism if occurring in children before closure of the long bones' epiphyseal plates

  OR
- Acromegaly in adults.

Neurohypophysis (Posterior Pituitary)

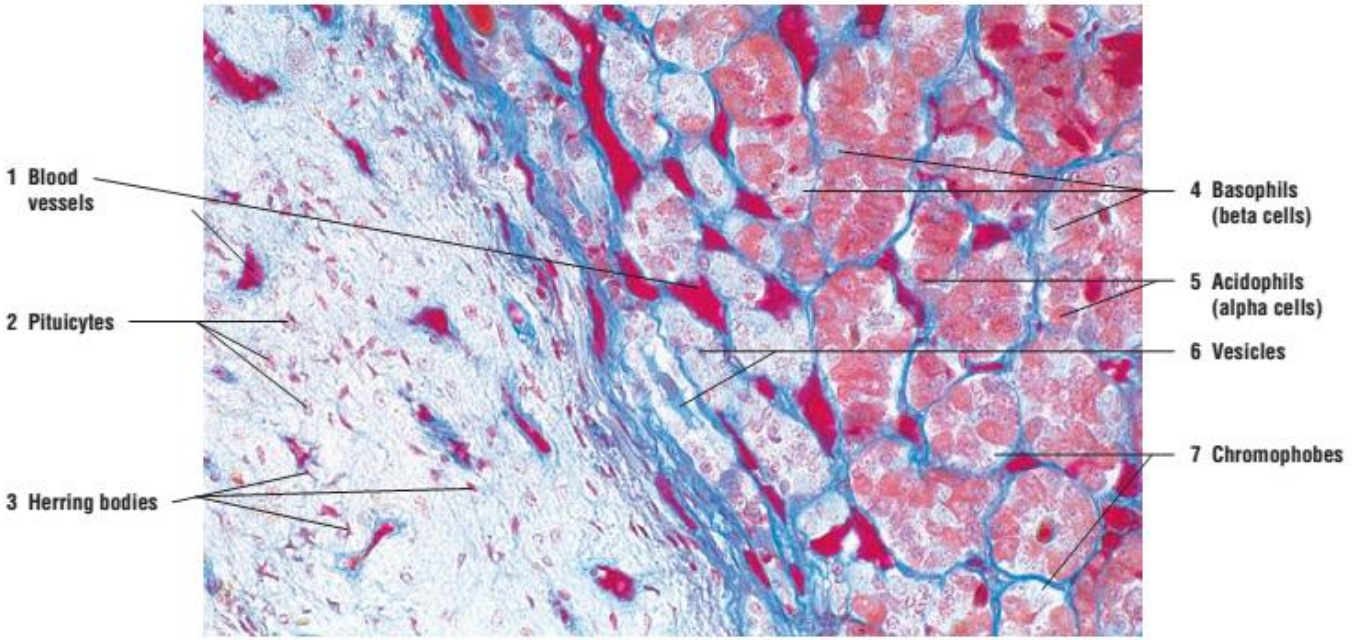
- ***Pars nervosa***
- ***Infundibular stalk***

- Unlike the adenohypophysis, does not contain the cells that synthesize its hormones.
- It is composed of neural tissue,
- Containing some 100,000 unmyelinated axons
- large secretory neurons with cell bodies in the supraoptic and paraventricular nuclei of the hypothalamus .



Pars Nervosa

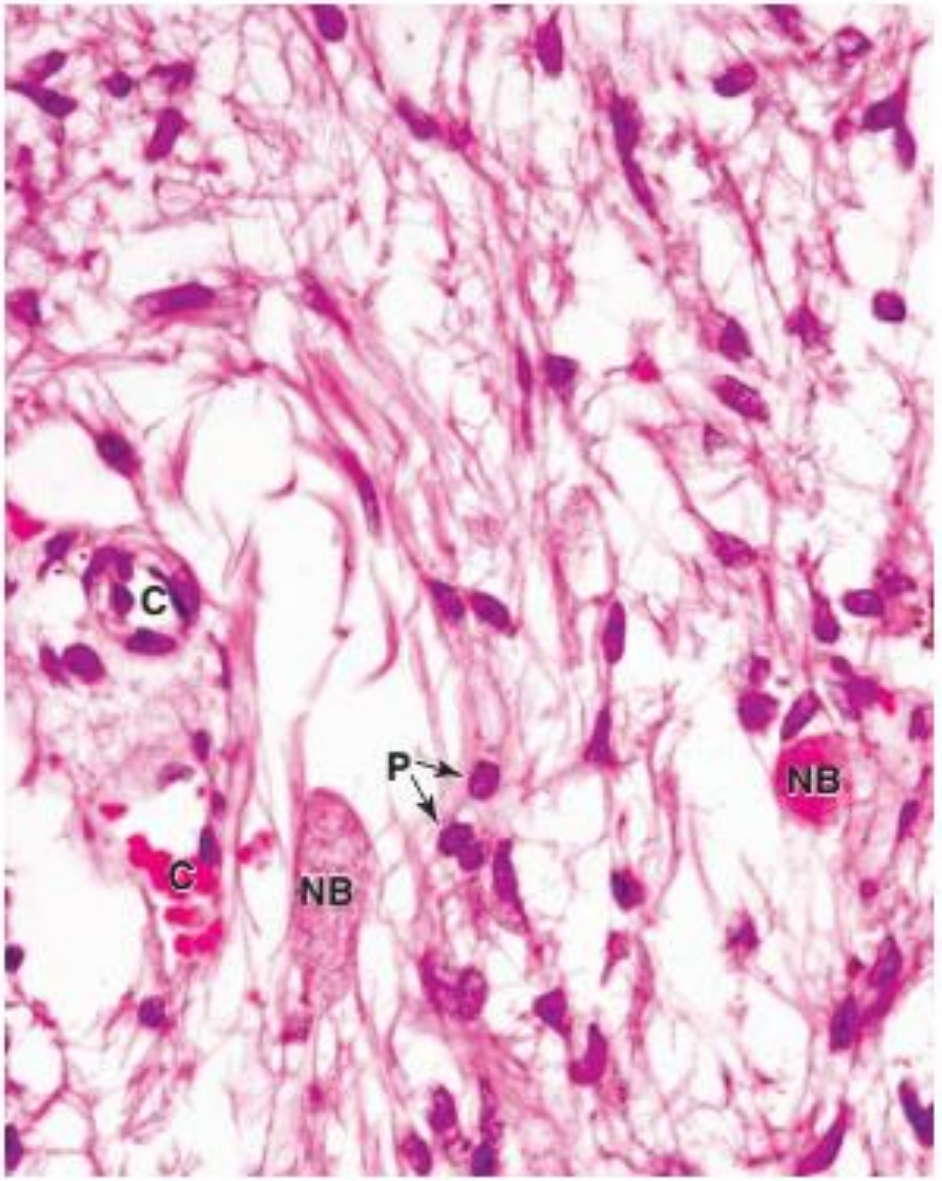
- **Pituicytes** of pars nervosa have variable cell shape and cell size.
- The small, orange stained cytoplasm is diffuse and barely visible



PARS NERVOSA

Arginine Vasopressin (ADH) And Oxytocin.

- Transported axonally into the pars nervosa
- These hormones accumulate in axonal dilations called neurosecretory bodies or Herring bodies, (**NB)**
- Visible in the light microscope as faintly Eosinophilic structures.



Anti Diuretic Hormone

- ADH is released in response to increased blood tonicity, sensed by osmoreceptor cells in the hypothalamus,
- which then stimulate ADH synthesis in supraoptic neurons.
- ADH increases the permeability of the renal collecting ducts to water
- So that more water is reabsorbed from the filtrate in these tubules and
- Osmotic balance of body fluids is restored .

TABLE **20–3** Hormones of the posterior pituitary.

Hormone	Function
Vasopressin/antidiuretic hormone (ADH)	Increases water permeability of renal collecting ducts
Oxytocin	Stimulates contraction of mammary gland myoepithelial cells and uterine smooth muscle

Oxytocin

- Stimulates contraction of the myoepithelial cells of uterine smooth muscle during childbirth
- And of alveoli and ducts in the mammary glands
- A nursing infant induces oxytocin secretion by stimulating sensory tracts. that act on the hypothalamus in a neurohormonal reflex producing rapid ejection of milk.

MEDICAL APPLICATION

Posterior pituitary function can be adversely affected by

- Heritable mutations in the gene for vasopressin (ADH)-
- By compression from a tumor OR by head trauma.

❑ Lower levels of vasopressin, such conditions can produce **diabetes insipidus**,

- A disorder characterized by inability to concentrate urine, which leads to frequent urination (polyuria) and increased thirst (polydipsia).

Untreated Diabetes Insipidus

Home take message

Home take message

- EXCESS USES OF MOBILE AND OTHER ELECTRONIC INSTRUMENT
- DELAY MILK EJECTION AFTER DELIVERY


THANK YOU