

Pituitary Gland

Stroma

1- Capsule	2- Septa	3- Reticular C.T. stroma
The gland is surrounded by a thin capsule formed of dense irregular C.T. "represents continuation of dura matter"	They are thin, incomplete and irregular septa arising from the inner surface of the capsule, dividing the gland into intercommunication indistinct lobules.	Arises from the inner surface of the capsule and both surfaces of the of the septa to fill the background of the gland and takes the arrangement of parenchyma.

Parenchyma

- It's formed of: 1- endocrinal secretory cells **AND** 2- fenestrated blood capillaries whose fenestra are closed with diaphragms.
- The type and arrangement of the cells and blood capillaries is variable from one region of the gland to another.

Parenchyma of Adenohypophysis (Anterior Pituitary)

A) Pars Distalis

- The Parenchyma is formed of branching and anastomosing cords of cells with wide fenestrated blood capillaries inbetween in which the fenestra are closed by diaphragms
- The cells of the pars distalis are classified according to the presence or absence of stainable granules in their cytoplasm into:

Chromophils

- They contain stainable granules in their cytoplasm (represent about 50% of the pars distalis cells) .
- Chromophils are subdivided according to the staining affinity of their granules into :

Acidophils

medium-sized.
Rounded or polygonal in shape.
They are more located in periphery of pars distalis specially in its postrolateral regions
Represent 35% of the cells of pars distalis

Nucleus:
Single, central, rounded & vesicular nucleus with prominent nucleolus.

Cytoplasm:
- Mild basophilic
- By L.M., it appears to be crowded with acidophilic granules which can be stained by orange G.

- By E.M., (like any protein secretory cell). It contains well-developed rER, Golgi complex, small rod-shaped mitochondria and membrane-bound secretory granules.

There are 2 kinds of acidophils which can be distinguished by immunocytochemical techniques & by E.M:

1- Somatotrophs

- Their membrane-bound granules are 300-350 nm in diameter.
- The cisternae and their rER are well-developed and lie parallel to the cell surface.
- They secrete GH.

2- Mammotrophs (lactotrophs)

- Their membrane-bound granules 500 – 900 nm in diameter
- These granules can be stained specifically by **erythrocin** for light microscope.
- They secrete the prolactin

→ In males & cycling females:

They small cells with few elongated cisternae of rER, medium-sized Golgi complex, few small membrane-bound granules.

→ In female during pregnancy & lactation:

The cells increase in size (hypertrophy) & in number (hyperplasia) and their rER and Golgi complex become more developed.

At the termination of lactation, these changed regress.

Basophils

Large cells
Rounded or polygonal
They are more located in the central part of the gland.

Represent 15% of the cells of pars distalis

Nucleus:
Single, central (eccentric), rounded & vesicular nucleus with prominent nucleolus.

Cytoplasm:
- Mild basophilic
- By LM, it appears to contain basophilic granules which can be stained :
1- deeply by the basic dye; methylin blue
2- positively by PAS

- By E.M., (like any protein secretory cell). It contains well developed rER, Golgi complex, small rod-shaped mitochondria and membrane-bound secretory granules.

There are 3 kinds of basophils which can be distinguished by immunocytochemical techniques & by E.M:

1- Thyrotrophs

- They have smallest granules, whose diameter is 100-150 nm.

- They secrete TSH.

- These granules can be stained specifically by **aldehyde fuchsine** for light microscope

2- Corticotrophs

- They have granules, whose diameter is 150-200 nm.

- They secrete ACTH.

- Some secrete MSH.

3- Gonadotrophs

- They have granules of variable sizes ranging from 200-400 nm in diameter.

- They secrete:
- FSH
- LH

A) Pars tuberalis

- It forms a thin sleeve that surrounds the ant. and lateral aspects of the infundibular stalk.

- It's only 25-60 um in thickness, and separated from the infundibular stalk by a thin layer of C.T.

- **It's formed of** cords of cells separated by fenestrated blood capillaries .

The cells :

- maybe grouped to form follicle-like structures.
- They are cuboidal or polygonal in shape,
- **Nucleus:** single central rounded nucleus.
- **Cytoplasm:** contains the ordinary cell organoids and inclusions, and good content of glycogen.
- **Function:** Unknown.

A) Pars Intermedia:

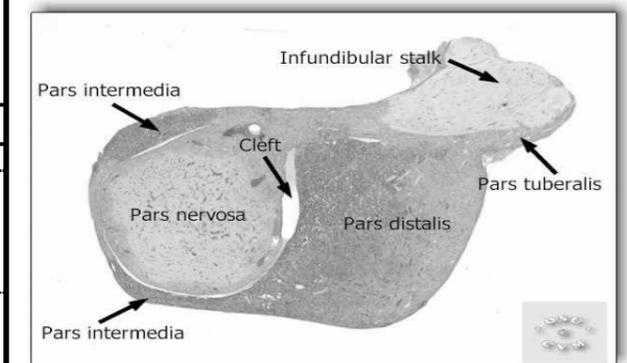
- It's the layer that lies between the hypophyseal cleft anteriorly and the pars nervosa posteriorly and surrounds it's ant. and lateral aspects.

- **In Human Fetus** → moderately thick forming 3% of the cells of adenohypophysis.

- **In Adults** → no longer identified as a distinct layer.

The Cells:

- It's formed of cells which are forming irregular cords or small groups with fenestrated blood capillaries inbetween.
- In rats where the pars intermedia is well-developed, the cells are large, polygonal.
- **Nucleus:** single, central, rounded & vesicular nucleus.
- **Cytoplasm:** is pale basophilic containing well-developed rER, Golgi complex, mitochondria and numerous membrane-bound secretory granules 200-250nm in diameter.
- **Function:** They secrete MSH .



Chromophobes

General appearance:

- They are small polygonal cells, with ill-defined cell boundaries.
- They present mainly in the central regions of the cell cords
- Represent 50% of the cells of pars distalis.

Nucleus: Each cell contains a single, central, rounded and vesicular nucleus.

Cytoplasm:

- Pale basophilic, or relative little amount around the nucleus.
- By L.M., appears to have no granules
- By E.M., it has poorly developed rER, Golgi complex, mitochondria, few small membrane-bound granules.

Function:

Most chromophobes are partially degranulated chromophils, and small percentage of them maybe reserve or non-secretory cells.

Parenchyma of Neurohypophysis (Posterior Pituitary)

- The neurohypophysis consists of → **median eminence** of the hypothalamic tuber cinereum, the **infundibular stem** and the **infundibular process** (Pars nervosa).
- The pars nervosa is the only site of storage and release of hormones synthesized in the nerve cells of the hypothalamic supraoptic and paraventricular nuclei.
- **The axons of these nerve cells :**
 - Collect to form a thick bundle of unmyelinated nerve fibers called the hypothalamo-hypophyseal tract. These axons pass in the neurohypophysis to terminate in its pars nervosa.
 - Have numerous dilatations along their length & their terminations in the pars nervosa. In these dilatations, the hormones synthesized by the nerve cells are accumulated to form spherical basophilic masses of secretory material called **Herring bodies**.
 - In the pars nervosa, the nerve, the nerve fibers & their Herring bodies are separated and supported by **fenestrated blood capillaries & pituicytes**.

Structure of pars nervosa

Accordingly, the pars nervosa is composed of:

- 1- About 100,000 unmyelinated nerve fibers which are the axons of the paraventricular & supraoptic nuclei that form the hypothalamo-hypophyseal tract.
- 2- Herring bodies, which are spherical basophilic masses of secretory material which accumulate along the course of the nerve axons and their terminations.
- 3- Fenestrated blood capillaries .
- 4- Pituicytes, which are stellate-shaped cells with slender processes that are joined to the process of other pituicytes to form three-dimensional network among the nerve fibers. (*these cells seem to have no role in secretory process, but are believed to have a supportive and trophic function - neuroglia cell -*).
- 5- Some cells migrating from the pars intermedia.

Fuction of pars nervosa

- The pars nervosa is the site of storage and release of two peptide hormones synthesized in the hypothalamic paraventricular and supraoptic nuclei.

These hormones are:

- 1- Oxytocin, produced by the paraventricular nucleus.
- 2- Vasopressin, produced by the supraoptic nucleus.

