

## **Endocrine system**

What is the meaning of : exocrine and endocrine glands?

Why endocrine glands are named ductless glands?

The secretory cells release their products, hormones, into the extracellular space, then the hormones may enter the blood stream, by which they reach their target organs. These glands are known as ENDOCRINE glands.

Endocrine glands do not have ducts.

Their secretions (hormones) are secreted into the blood stream.

There is a specific 'target' organ that the hormone acts on.

They composed of secretory cells and rich network of blood capillary .

Cells typically aggregate as: Cords and clumps ,,and as follicles.

The major endocrine glands are:

The pituitary gland.

The thyroid gland.

The parathyroid gland.

The adrenal glands.

The pineal body.

The pancreas.

The ovaries and the testes.

Endocrine part is scattered masses within the exocrine glands – called mixed gland :-  
like 1. Islet of Langerhans in pancreas .

2.Leydig cells of ( Interstitial cells of the testes) .

3. corpus luteum of the ovary .

## **Pituitary Gland (Hypophysis)**

The pituitary gland, weighs about 0.5g in adults is found at the base of the brain, lying beneath the third ventricle in a bony cavity (sella turcica) in the base of the skull.

.The pituitary gland develops in the embryo from two different origins so that the pituitary has anterior and posterior parts .

:The pituitary develops in the embryo from:

Oral ectoderm

The developing brain

Early in gestation a finger of ectoderm grows upward from the roof of the mouth. This protrusion is called Rathke's pouch

Later, the base of this pouch constricts and separates it from the pharynx, and will develop into the anterior pituitary or adenohypophysis.

At the same time ,another finger of tissue evaginates ventrally from the diencephalo of the developing brain.

This extension will become the posterior pituitary or neurohypophysis..

The pituitary gland is surrounded by a thin connective tissue capsule. The loose connective tissue between the capsule and the periosteum of

the sphenoid bone contains a dense plexus of thin-walled veins,

which surround the entire pituitary gland.

## **The histological features of pituitary gland**

The pituitary gland is composed of :

An anterior part and posterior part

**Anterior Pituitary-Adenohypophysis**

- Pars distalis
- Pars tuberalis -
- Pars intermedia

## Neurohypophysis

- Pars nervosa -
- Median eminence
- fundibular stalk -

## Adenohypophysis (Anterior Pituitary)

### 1- Pars Distalis:

The pars distalis accounts for 75% of the adenohypophysis .

Pars distalis :Is composed of CORDS OF EPITHELIAL CELLS (hormone-secreting cells), are SUPPORTED BY RETICULAR FIBERS , and surrounded by CAPILLARIES.

What is the type of these capillaries?

They enable passage of hormones from the secretory cells into the blood stream.

Two types of cells are found in pars distalis: Based on staining affinity

1-Chromophils cells

2- Chromophobs cells

Chromophils cells are, identified by TEM ,or according to their

affinity for basic and acidic dyes by immunohistochemistry into two types :

**Acidophils cells and Basophils cells .**

Both are divided into different classes of cells which have different secretory products and target organs.

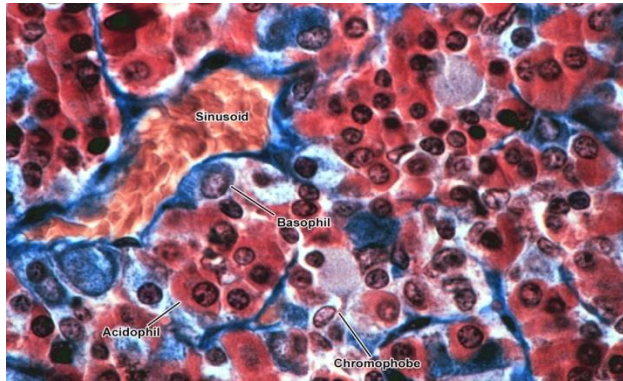
These cannot be distinguished easily by H&E or other histological stains, but can be stained specifically by immunohistochemical techniques.

Due the high carbohydrate content of the hormones within acidophils, they also stain bright purple with PAS stains

Basophils have cytoplasm that stains a bluish color.

## Chromophobes cells:

Stain weakly, have few or no secretory granules, and also represent a group, including stem cells that have not yet differentiated into hormone-producing cells.



## Cells and hormones of the anterior pituitary

LM staining	Cell type	Hormone
Acidophil	Somatotrope = somatotrope	Growth hormone (GH) = somatotropin
Acidophil	Mammotrope = lactotrope	Prolactin (PRL)
Basophil	Thyrotrope	Thyroid stimulating hormone (TSH) = thyrotropin
Basophil	Gonadotrope	Luteinizing hormone (LH), follicle stimulating hormone (FSH); both
Basophil	Corticotrope	Adrenocorticotropin (ACTH) = corticotropin

**2-The pars tuberalis** A collar of tissue that usually surrounds the infundibular stalk.

It contains cords of epithelial cells and is filled with hypophyseal portal vessels.

It contains gonadotropes and thyrotropes, plus other secretory cells of unknown function.

**3-The pars intermedia :**

is between anterior and posterior pituitary, separated from each other by the hypophyseal cleft.

It contains large pale cells that often surround follicles filled with ill-defined "colloid".

This pars secretes Melanocyte-stimulating hormone.

Poorly developed and of doubtful function in humans.

### **Neurohypophysis**

- Pars nervosa - the bulk of the posterior pituitary
- Median eminence - the upper section of the neurohypophysis above the pars tuberalis
- Infundibular stalk - the "stem" that connects the pars nervosa to the base of the brain

### **Posterior Pituitary -Neurohypophysis(parsnervosa)**

It contains :

1-non-myelinated axons.

The neuron cell bodies are located in the hypothalamus.

Hormones synthesized in neuron cell , and secreted from axon to pars nervosa and terminals into capillaries..

2- It contains pituicytes which are Specialized glial cells.

3- Herring bodies which are the dilated areas in the terminal portion of axons .

**Herring bodies**, contain clusters of neurosecretory granules, It secretes two hormones:

**1-Antidiuretic hormone (ADH)**

which acts on the kidney.

**2-Oxytocin**, which acts on the uterus.

Herring bodies often are seen in association with capillaries.

