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**Group – B**

**Topic: Pituitary Gland**

### **Pituitary Gland**

- The Pituitary gland (or hypophysis ) regulates so many body activities, it has been nicknamed the ‘master gland’ or ‘the conductor of endocrine symphony’.
- The pituitary gland is located in the sella turcica of sphenoid bone and is attached to the hypothalamus by infundibulum .
- The pituitary gland consists of two major parts in human-large anterior pituitary (or adenohypophysis ) and small posterior pituitary (or neurohypophysis).
- In man, it normally measures about 1.3 cm in diameter and weighs about 0.5 gram. It is slightly larger in woman.

#### **Adenohypophysis**

##### **(Anterior lobe)**

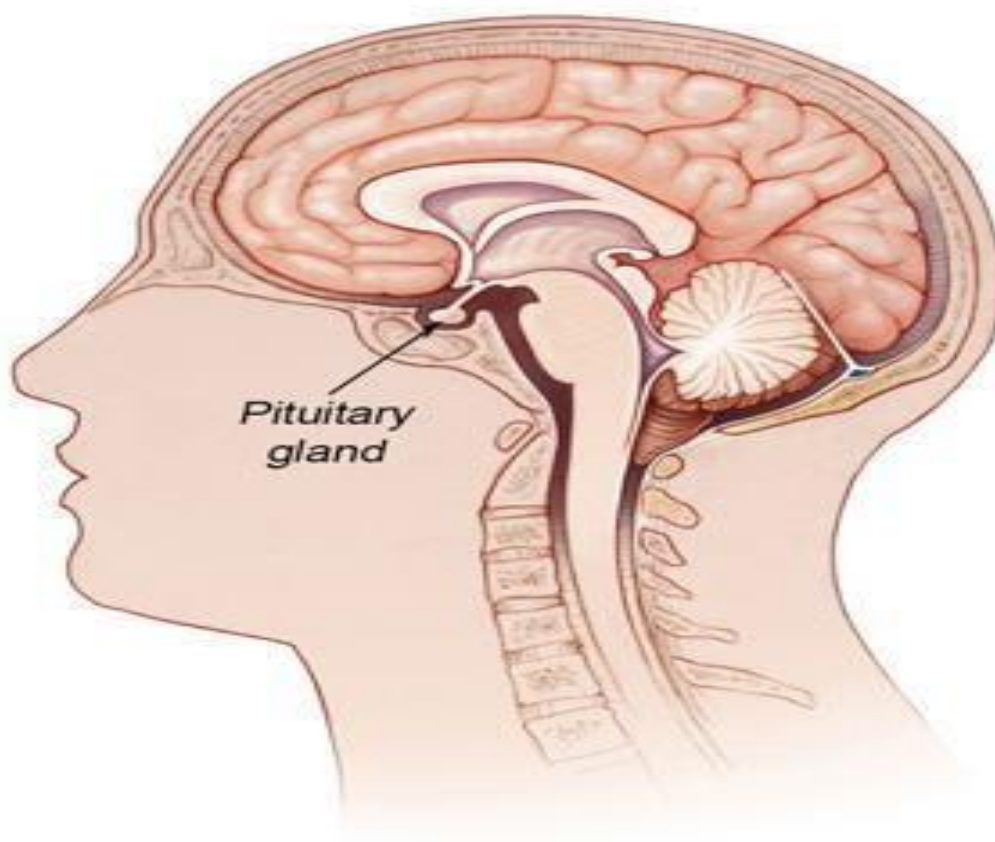
- Pars distalis
- Pars intermedia
- Pars tuberalis

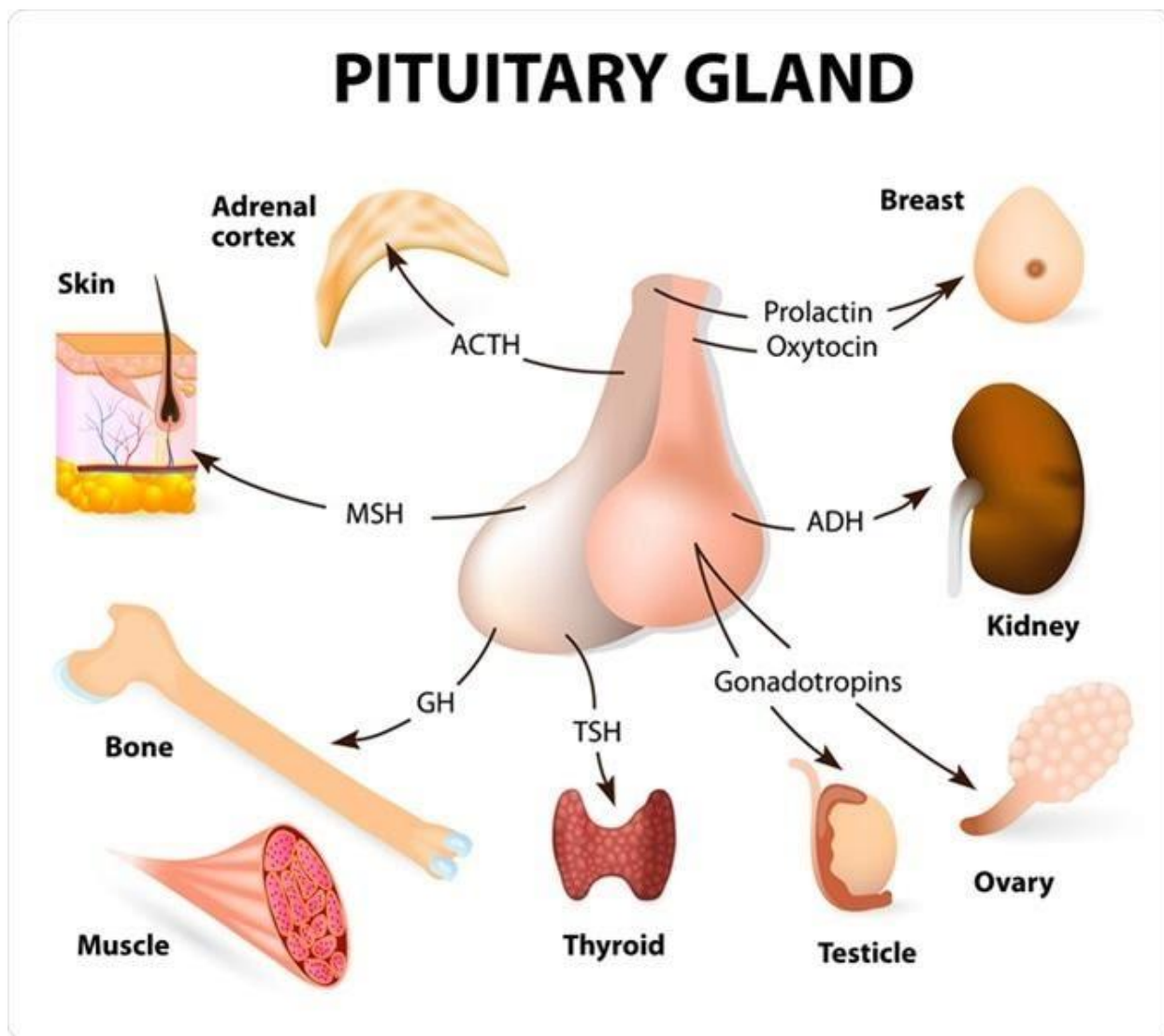
#### **Neurohypophysis**

##### **(Posterior lobe)**

- Median eminence
- Infundibular stem
- Pars nervosa

- The hormones secreted by pituitary are proteins (peptides) or glycoproteins.





### Hormones of Adenohypophysis:

1. Somato-Tropic Hormone (STH) or GH
2. Thyroid Stimulating Hormone (TSH)
3. Adreno-Cortico-Tropic Hormone (ACTH)
4. Follicle-Stimulating Hormone (FSH)
5. Luteinizing Hormone (LH)
6. Prolactin (Galactin or LTH)

## 7. Melanocyte Stimulating Hormone (MSH)

### 1. Somato-Tropic Hormone (Growth Hormone):

Growth hormone (GH) promotes the movement of amino acids into cells and the incorporation of these amino into proteins, thus promoting overall tissue and organ growth.

Growth hormone exerts its cell division stimulating (mitogenic) effect not directly on cells but rather indirectly through the mediation of a mitogen whose synthesis and release are induced by growth hormone.

This mitogen is called insulin-like growth factor 1 (IGF-1). Under the influence of growth hormone, IGF-1 is secreted by the liver, enters the blood and functions as a hormone.

### 2. Thyrotropin:

Thyroid Stimulating Hormone (THS) stimulates the synthesis and secretion of hormones produced by thyroid gland.

### 3. Adreno-Cortico-Tropic Hormone(ACTH):

Adrenocorticotropic hormone (ACTH) is a polypeptide hormone synthesized in the anterior lobe of the pituitary gland in response to the corticotropin –releasing hormone (CRH) released by the hypothalamus.

It consists of 39 amino acids. ACTH stimulates the synthesis and secretion of steroid hormones called corticosteroids from the adrenocortical cells of adrenal cortex.

#### **4. Follicle-Stimulating Hormone:**

Follicle- stimulating hormone stimulates gamete (ova and sperm) Production in both sexes.

In females, it stimulates growth and development of ovarian follicles, within which the ova or eggs develop. It also promotes secretion of the estrogen by the ovaries.

In males, FSH targets seminiferous tubules in testes and stimulates sperm production.

#### **5. Luteinizing hormone (LH)**

In females, LH triggers ovulation from Graafian follicles with the release of a secondary oocyte (future ovum) by an ovary.

LH also stimulates formation of the corpus luteum (structure formed after ovulation) in the ovary and the secretion of progesterone by the corpus luteum.

In males, it is called interstitial cell stimulating hormone (ICSH). It stimulates cells in the testes to secrete testosterone.

LH and FSH stimulate gonadal activity and hence are called gonadotropins.

#### **6. Prolactin (PRL)**

Prolactin (PRL) is a peptide hormone synthesized and secreted by the adenohypophysis. Prolactin has many effects, the most important is to stimulate the mammary glands to produce milk (lactation).

Increased serum concentration of prolactin during pregnancy causes enlargement of the mammary glands of the breasts and increases the production of milk.

However, the high levels of progesterone during pregnancy act directly on the breasts to stop its lactogenic effect. Milk production normally starts when the levels of progesterone fall by the end of pregnancy.

Prolactin also gives negative feedback to hypothalamus to stop the secretion of GnRH which in turn decreases the secretion of FSH and LH from anterior pituitary. It stops ovulation during pregnancy.

### **7. Melanocyte-Stimulating Hormone (MSH):**

Melanocyte -Stimulating hormones act on the melanocytes and increases pigmentation of the skin in amphibians. Its exact role in humans is unknown.

### **Hormones of Neurohypophysis:**

1. Anti-Diuretic Hormone (ADH) or Vasopressin (Pitressin)
2. Oxytocin or Pitocin

#### **1. Anti-Diuretic Hormone (ADH) or Vasopressin (Pitressin)**

Vasopressin (or pitressin) increases the resorption of water by the distal convoluted tubule and collecting duct of the nephron and thereby reduces loss of water through urine (diuresis). Hence, it is also called anti-diuretic hormone (ADH)

The urine becomes more concentrated as water is reabsorbed. In the absence of ADH, urine output increases more than tenfold.

Drinking alcohol often causes frequent urination because alcohol inhibits secretion of ADH. ADH also causes vasoconstriction, thereby, increasing blood pressure.

## **2. Oxytocin or Pitocin**

Oxytocin (or Pitocin) stimulates uterine contractions at the time of child birth that are needed to move the child out through the birth canal.

The hormone stimulates the release of milk from the mammary glands by causing surrounding cells to contract.

After birth, stimulation of the breast by the infant feeding stimulates the posterior pituitary to produce Oxytocin. It is often called as birth hormone.

The function of Oxytocin in males and in non-pregnant females is not clear.