

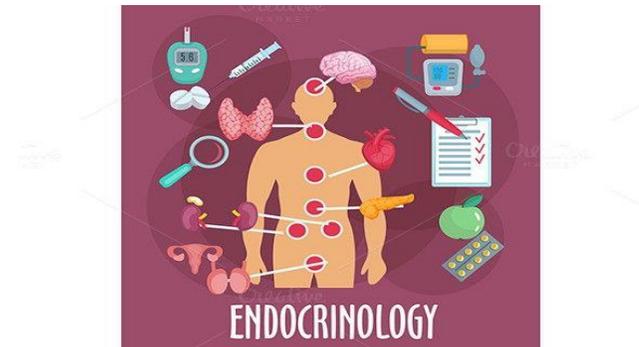


B.Sc. 3rd Semester Zoology (Generic)

Endocrinology



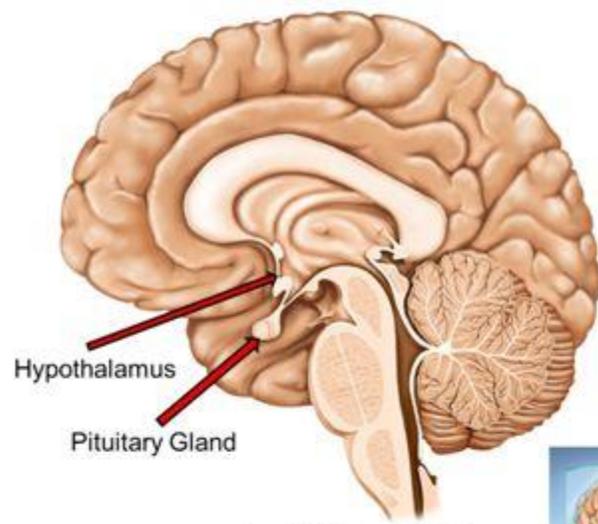
Topic: 1. *Structural and function of endocrine gland- pituitary gland*



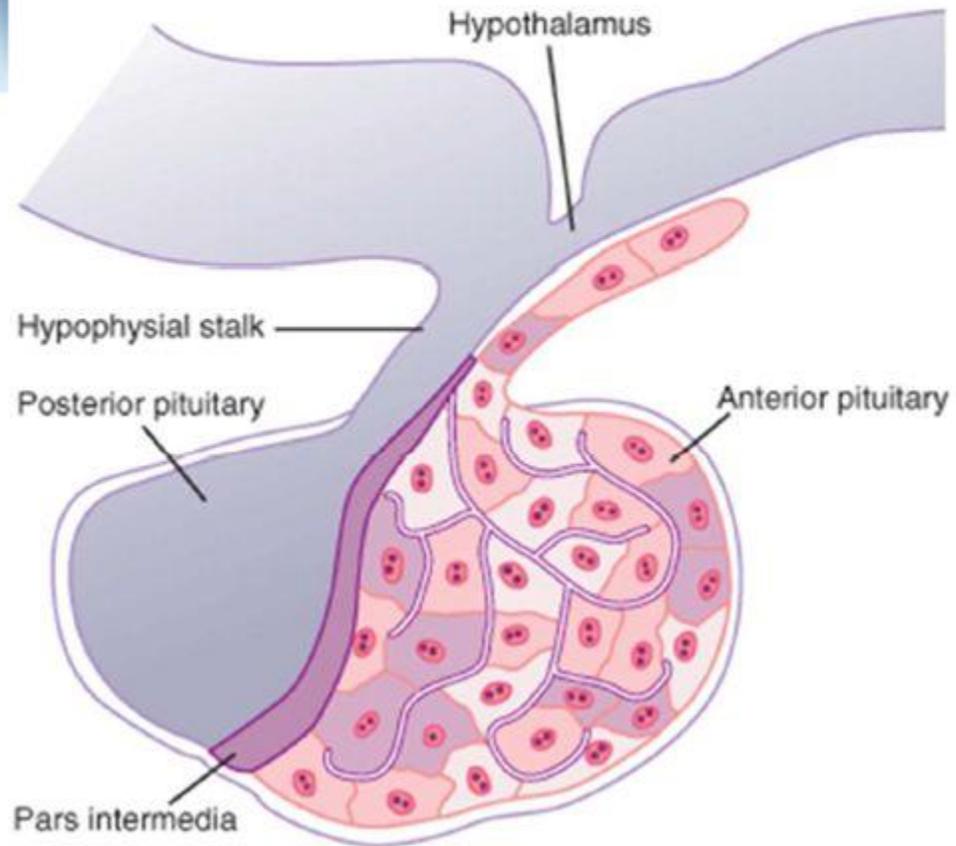
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- The pituitary gland is a small gland about 1cm in diameter and 0.5 to 1 g in weight.
- The pituitary gland lies in the *Sella turcica*, a body cavity at the base of the brain, and is connected to the hypothalamus by the pituitary or *hypophysial stalk*.
- Physiologically, the pituitary gland is divisible into two distinct portions: the anterior pituitary, also known as the *adenohypophysis* and the posterior pituitary, also known as the *neurohypophysis*.
- Between these is a small, relatively avascular zone called the *pars intermedia*, which is almost absent in the human being is much larger and much more functional in some lower animals.
- Embryologically, the two portions of the pituitary originate from different sources-
 - The *anterior pituitary* from *Rathke's pouch*, which is an embryonic invagination of the pharyngeal epithelium and the *posterior pituitary* from the *neural tissue* outgrowth from the hypothalamus.

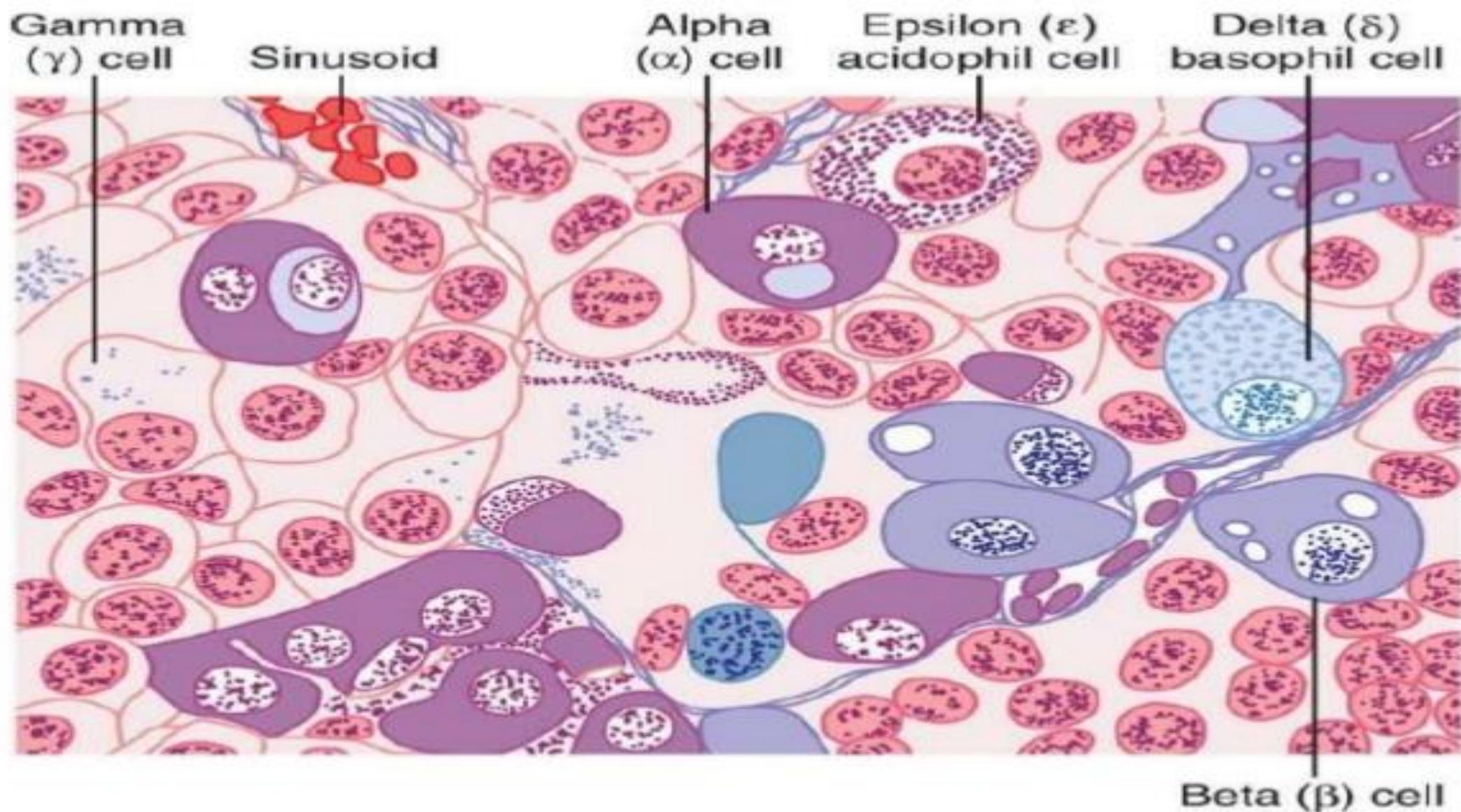
Pituitary gland



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Histological structure of Pituitary Gland



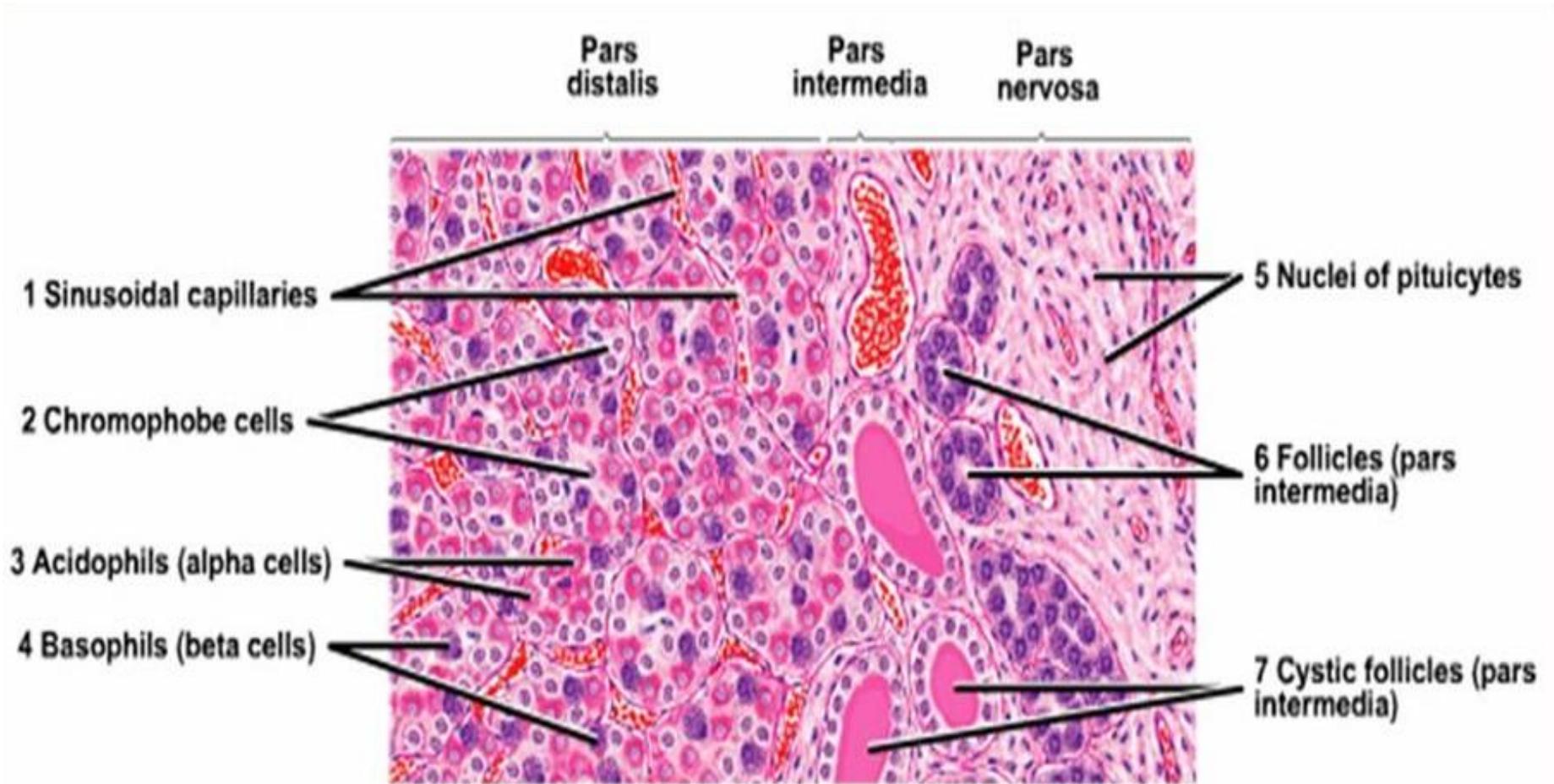


Fig. Different types of cell present in the pituitary gland

Anterior Pituitary Gland

- ▶ Contains different Cell Types that Synthesize and Secrete Hormones.
- ▶ There is one cell type for each major hormone
- ▶ Five cell types:
 1. **Somatotropes**—human growth hormone (hGH), 30-40%
 2. **Corticotropes**—adrenocorticotropin (ACTH), 20%
 3. **Thyrotropes**—thyroid-stimulating hormone (TSH)
 4. **Gonadotropes**—gonadotropic hormones, LH and FSH
 5. **Lactotropes**—prolactin (PRL)
- ▶ Somatotropes stain strongly with acid dyes and are therefore called acidophils. Thus, pituitary tumors that secrete large quantities of human growth hormone are called acidophilic tumors.

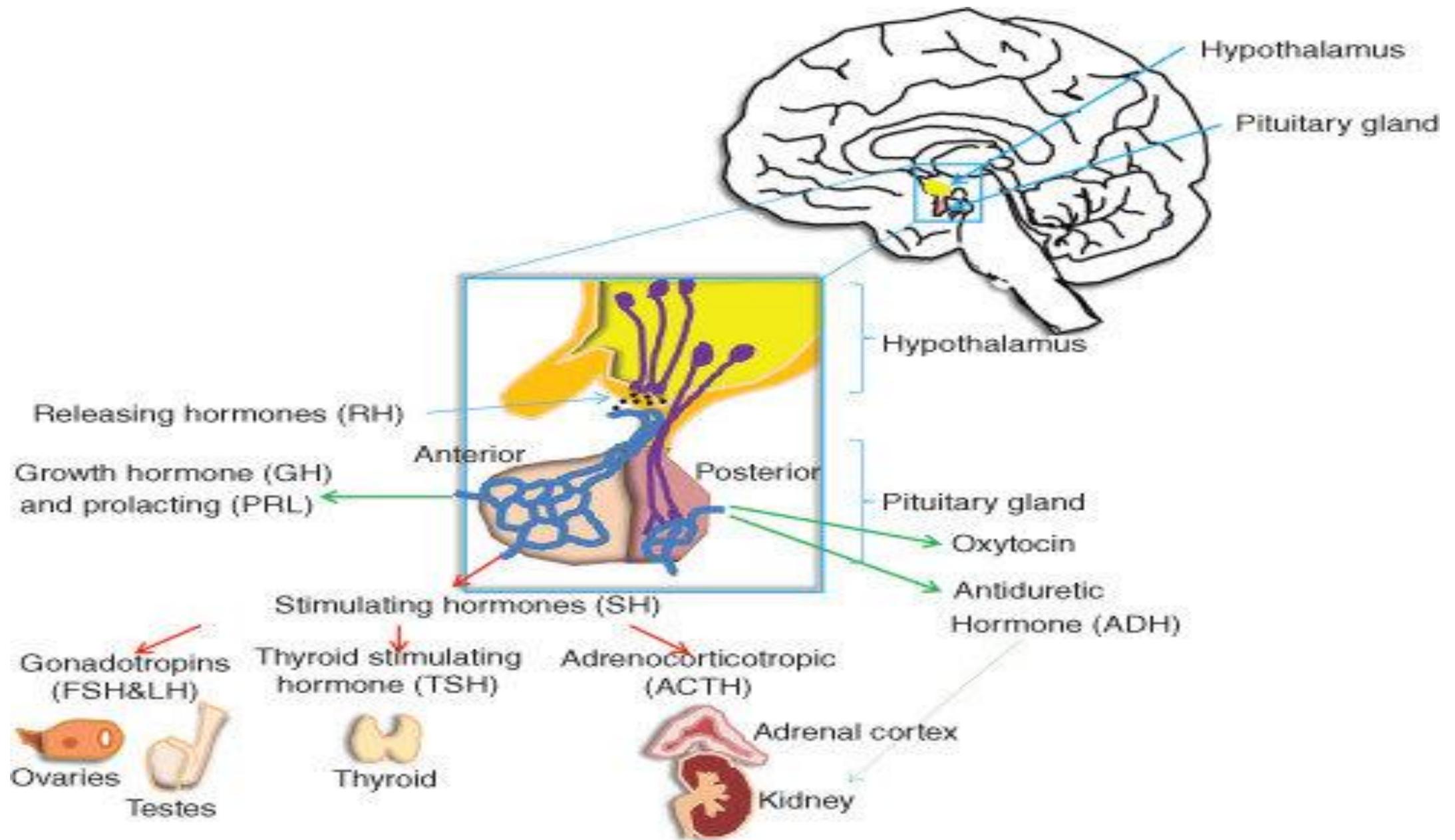


Fig. Pituitary gland showing the release of hormones from anterior and posterior pituitary.

Hypothalamus controls Pituitary Secretion:-

- ❖ Almost all secretion by pituitary is controlled by either hormonal or nervous signals from the hypothalamus.
- ❖ Secretion of the posterior pituitary is controlled by nerve signals that originate in the hypothalamus and terminate in the posterior pituitary.
- ❖ In contrast, secretion by the anterior pituitary is controlled by hormones called **hypothalamic releasing** and **hypothalamic inhibitory** hormones secreted within the hypothalamus.
- ❖ In the anterior pituitary, these releasing and inhibitory hormones act on the glandular cells to control their secretion.
- ❖ The hypothalamus receives signals from many sources in the nervous system.

Table.1. Hormones secreted by the parts of pituitary glands and their target organs

	Hormone	Major target organs	Major physiologic effects
Anterior Pituitary	Growth hormone	Liver, adipose tissue	Promotes growth (indirectly), control of protein, lipid and carbohydrate metabolism
	Thyroid stimulating hormone	Thyroid gland	Stimulates secretion of thyroid hormones
	Adrenocorticotrophic hormone	Adrenal gland cortex	Stimulates secretion of glucocorticoids
	Prolactin	Mammary gland	Milk production
	Luteinizing hormone	Ovary and testis	Control of reproductive function
	Follicle stimulating hormone	Ovary and testis	Control of reproductive function
Posterior pituitary	Antidiuretic hormone	Kidney	Conservation of body water
	Oxytocin	Ovary and testis	Stimulates milk ejection and uterine contractions

Disorders of Hormones secreted by Pituitary gland:

Disorders are classified under hypo and hypersecretion of hormones. The major disorders of pituitary are-

- Acromegaly
- Diabetes insipidus
- Hypopituitarism
- Pituitary tumor

Acromegaly

- Caused by excessive secretion of Growth hormones.
- Characterised by excessive growth in the form of swelling of hands, legs and soft tissues.

Symptoms-

- Swelling of hands and feet.
- Facial features become coarse as human grow.
- Protruding jaw.
- Degenerative arthritis.
- Enlargement of organs.

Diabetes insipidus-

- Caused due to insufficient production of Antidiuretic hormone.
- Characterised by excessive thirst and excretion of large amount of severely diluted urine.

Symptoms-

- Extreme thirst.
- Blurred vision.
- Dehydration.
- Extreme urination.
- Fever, vomiting or diarrhea.

Hypopituitarism-

Deficiency of all anterior pituitary hormones is more common than individual hormone deficiency.

Luteinizing hormone (LH) and Follicle –Stimulating Hormone (FSH)-

- Women experience infrequent menstrual periods and infertility.
- Men lose facial and trunk hair, as well as suffer decreased muscle mass and anaemia with increased risk of osteoporosis.

Growth Hormone-

- Decrease in muscle mass, central obesity.
- Impaired attention and memory.
- Children experience growth retardation and short stature.

Adrenocorticotrophic hormone (ACTH)-

- Lack of production of glucocorticoids such as cortisol by the adrenal gland.
- Fatigue, weight loss, delayed puberty (in adolescents).
- Hypoglycemia (low blood sugar levels), anaemia and hyponatremia (low sodium levels)

Thyroid stimulating hormone (TSH)-

- Deficiency leads to hypothyroidism
- Typical symptoms are tiredness, intolerance to cold, constipation, weight gain, hair loss, low blood pressure.

Prolactin-

- It plays a role in breastfeeding and inability to breastfeed may point a abnormally low prolactin levels

Anti diuretic hormone-

- Inability to concentrate the urine.
- Extreme thirst.

Oxytocin-

Deficiency generally cause few symptoms, as it is only required at the time of childbirth and breastfeeding.

Pituitary Tumors-

- The most common pituitary tumors are-
 - **Pituitary adenomas** are tumors that occur in the pituitary gland and account for about 15% of intracranial neoplasm
 - **Prolactinomas** are the most common type of pituitary tumor. It secrete prolactin acidophilic. It causes galactorrhea, hypogonadism, amenorrhea, infertility and impotence.

THANK YOU