

# **The 10<sup>th</sup> lecture**

**In**

# **Anatomy and Physiology**

**For the**

# **1<sup>st</sup> Class**

**By**

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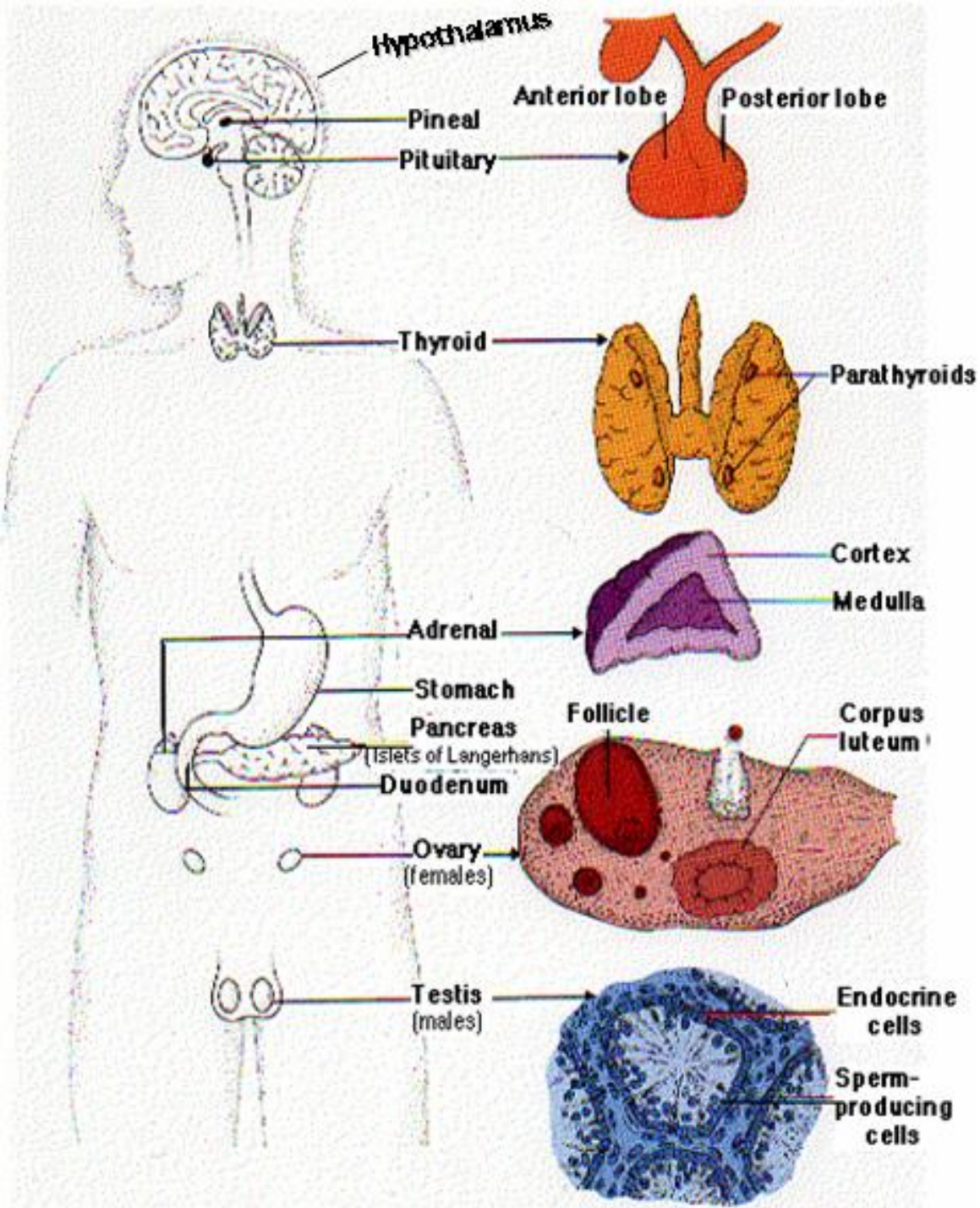
# The Endocrine System

# Control of the Body

- Internal control of the body is directed by 2 systems:
  1. The Nervous System
  2. The Endocrine System

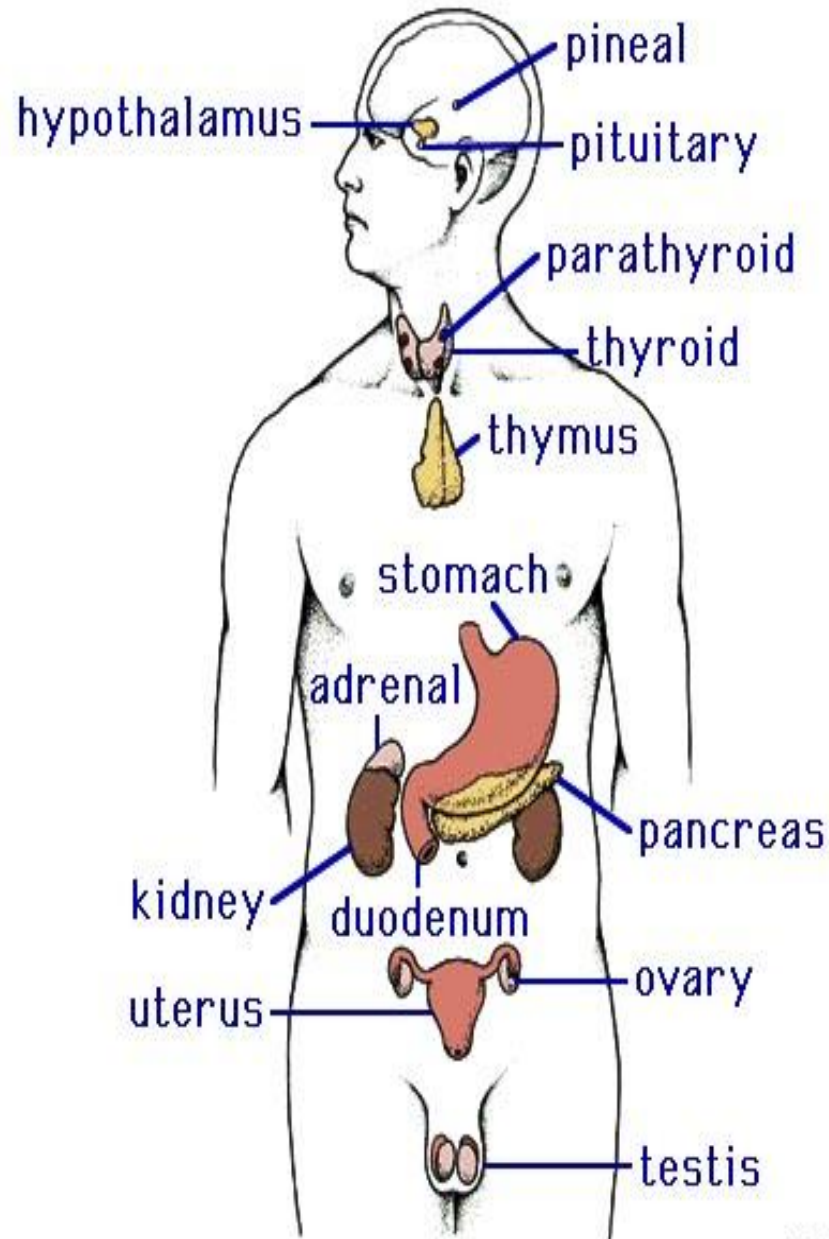
# Endocrine System

- Endocrine tissue is made up of cells that release chemicals directly into bloodstream.
- Some organs are entirely endocrine in function. They are referred to as endocrine glands like **pituitary glands, pineal body, thyroid gland, parathyroid glands, and adrenal glands.**
- Groups of endocrine cells may be present in organs that have other functions like **islets of pancreas, the interstitial cells of the testes, the kidneys, and the follicles and corpora lutea of ovaries.**



# Endocrine glands

# Endocrine glands



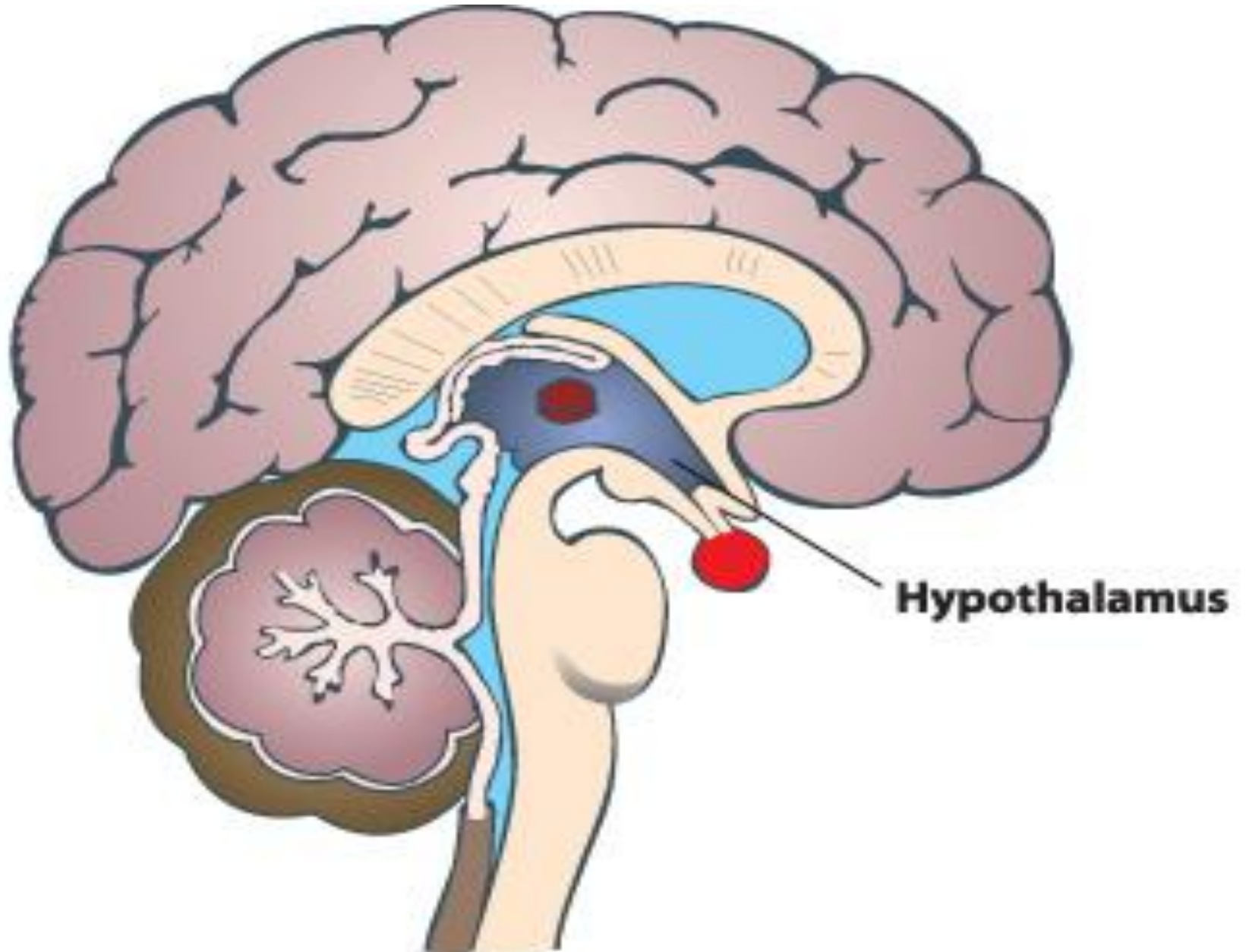
- The chemicals released by endocrine cells are called **hormones**.
- Hormones travel through blood to target cells.
- Some hormones act only on one organ or on one type of cell, while other hormones may have widespread effects.
- The endocrine organs co-ordinate and control the metabolic activities and the internal environment of the body.

# Pituitary Gland (Hypophysis)

- It is also called the master gland.
- The pituitary gland is located in the base of the brain.
- It controls many body functions and as well as other endocrine glands.
- Pituitary gland is divided into two major lobes:
  - Anterior lobe
  - Posterior lobe

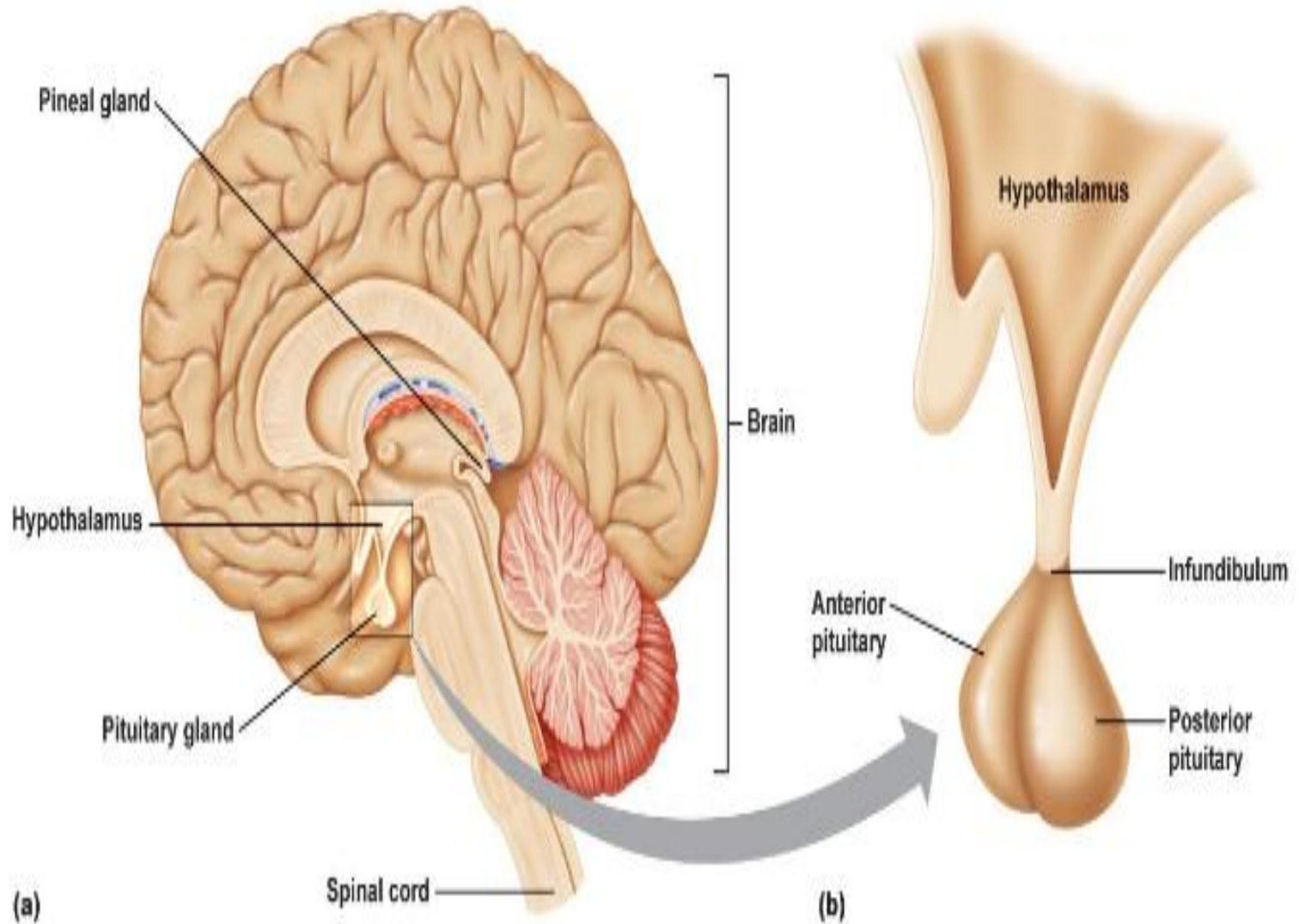


# Location of pituitary gland



# Pituitary gland

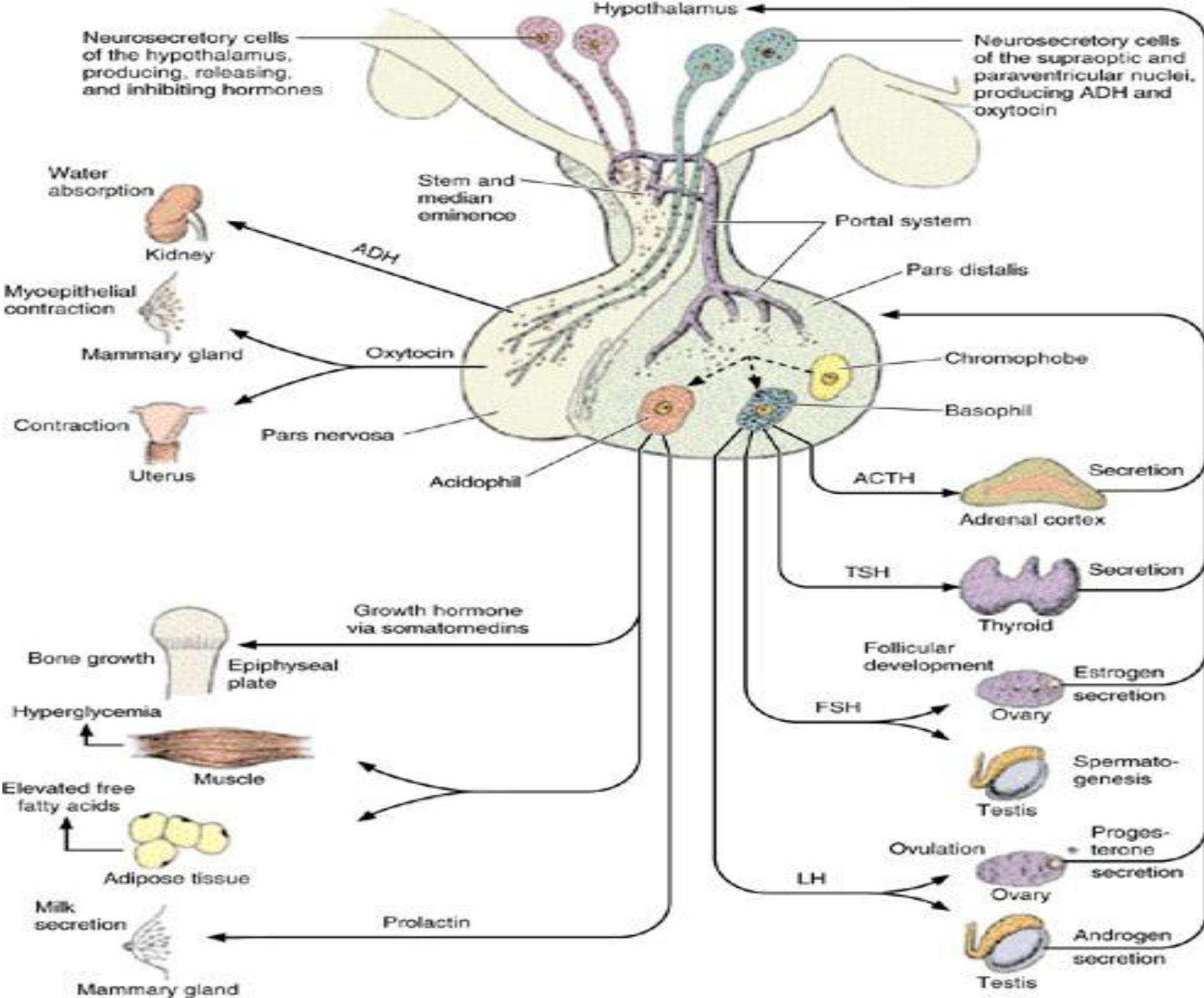
endocrine organ in two different ways.



# Anterior lobe of pituitary gland

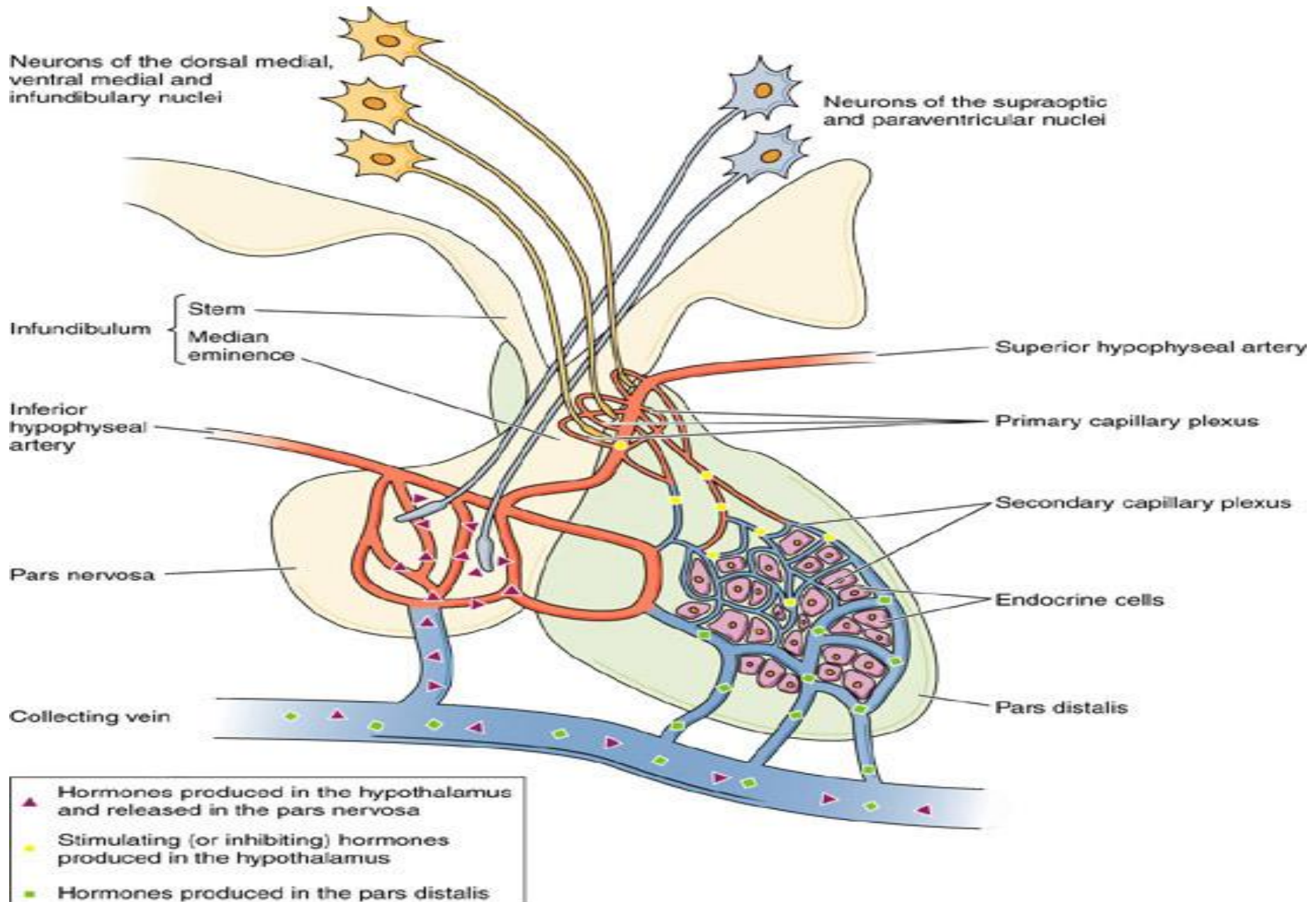
- It secretes many hormones;
1. **Growth hormone (GH)** promotes bone growth specially during adolescents.
  2. **Thyroid stimulating hormone (TSH)** stimulates thyroid gland to secrete thyroid hormone (thyroxin hormone).
  3. **Adenocorticotrophic hormone (ACTH)** acts on adrenal cortex to secrete its hormones.
  4. **Follicle stimulating hormone (FSH)** promotes ovarian follicle development and estrogen secretion in **women** and stimulates spermatogenesis in **men**.
  5. **Luteinizing hormone (LH)** stimulates the maturation of corpus luteum and progesterone secretion in **women** and Leyding cell stimulation and androgen secretion in **men**.
  6. **Prolactin hormone** promotes milk secretion.

# Pituitary gland Hormones





# Hypothalamus- Pituitary Relationship



# Posterior lobe of Pituitary gland

- It secretes of two hormones;
  1. **Vasopressin = Antidiuretic hormone (ADH)** it controls reabsorption of water by kidney tubules.
  2. **Oxytocin hormone** it controls the contraction of the smooth muscles of uterus and also of the mammary glands.

# Control of secretion of pituitary hormones

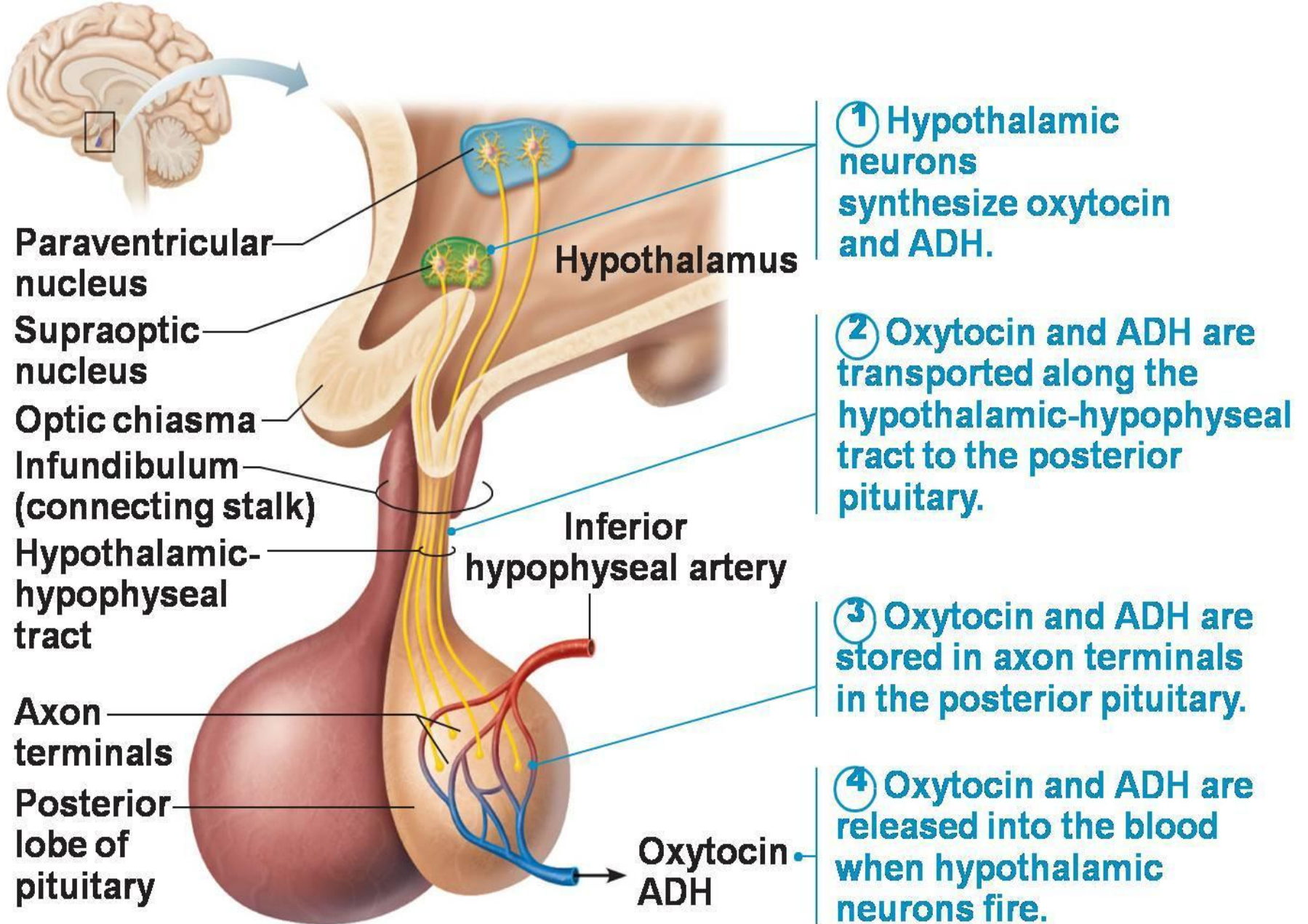
- Hypothalamus controls secretions of pituitary gland.

# Hypothalamus

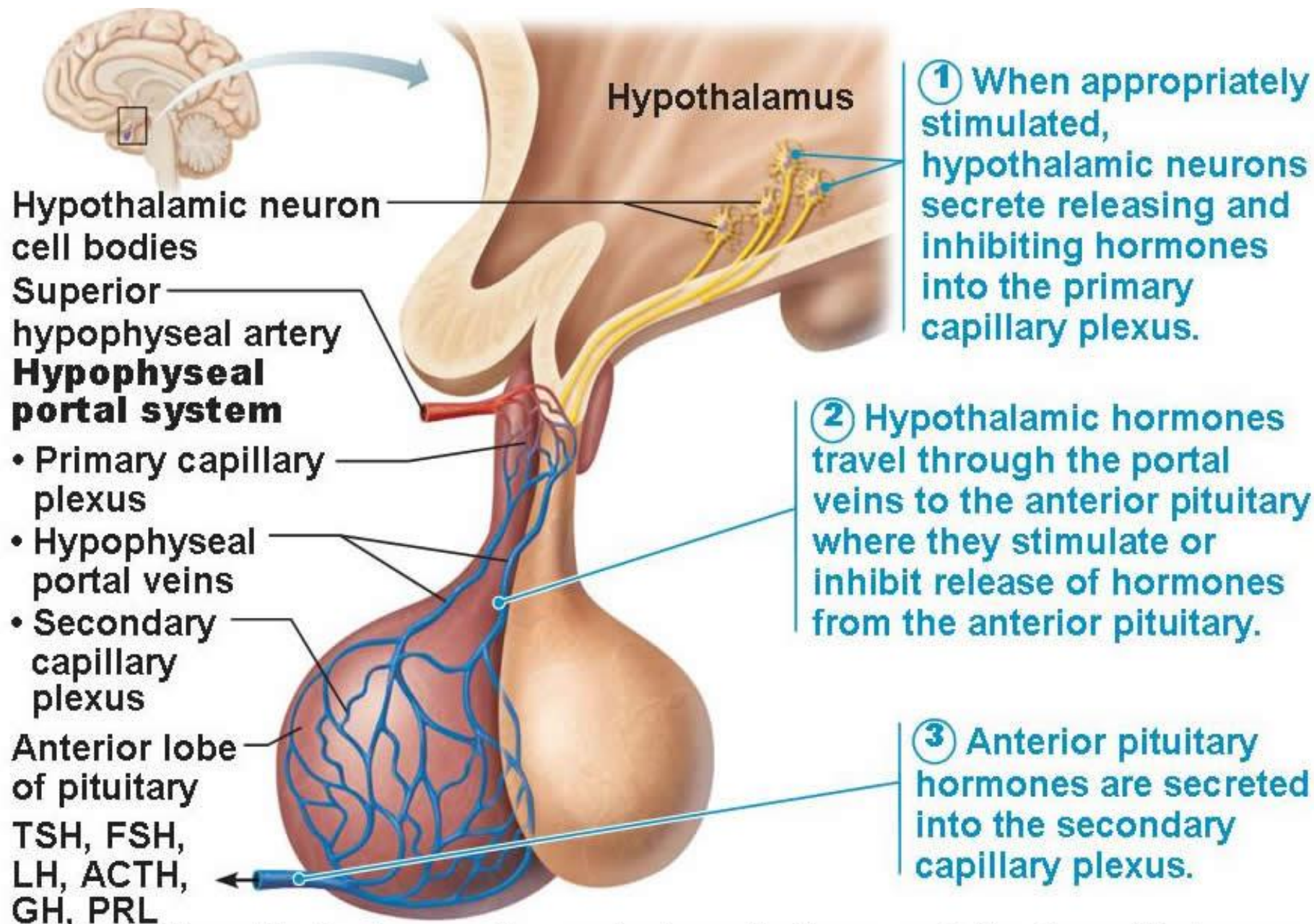
- The hypothalamus is a part of brain which controls visceral functions.
- Hypothalamus is a bridge between two major systems ; **Nervous System** and **Endocrine System**.
- Hypothalamus produces releasing factors, these factors reach anterior lobe of pituitary gland and stimulate the release of appropriate hormones..
- The releasing factors produced by hypothalamus are:
  - Growth hormone releasing factor
  - Corticotropin releasing factor
  - Thyrotropin releasing factor
  - Gonadotropin releasing factor
  - prolactin releasing factor
  - Prolactin inhibiting factor



- ADH and oxytocin synthesized in neurons located in the hypothalamus and then reach the posterior lobe of pituitary gland through axons.



**(a) Relationship between the posterior pituitary and the hypothalamus**

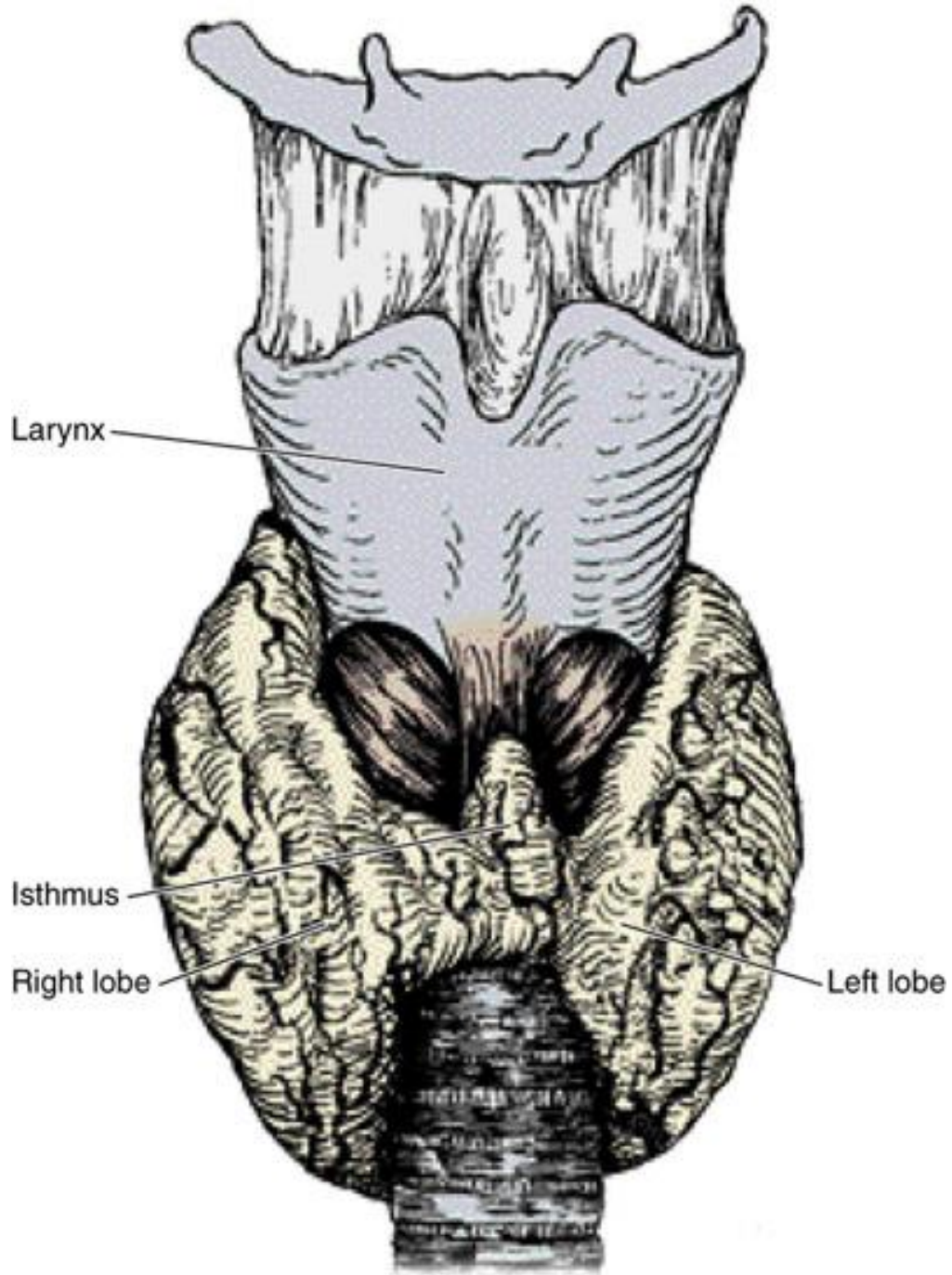


**(b) Relationship between the anterior pituitary and the hypothalamus**

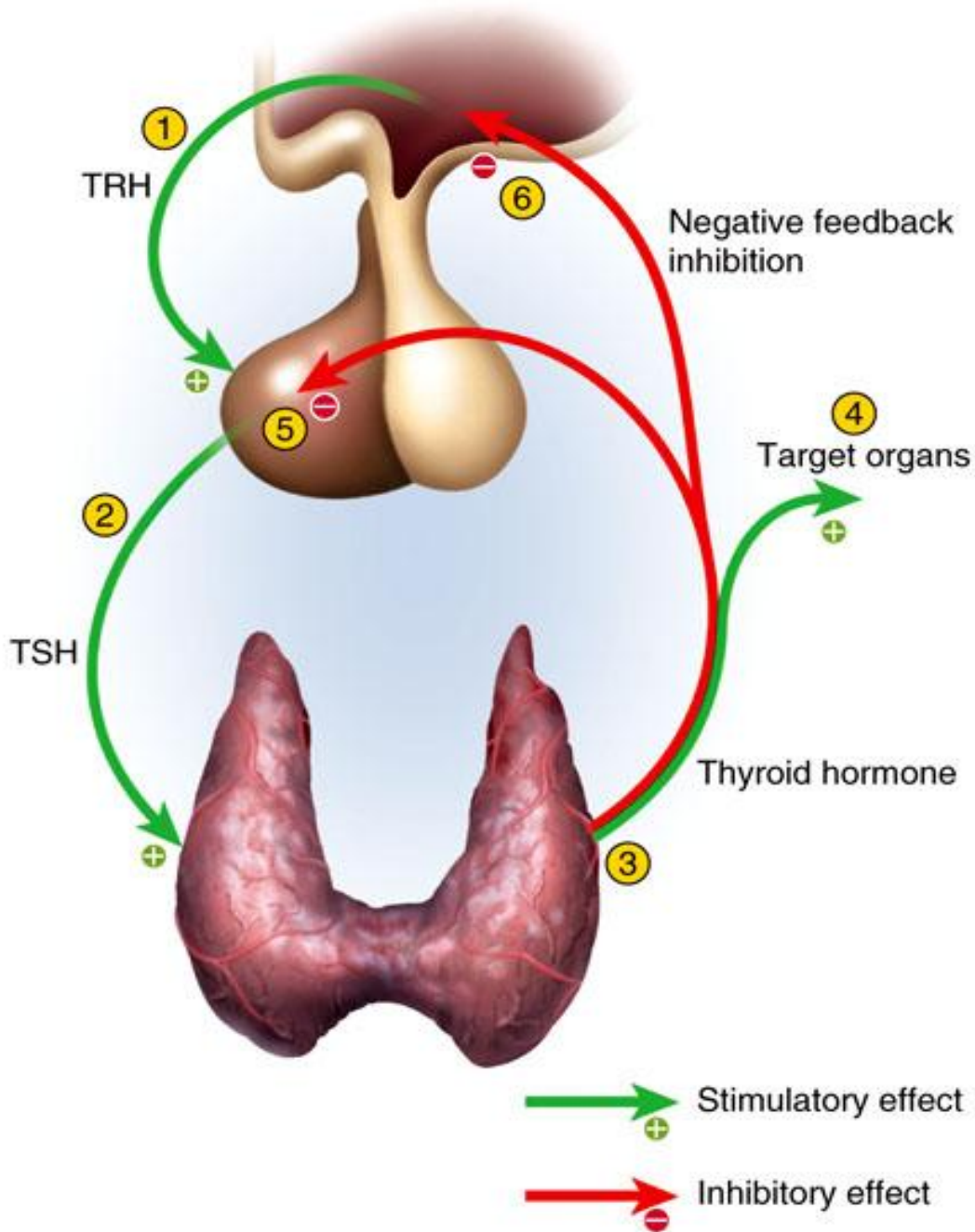


# The Thyroid Gland

- It is a very important endocrine gland.
- It is located in the front of the neck, anterior to the larynx and trachea.
- It releases two hormones:
  - 1. Thyroid hormone (Thyroxin)** this hormone regulates metabolism, growth and development.
  - 2. Calcitonin hormone** lower calcium level in the blood by decrease bone resorption.



.Anatomy of the human thyroid.



# Feedback Mechanism

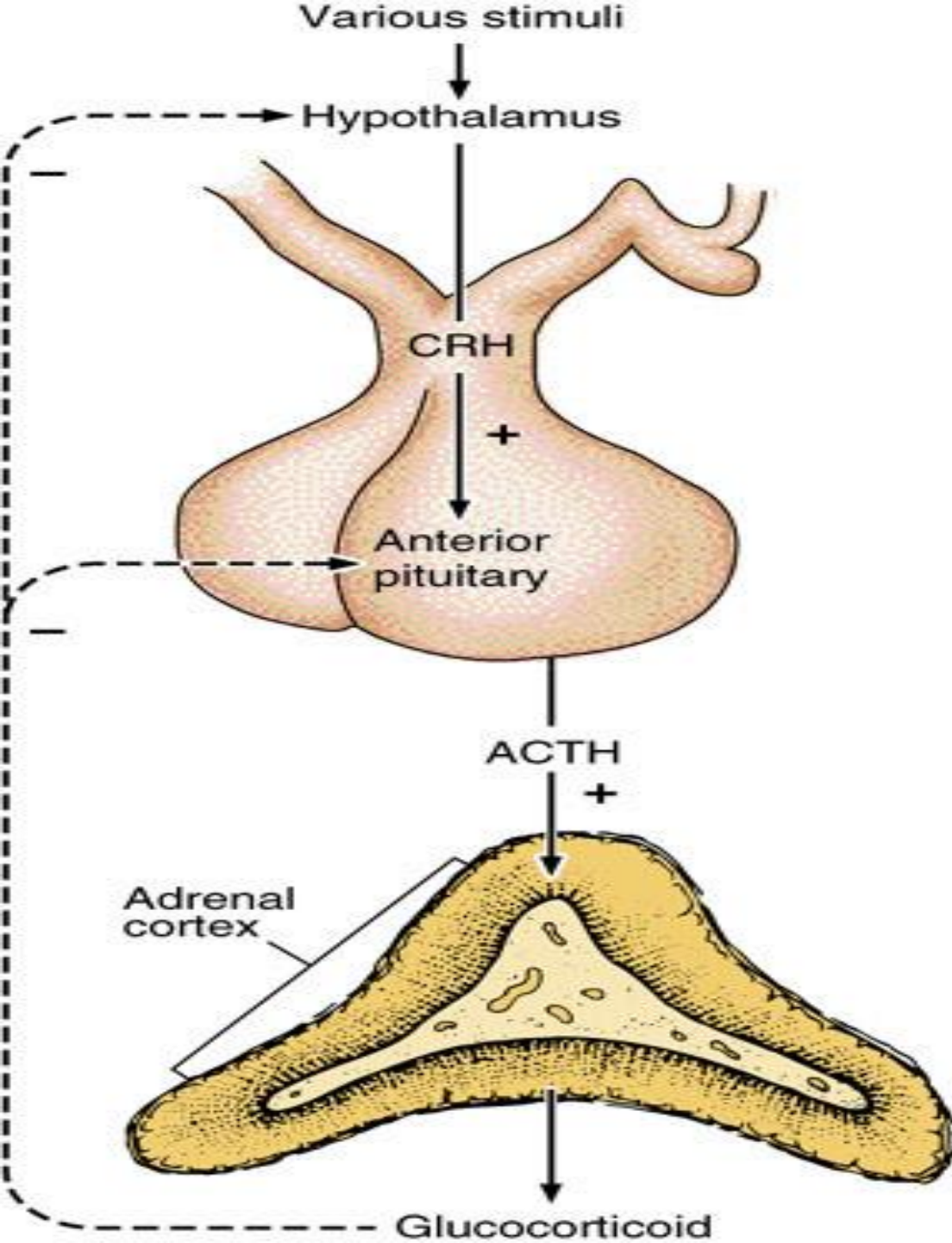
# The Parathyroid glands

- The parathyroids are 4 small glands located behind thyroid gland.
- They secrete parathyroid hormone (PTH).
- PTH increases level of calcium in the blood.

# The Adrenal glands

- These are two glands lie near the superior pole of the kidney.
- Each adrenal gland consists of two parts **cortex** and **medulla**.
- Adrenal cortex releases **Glucocorticoids, Mineralocorticoids**.
- Adrenal medulla secretes **epinephrine and norepinephrine**.
- **Epinephrine and norepinephrine** increase heart rate, blood pressure, and rate of respiration.





Feedback mechanism of ACTH and glucocorticoid secretion. Solid arrows indicate stimulation; dashed arrows, inhibition. CRH, corticotropin-releasing hormone, ACTH, corticotropin.

# The Pancreas

- The endocrine tissue of pancreas is called **Islets of Langerhans**.
- **Beta cells** of Langerhans islets secrete **Insulin**.
- The function of insulin is to help body cells to absorb glucose.
- Alpha cells secrete **Glucagon**.
- The function of the glucagon is to release glucose.