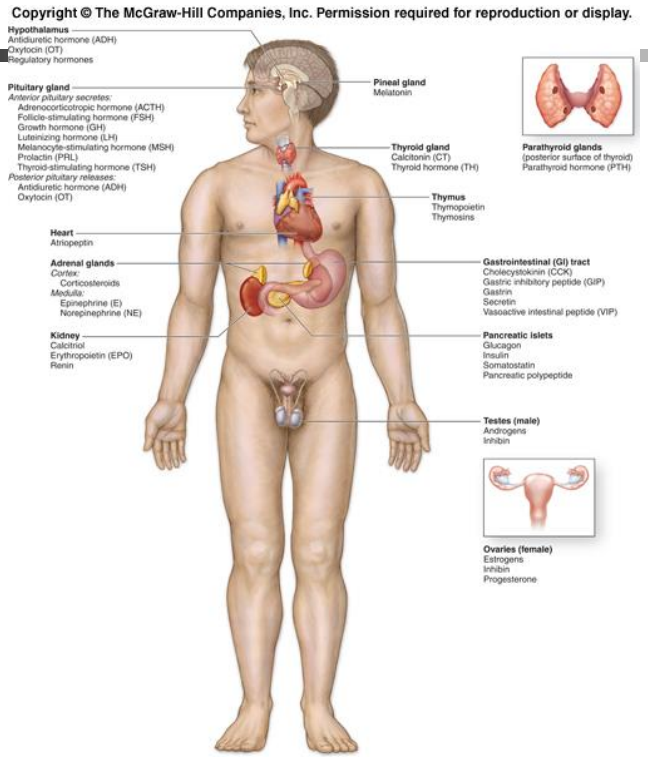
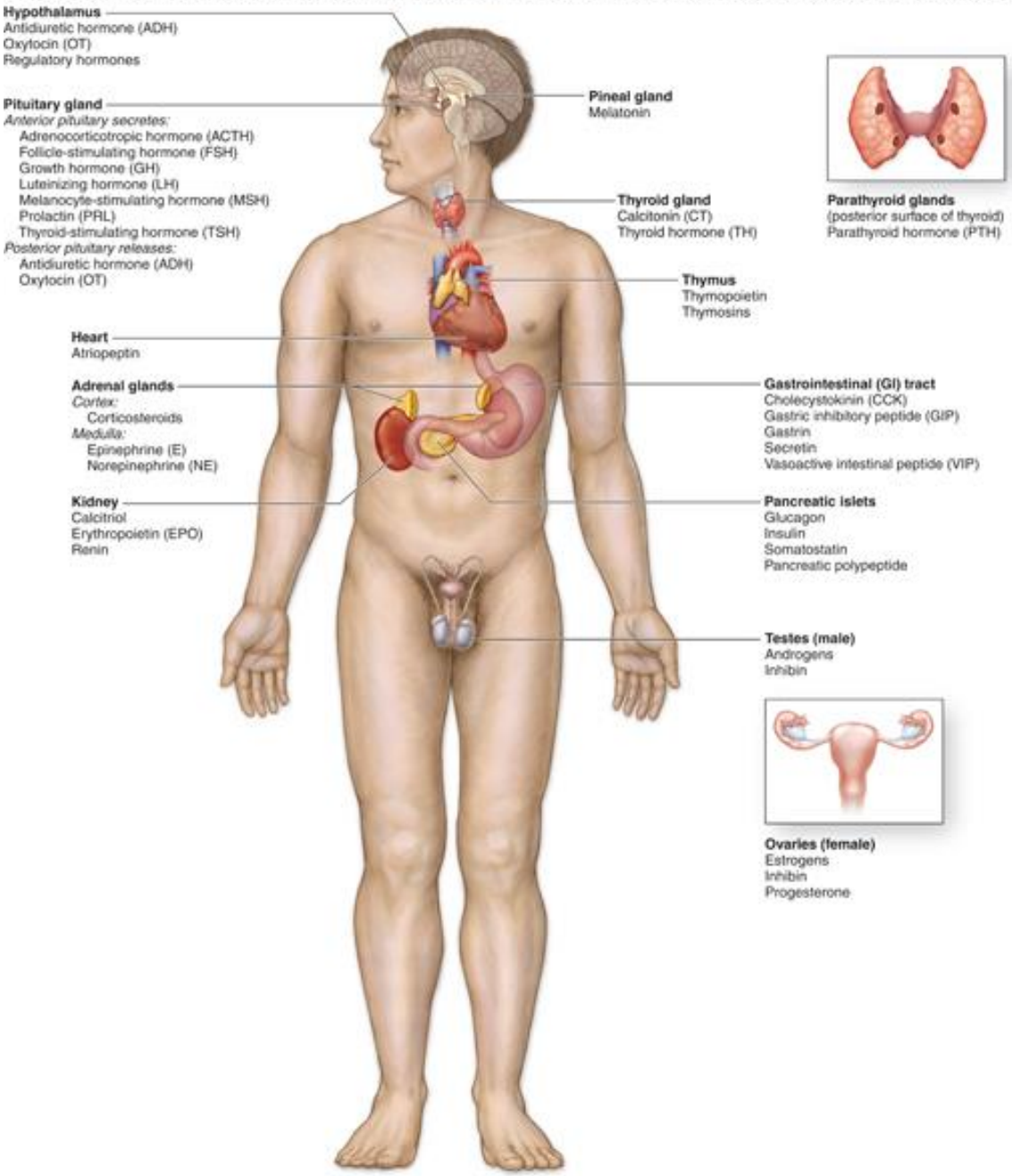
Anatomy of endocrine system.

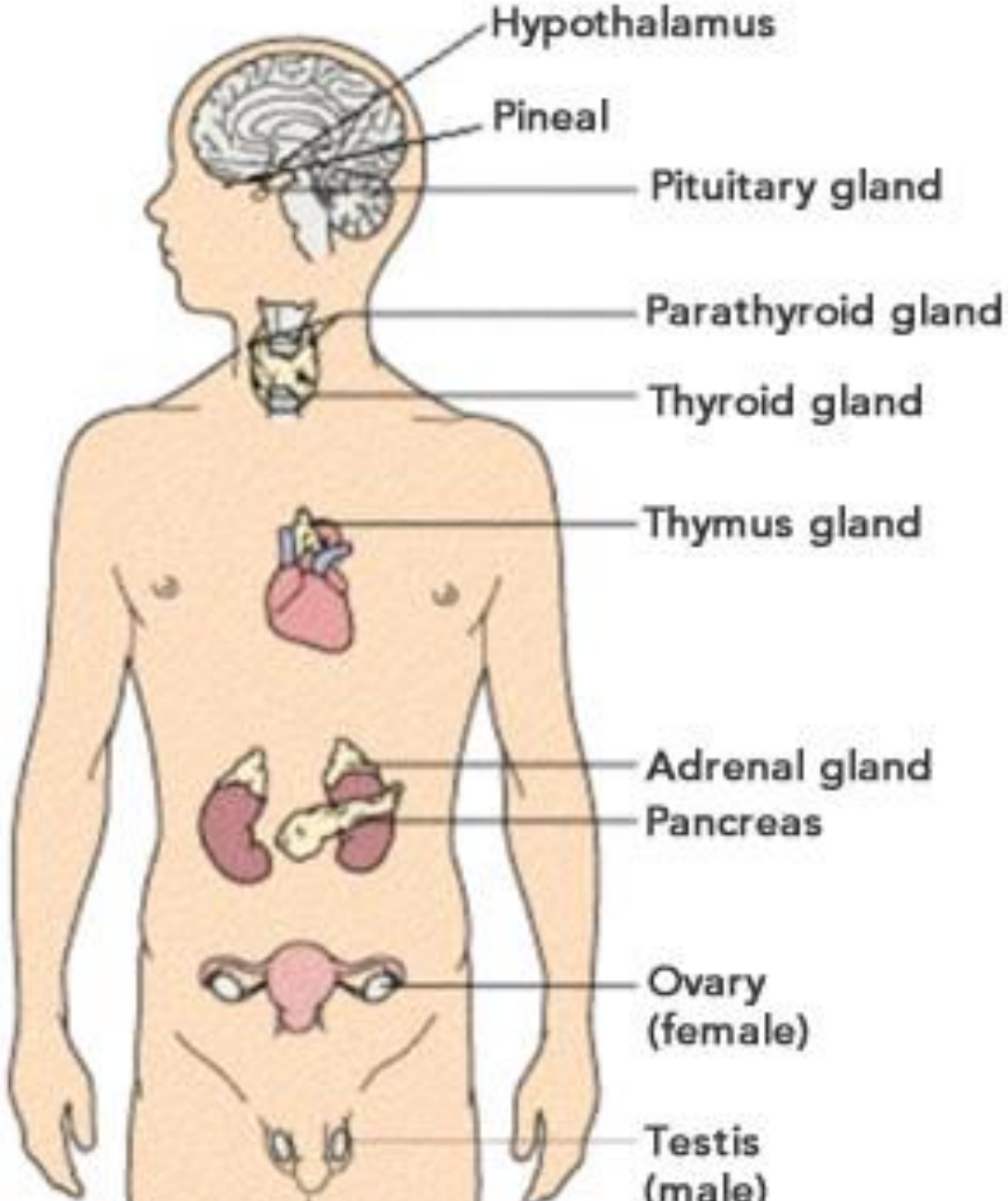


Endocrine System

- Major control system
  - Works with the nervous system
  - Function: to maintain homeostasis
- Both use
  - specific communication methods
  - affect specific target organs
- Their methods and effects differ.



The Endocrine System

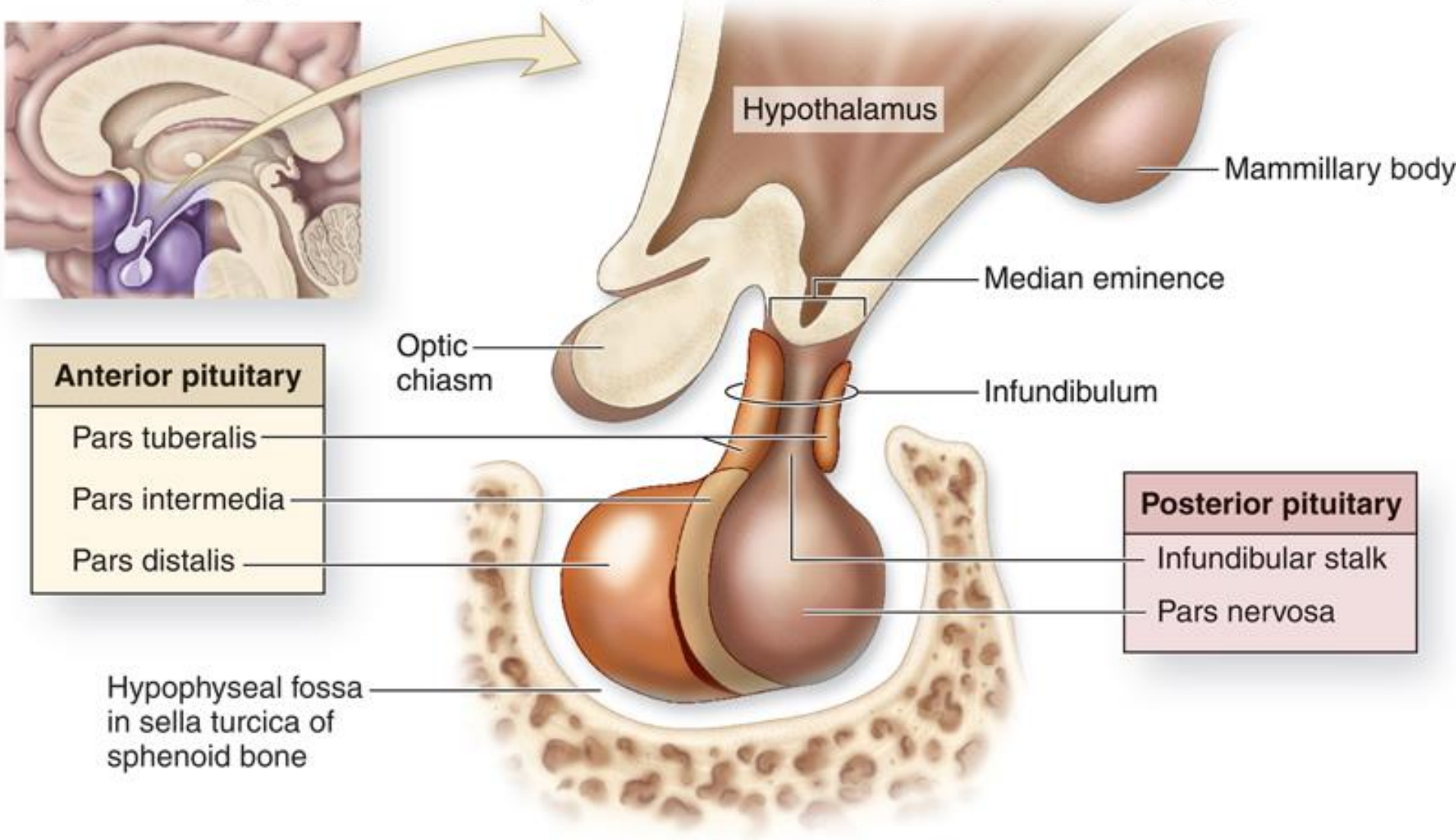


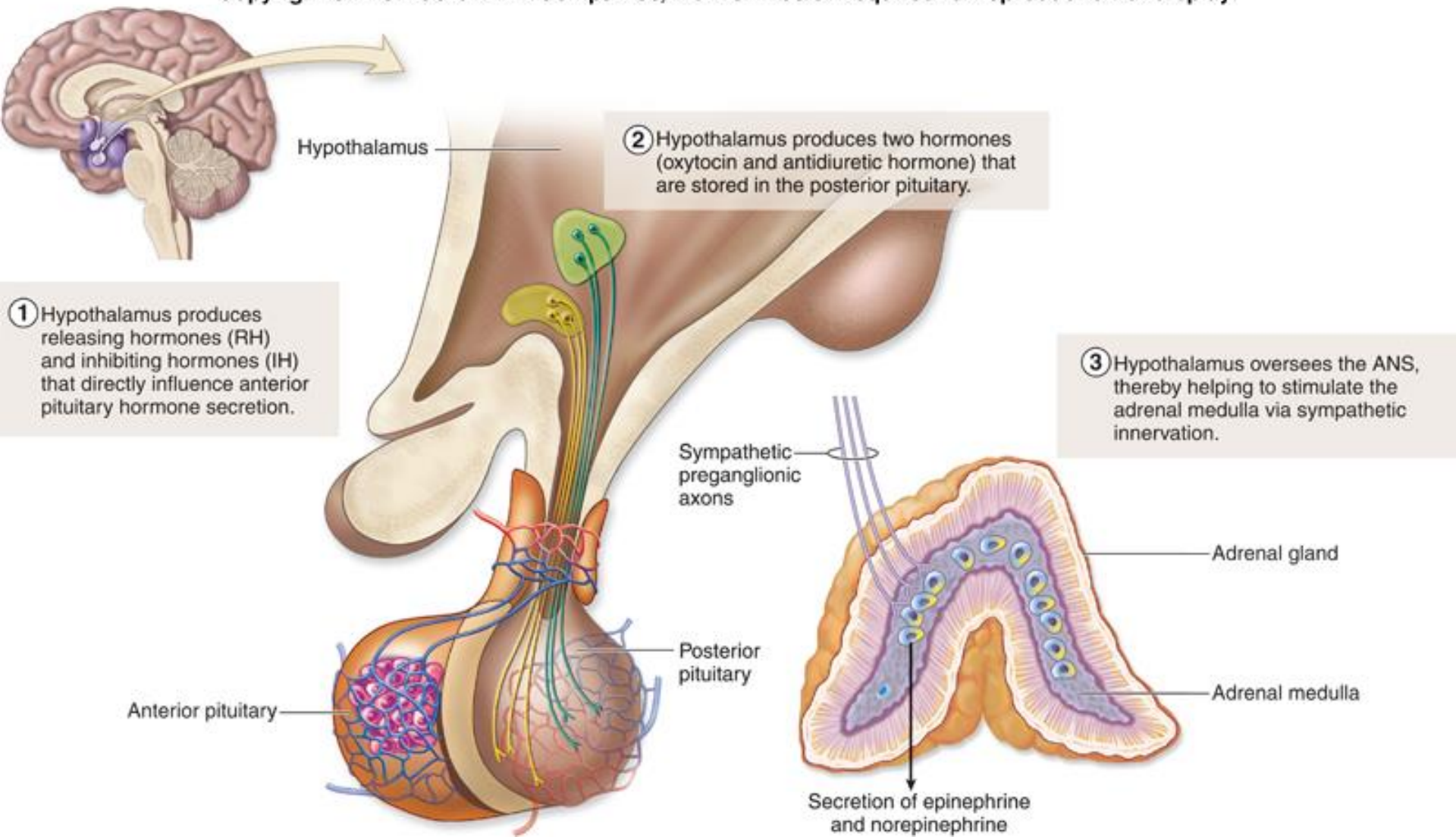
Endocrine Glands & Hormones

- Exocrine glands: ducted
  - secretions released into ducts
  - open onto an epithelial surface
- Endocrine glands: ductless
  - secrete product directly into the bloodstream
- All endocrine cells are located within highly vascularized areas
  - ensure that their products enter the bloodstream immediately.

Hypothalamic Control of the Endocrine System

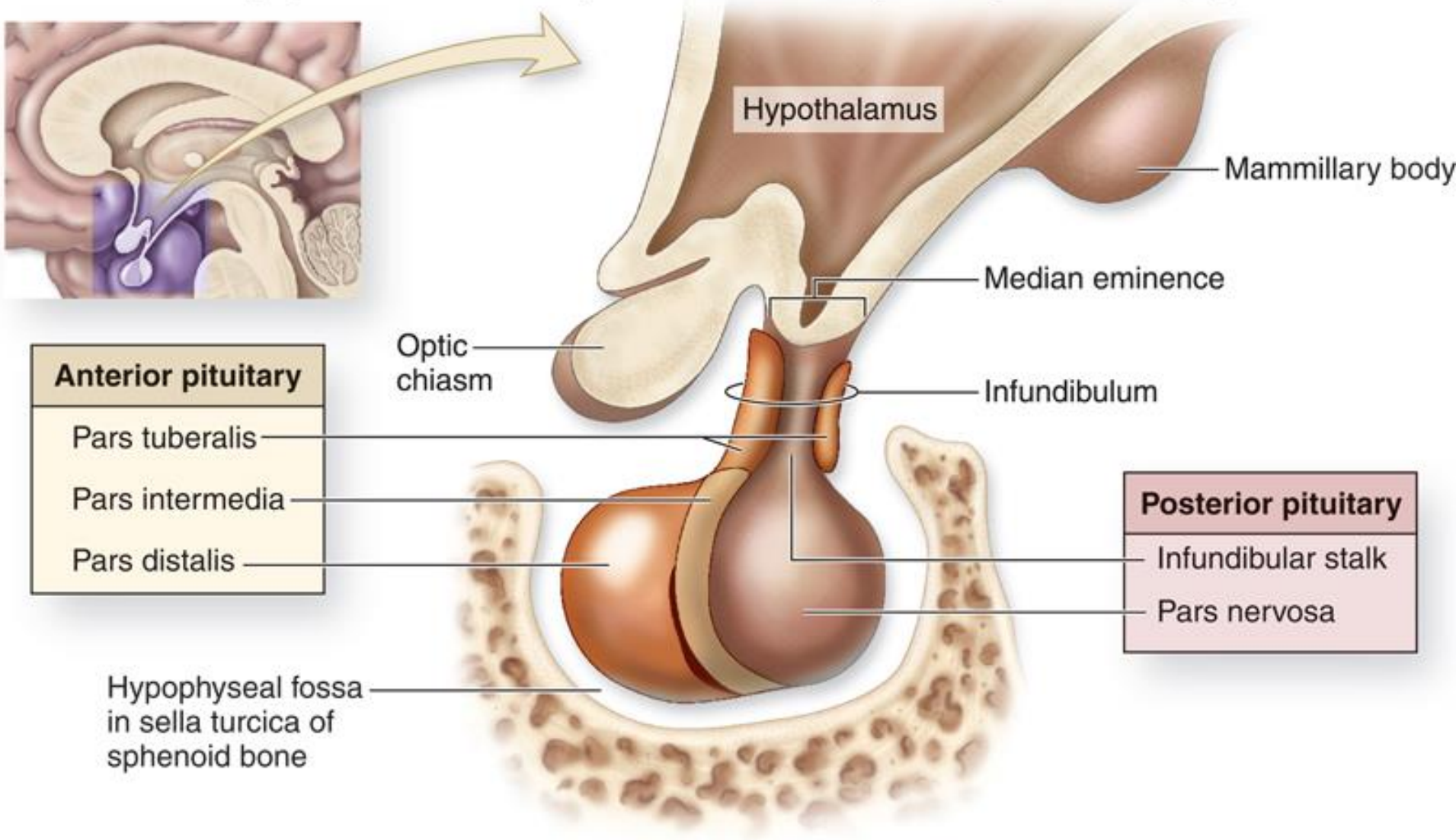
- Master control center of the endocrine system
- Hypothalamus oversees most endocrine activity:
  - special cells in the hypothalamus secrete hormones that influence the secretory activity of the anterior pituitary gland
    - called regulatory hormones
    - releasing hormones (RH)
    - inhibiting hormones (IH)
- Hypothalamus has indirect control over these endocrine organs.





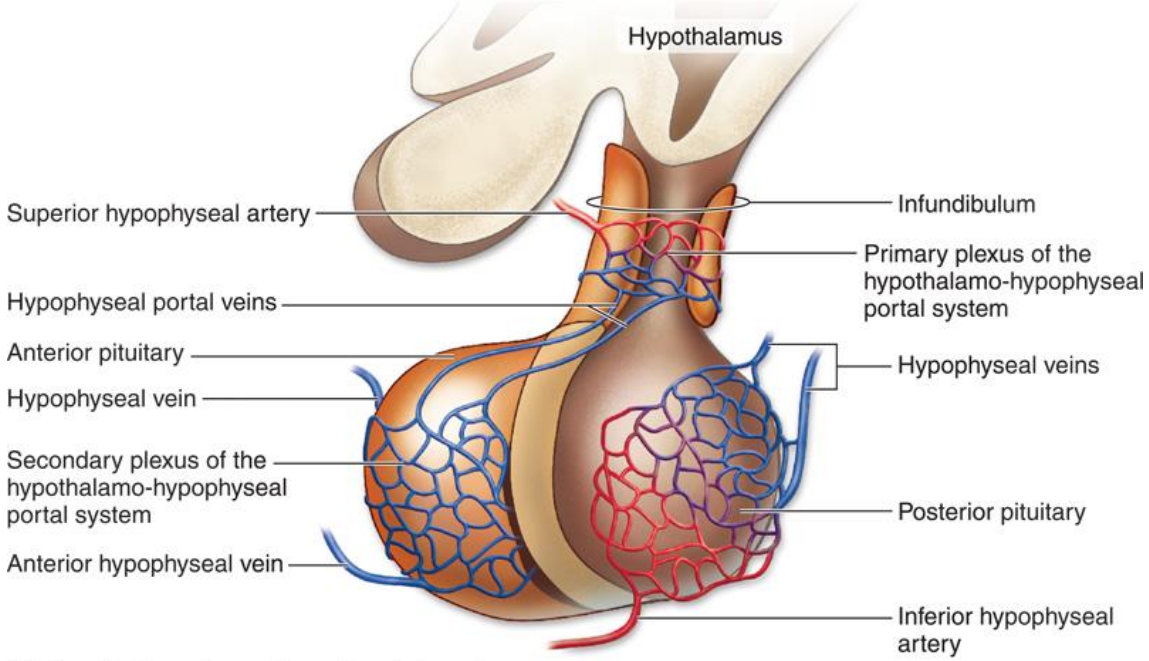
Pituitary Gland (Hypophysis)

- lies inferior to the hypothalamus.
- Small, slightly oval gland housed within the hypophyseal fossa of the sphenoid bone.
- Connected to the hypothalamus by a thin stalk, the infundibulum.
- Partitioned both structurally and functionally into an anterior pituitary and a posterior pituitary.
  - (called anterior lobes and posterior lobes)

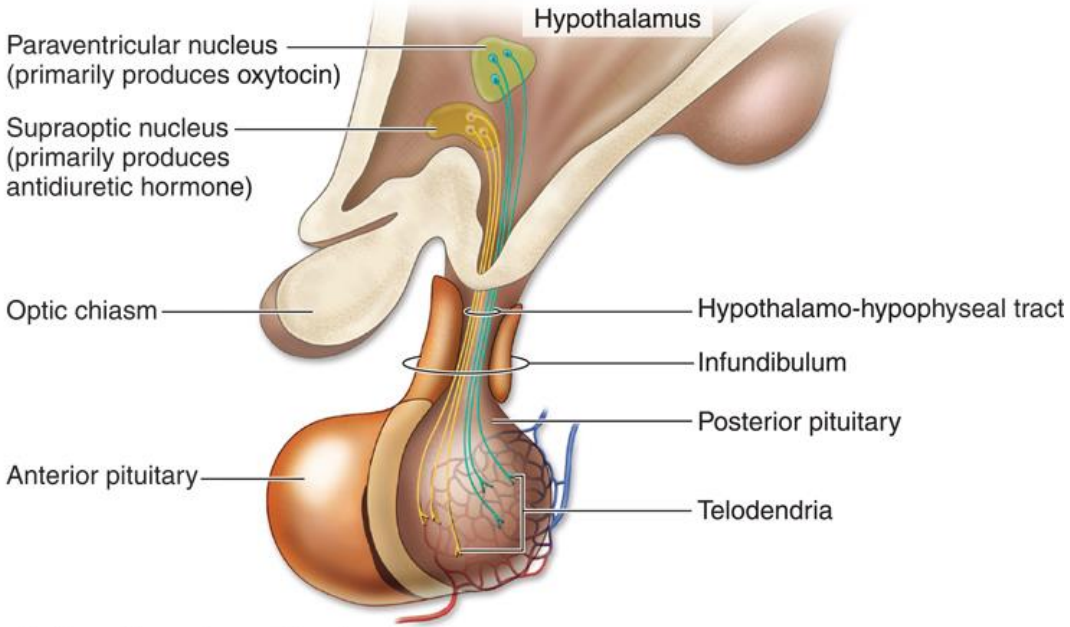


Control of Anterior Pituitary Gland Secretions

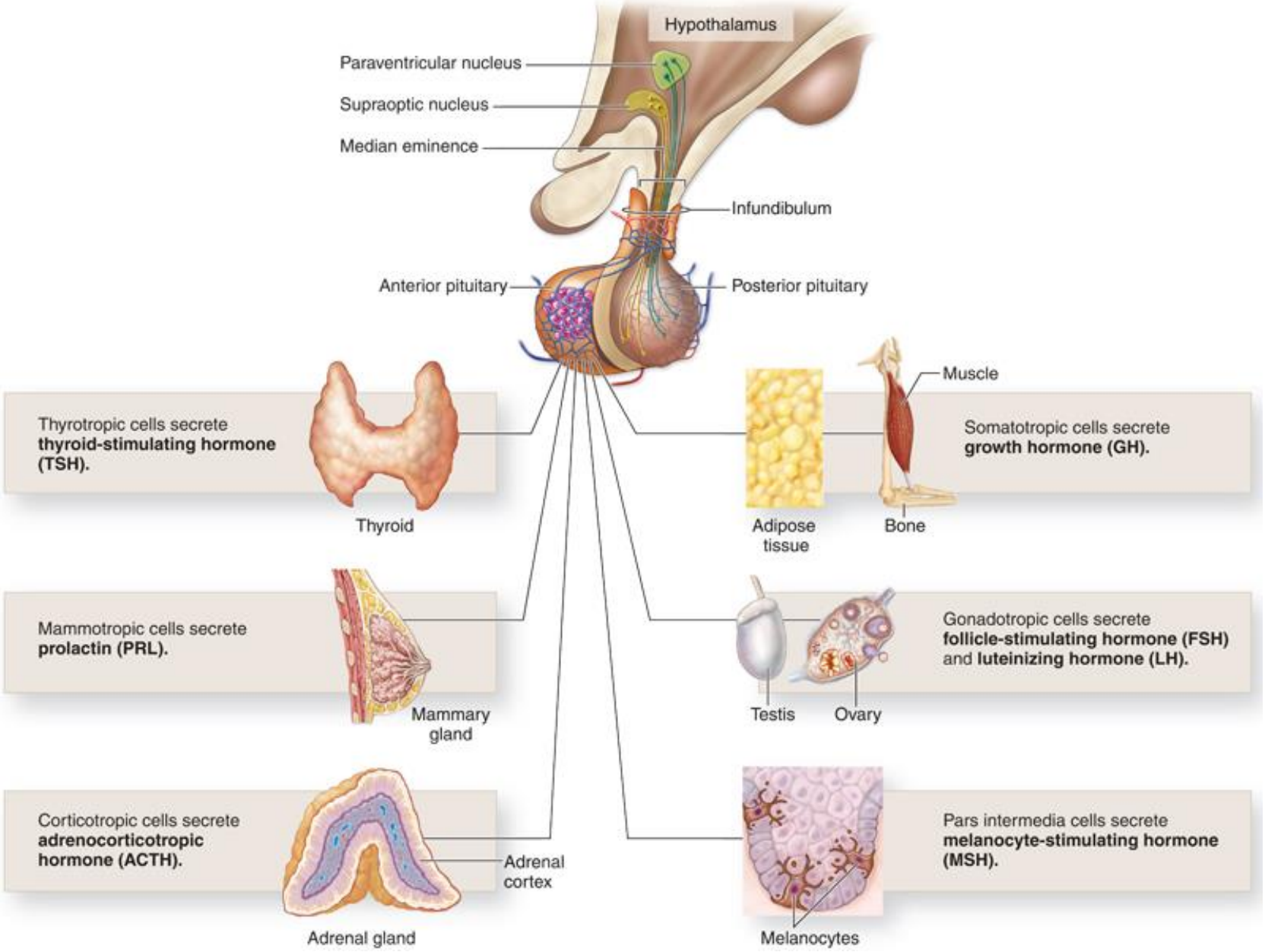
- Anterior pituitary gland is controlled by regulatory hormones secreted by the hypothalamus



(a) Hypothalamo-hypophyseal portal system



(b) Hypothalamo-hypophyseal tract

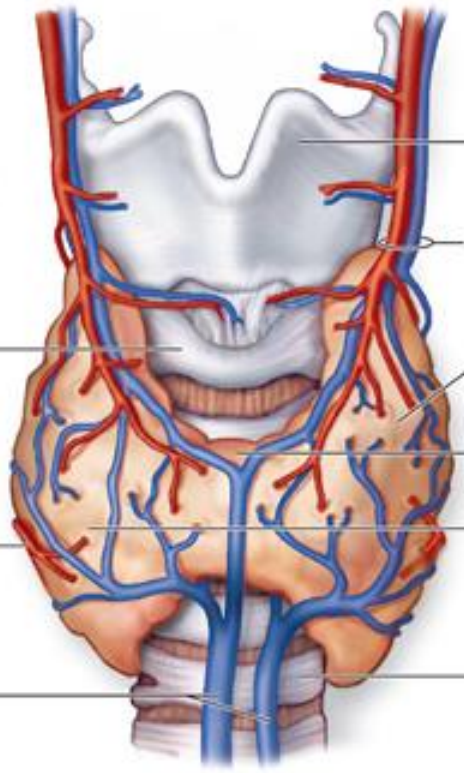


Thyroid Gland

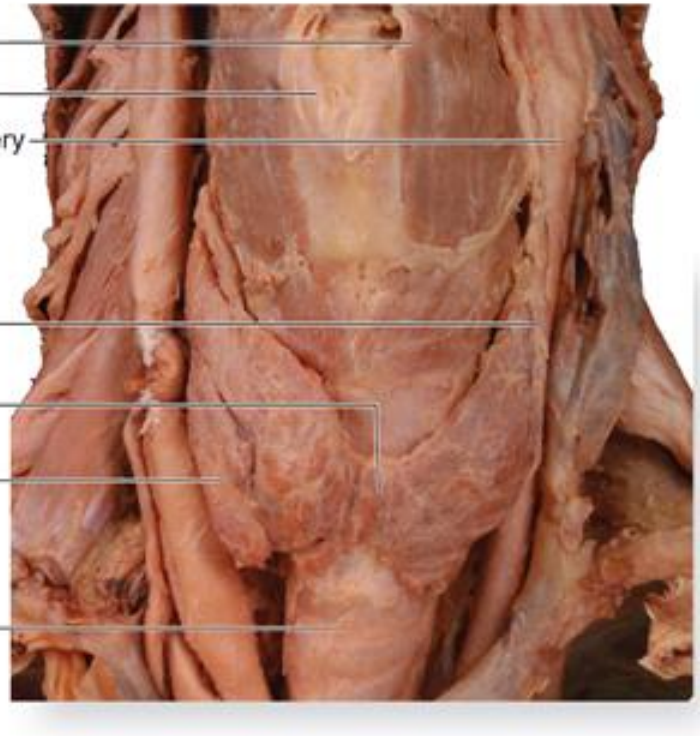
- Located immediately inferior to the thyroid cartilage of the larynx and anterior to the trachea.
- Distinctive "butterfly" shape due to its left and right lobes, which are connected at the anterior midline by a narrow isthmus.
- Both lobes of the thyroid gland are highly vascularized, giving it an intense reddish coloration.
- Regulation of thyroid hormone secretion depends upon a complex thyroid gland–pituitary gland **negative** feedback process.

Thyroid Gland

- Follicle cells:
  - Produce and secrete thyroid hormone
  - Precursor is stored in colloid
- Thyroid hormone
  - Increases metabolic rate
  - Important in growth and development.
- Parafollicular cells
  - Produce and secrete calcitonin
- Calcitonin: is a calcium lowering hormone.



Thyrohyoid muscle
Thyroid cartilage
Common carotid artery
Superior thyroid vessels
Cricoid cartilage
Left lobe of thyroid gland
Isthmus of thyroid gland
Right lobe of thyroid gland
Inferior thyroid artery
Trachea
Inferior thyroid veins



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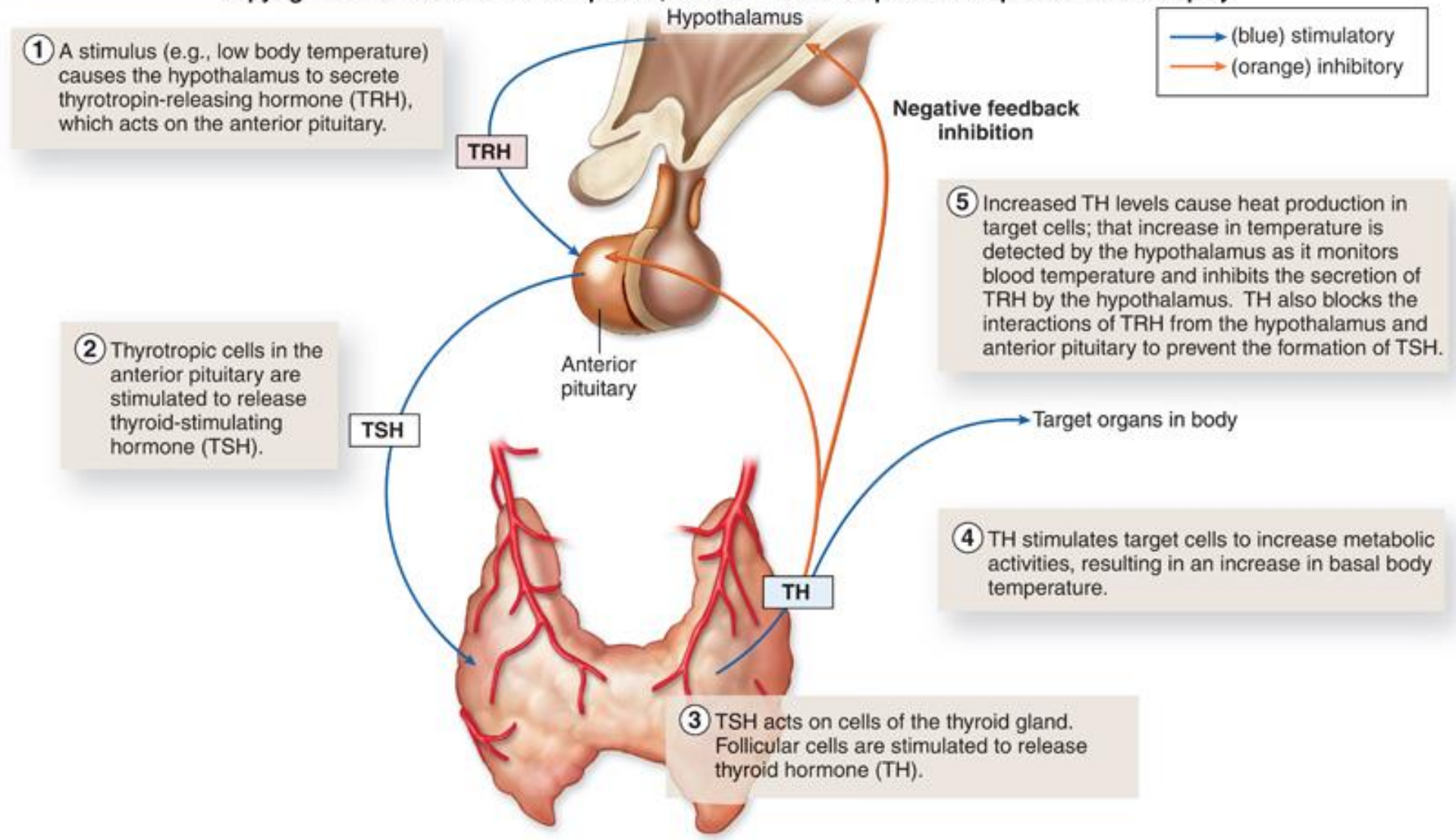
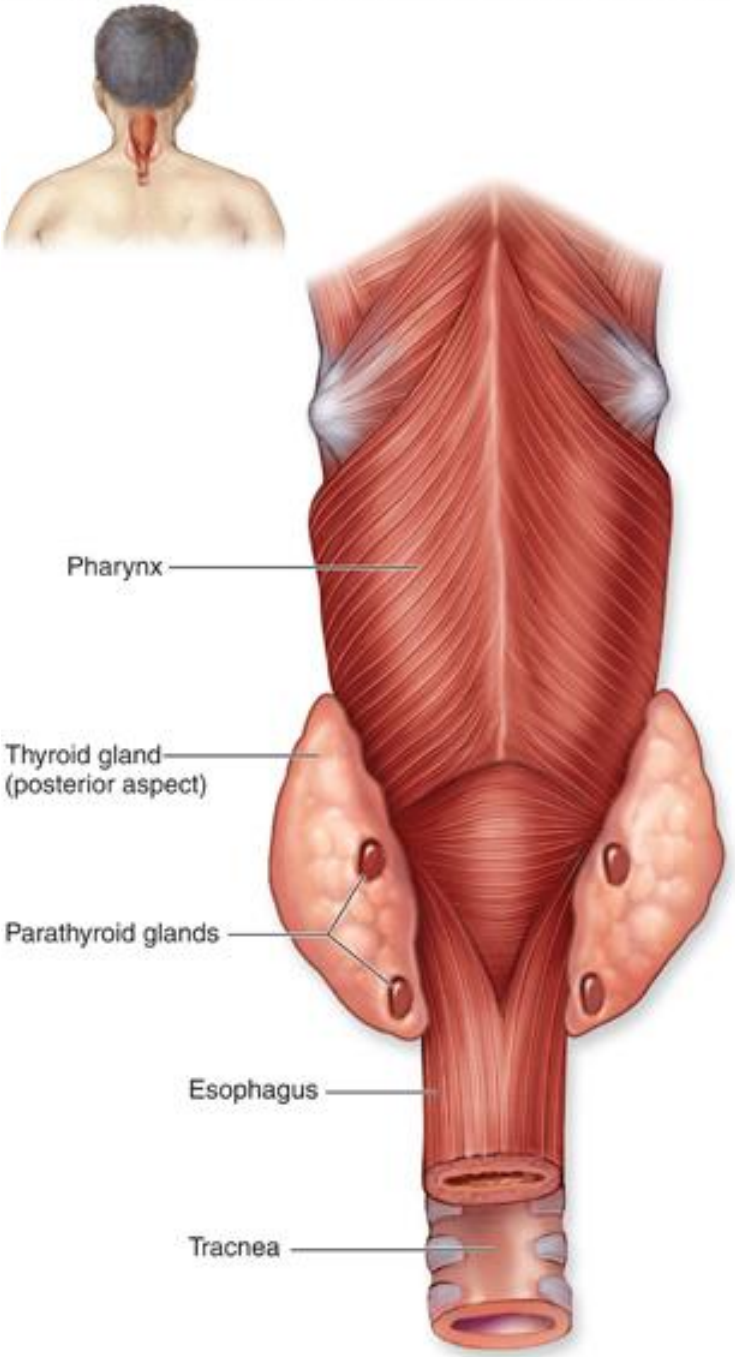


Parathyroid Glands

- Small, brownish-red glands
  - located on the posterior surface of the thyroid gland
- Usually four small nodules



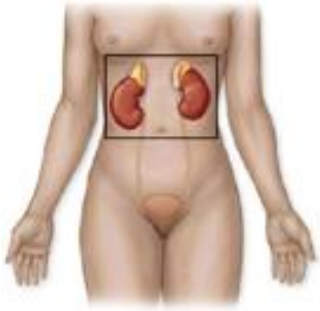
(a)

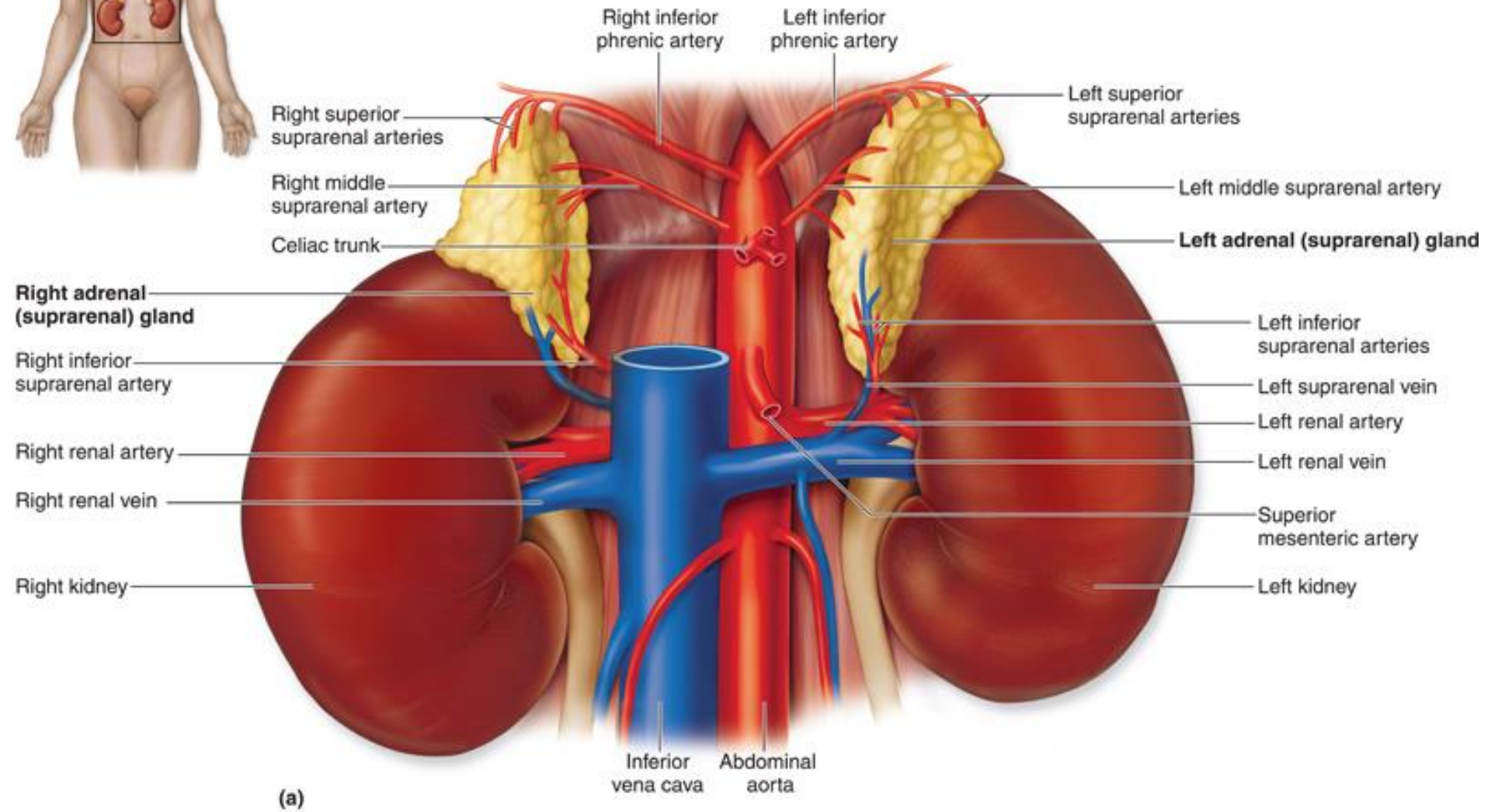
Adrenal Glands (suprarenal)

- Paired, pyramid-shaped endocrine glands anchored on the superior surface of each kidney.
- Outer adrenal cortex and an inner central core called the adrenal medulla.
  - secrete different types of hormones

Adrenal Cortex

- Distinctive yellow color due to stored lipids in its cell.
- Synthesize more than 25 different steroid hormones, collectively called corticosteroids.
- Regulates salt, sugar, and sex.





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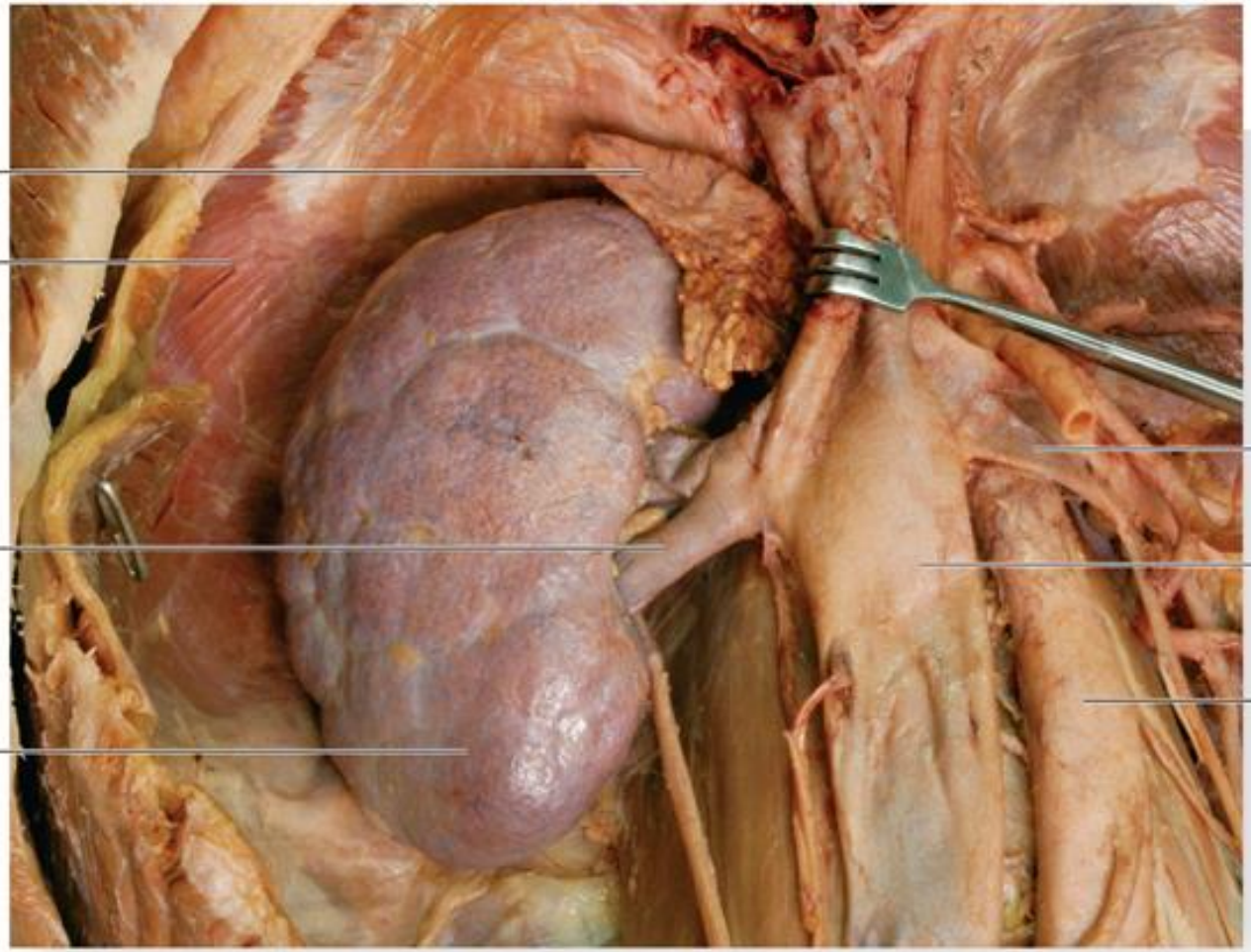
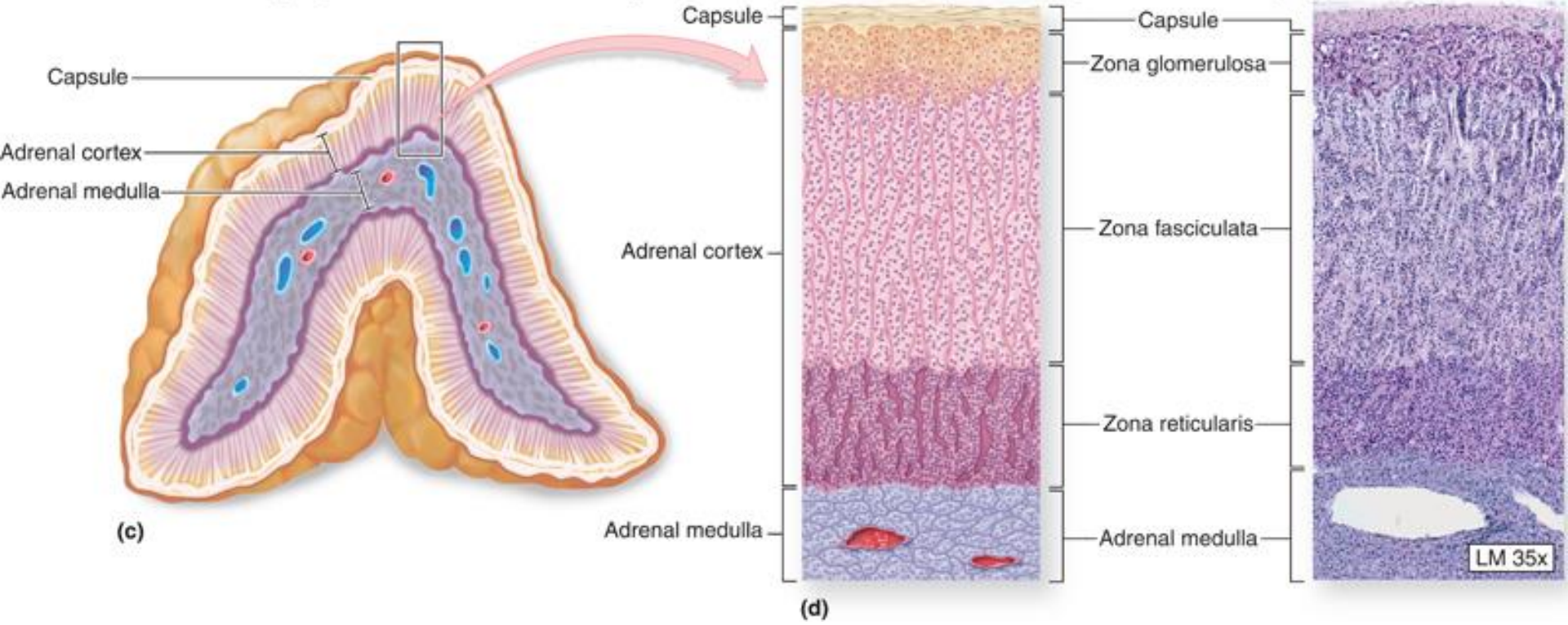


(b)

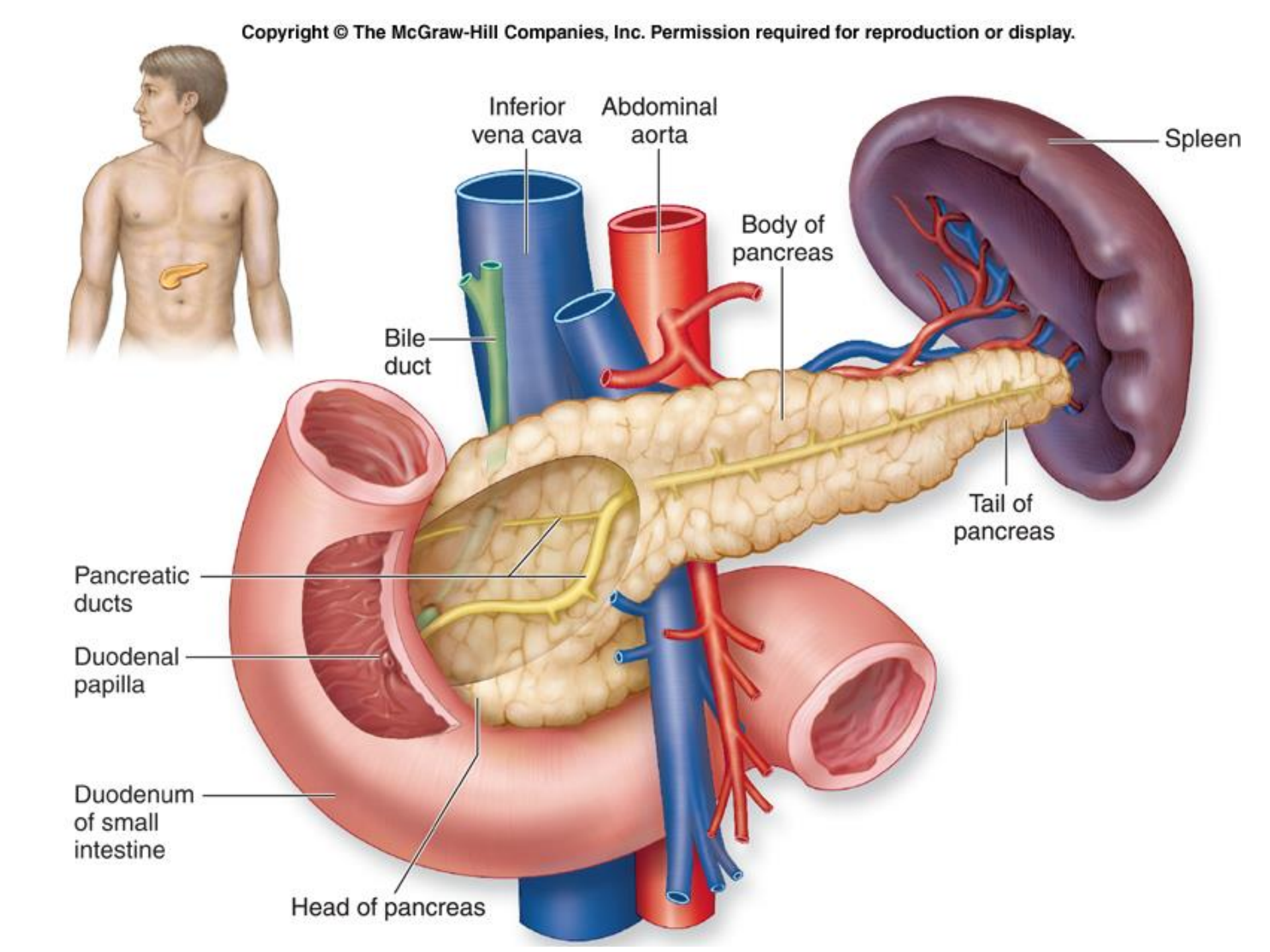


Adrenal Medulla

- Forms the inner core of each adrenal gland.
- Pronounced red-brown color due to its extensive vascularization.
- Hormones work with the sympathetic nervous system to prepare the body for an emergency or fight-or-flight situation.

Pancreas

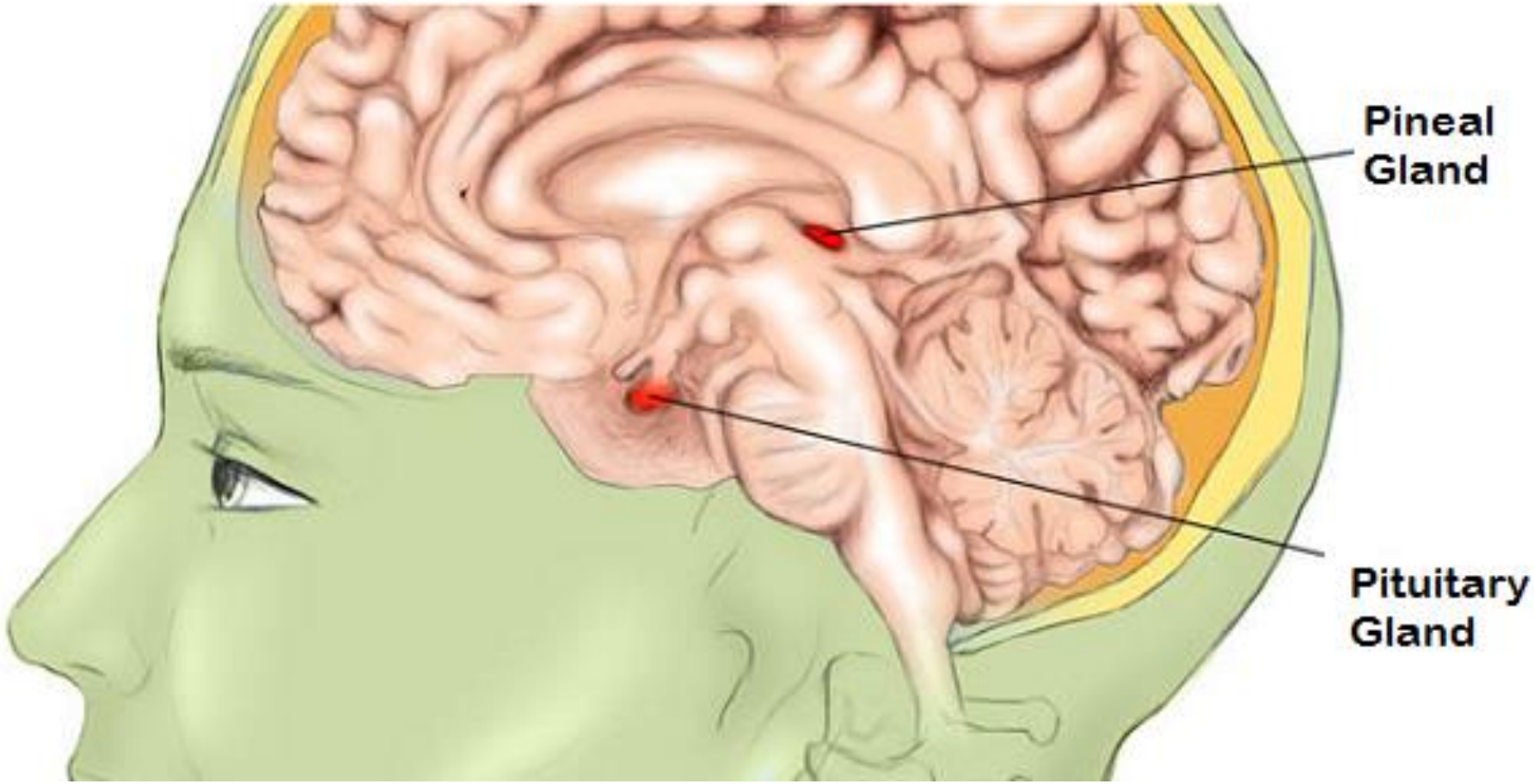
- Elongated, spongy, nodular organ
  - between the duodenum and the spleen
  - posterior to the stomach.
- Both exocrine and endocrine:
- The endocrine portion secretes insulin and glucagon.



Pineal Gland

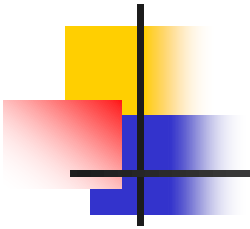
- Pineal gland or pineal body, is a small, cone-shaped structure attached to the posterior region of the epithalamus.
- Secretes melatonin.
  - helps regulate a circadian rhythm (24-hour body clock)
  - also appears to affect the synthesis of the hypothalamic regulatory hormone responsible for FSH and LH synthesis
  - role in sexual maturation is not well understood

The Pineal Gland



Thymus

- A bilobed structure located within the mediastinum superior to the heart and immediately posterior to the sternum.
- Size of the thymus varies between individuals.
  - it is always relatively large in infants and children
  - as with the pineal gland, the thymus diminishes in size and activity with age, especially after puberty
- Functions principally in association with the lymphatic system to regulate and maintain body immunity.
- Produces complementary hormones thymopoietin and thymosins.
  - hormones act by stimulating and promoting the differentiation, growth, and maturation of a category of lymphocytes called T-lymphocytes (thymus-derived lymphocytes)



- Questions?