Charles University of Prague
2nd Faculty of Medicine
Physiology

Endocrine function of hypothalamo-hypophyseal system

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Group 1
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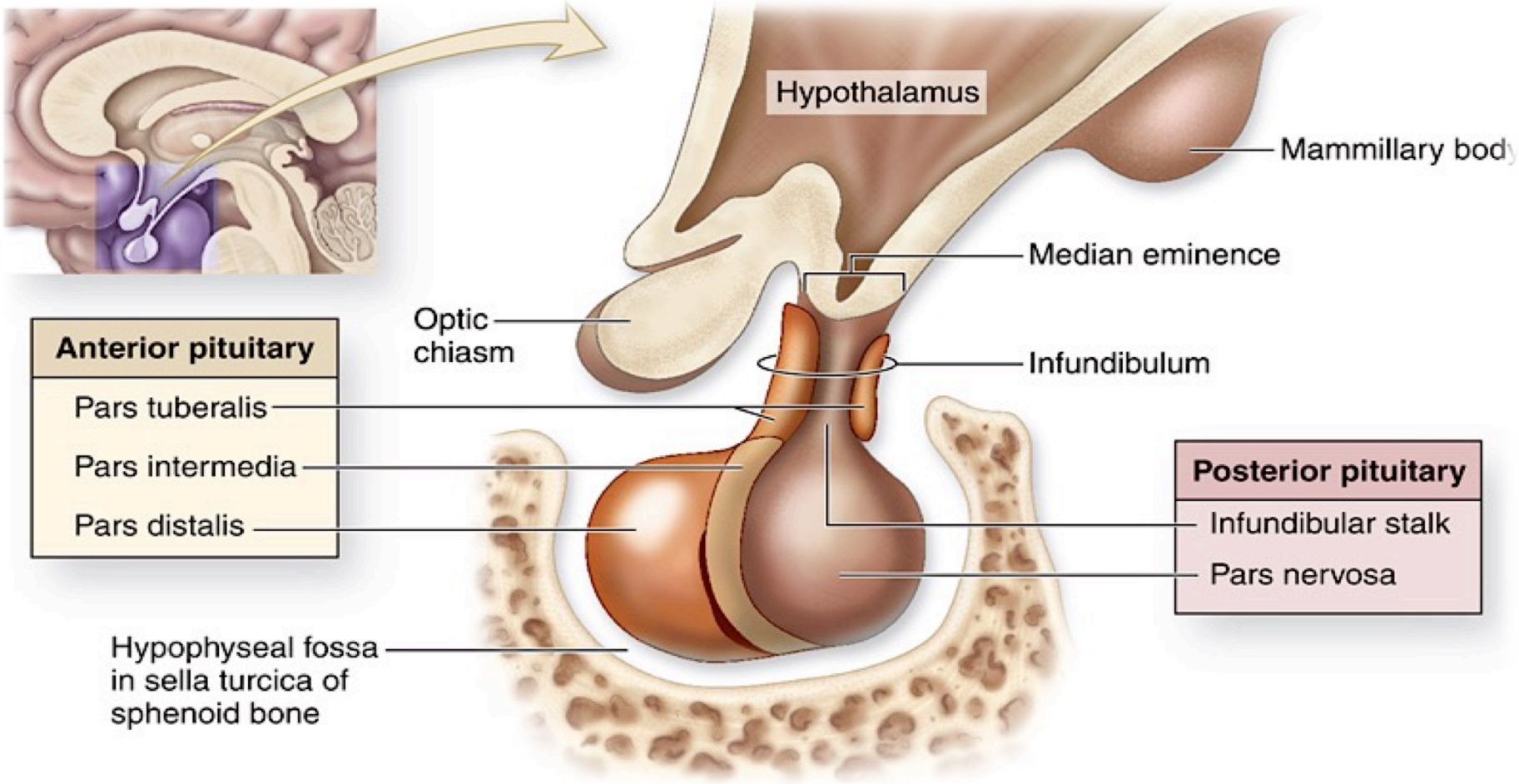
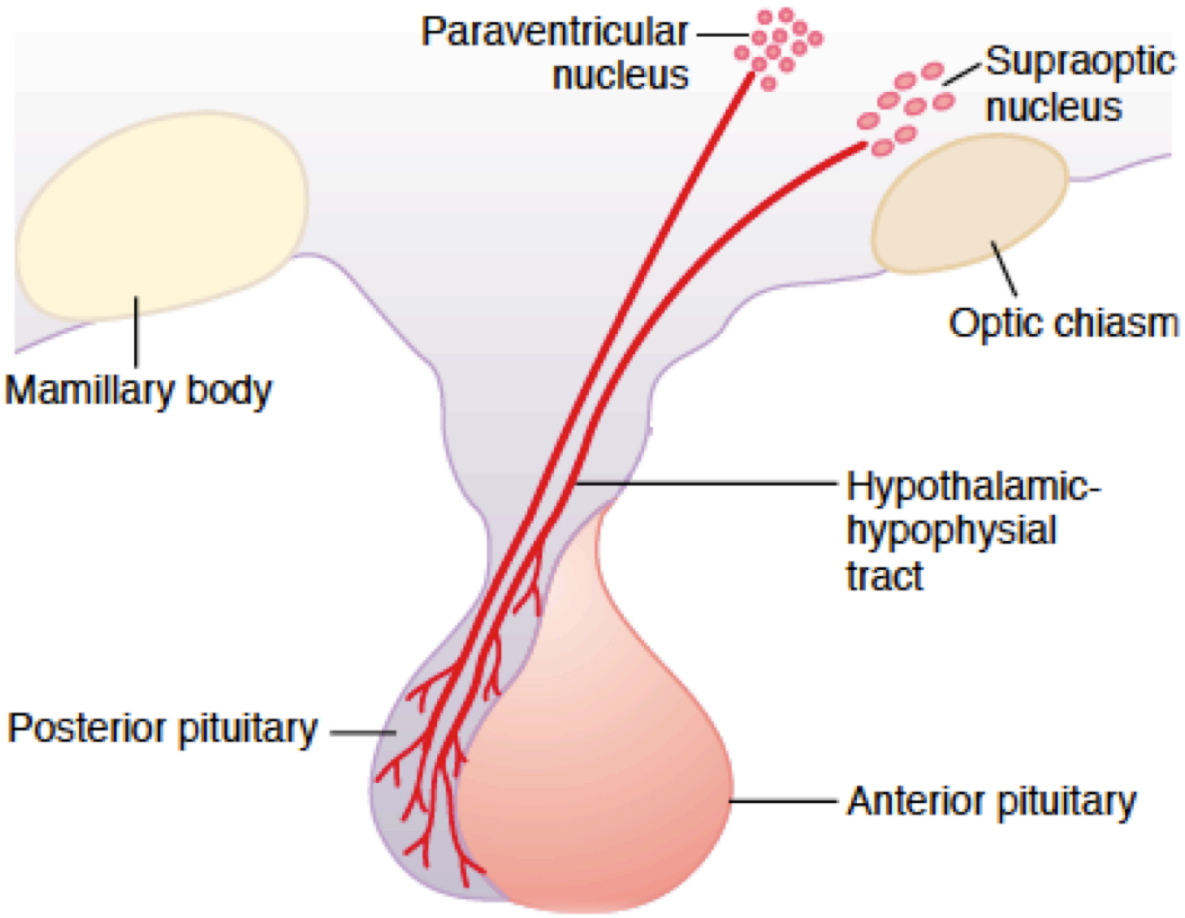
Hypothalamus and hypophysis

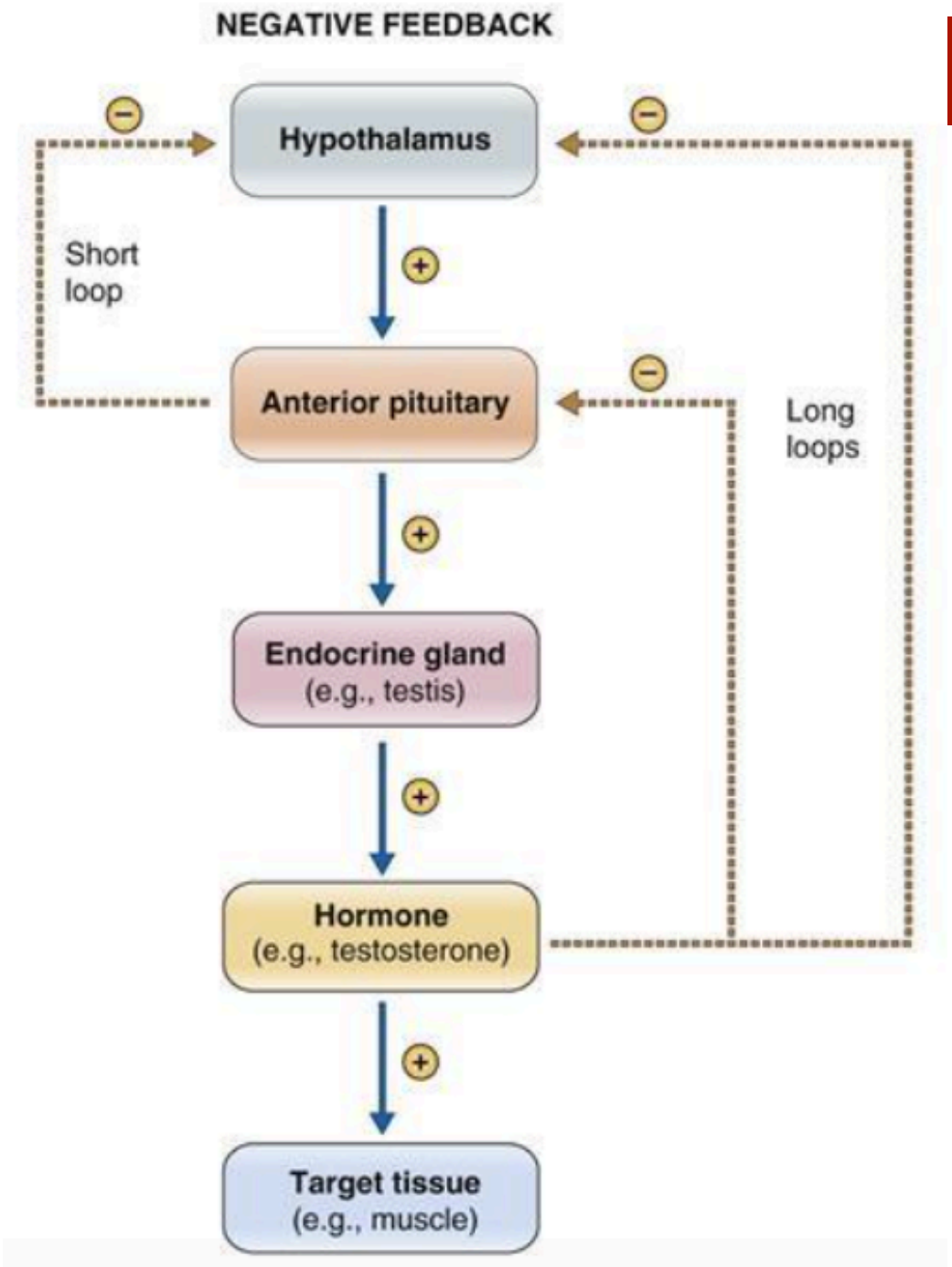


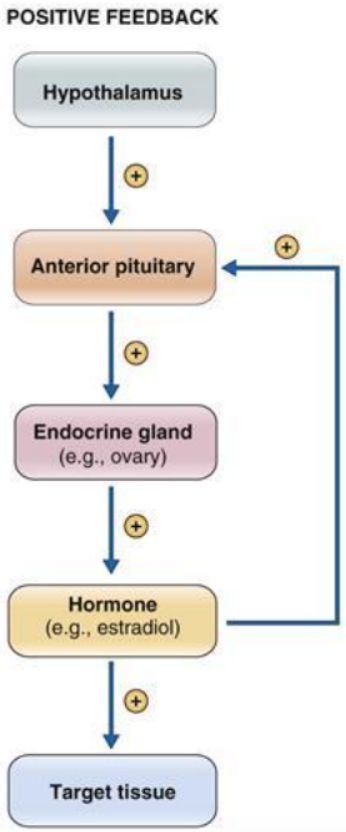
Hypothalamus and posterior pituitary

- Neural connections
- Hormones : ADH + oxytocin (neuropeptides)
- ADH = primarily associated w/ supraoptic ncl
- Oxytocin = primarily associated w/ paraventricular ncl



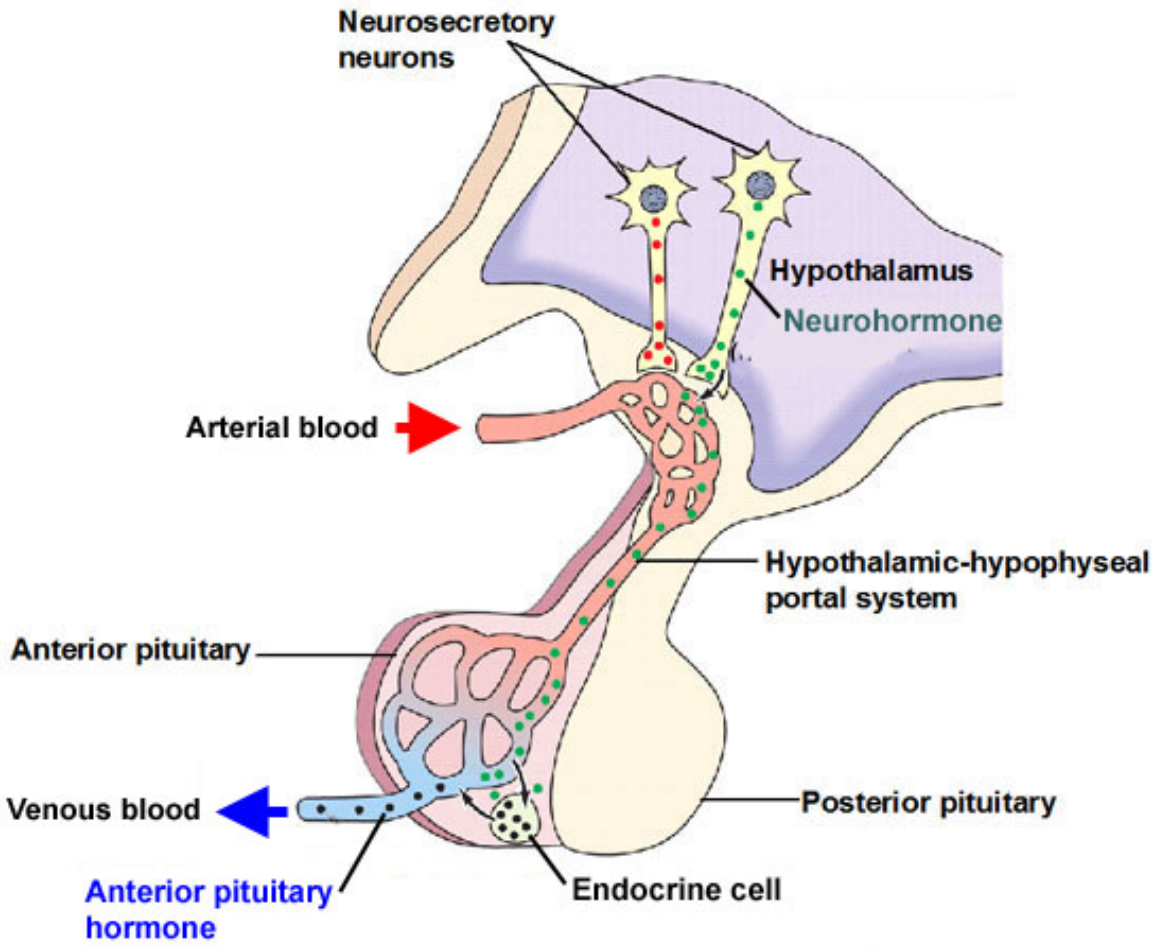
Control of hormonal secretion



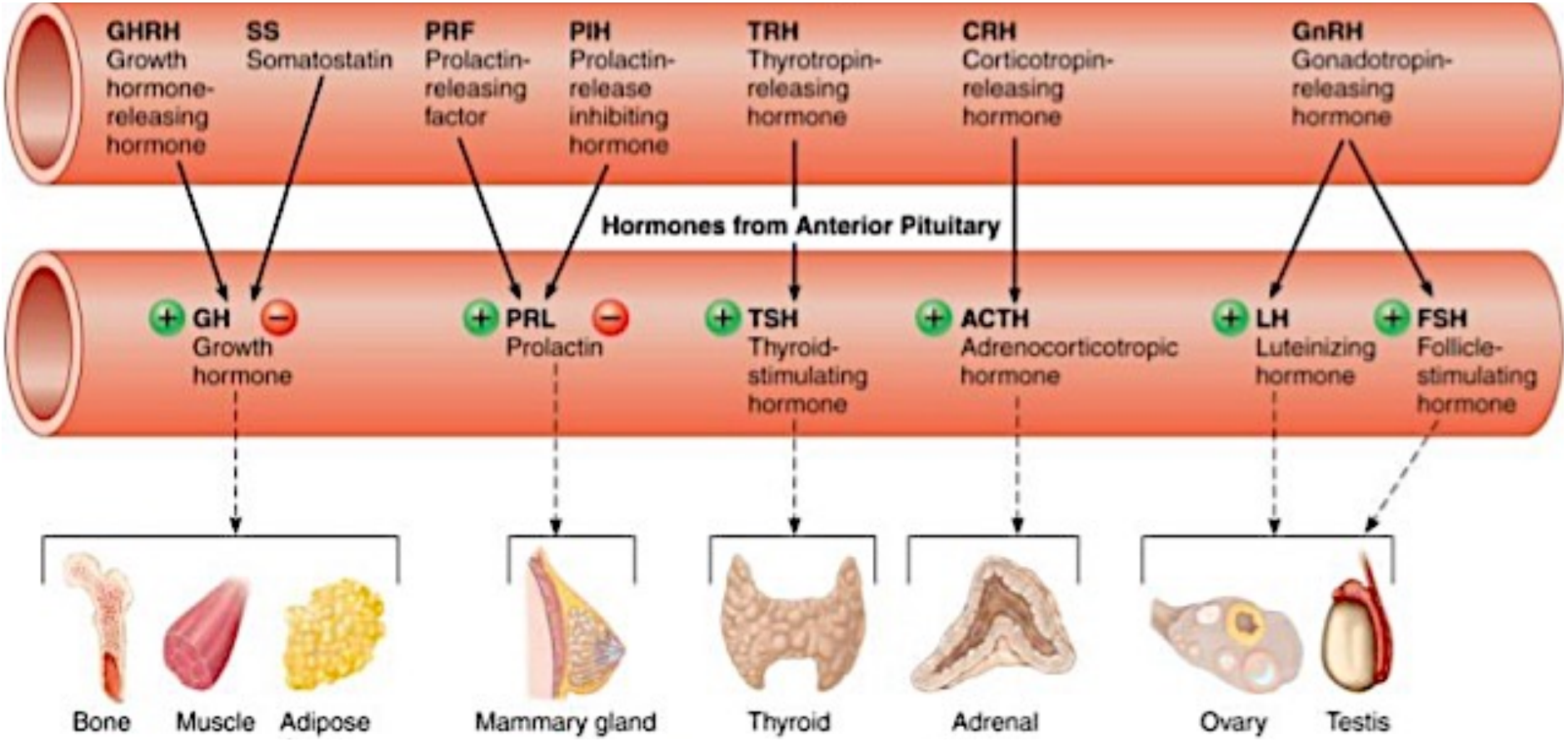


Hypothalamus and anterior pituitary

- Secretes 6 peptide hormones:
  - TSH
  - FSH
  - LH
  - Growth hormone
  - Prolactin
  - ACTH
- Hypothalamus and ant. pituitary linked directly by hypothalamic-hypophyseal portal system



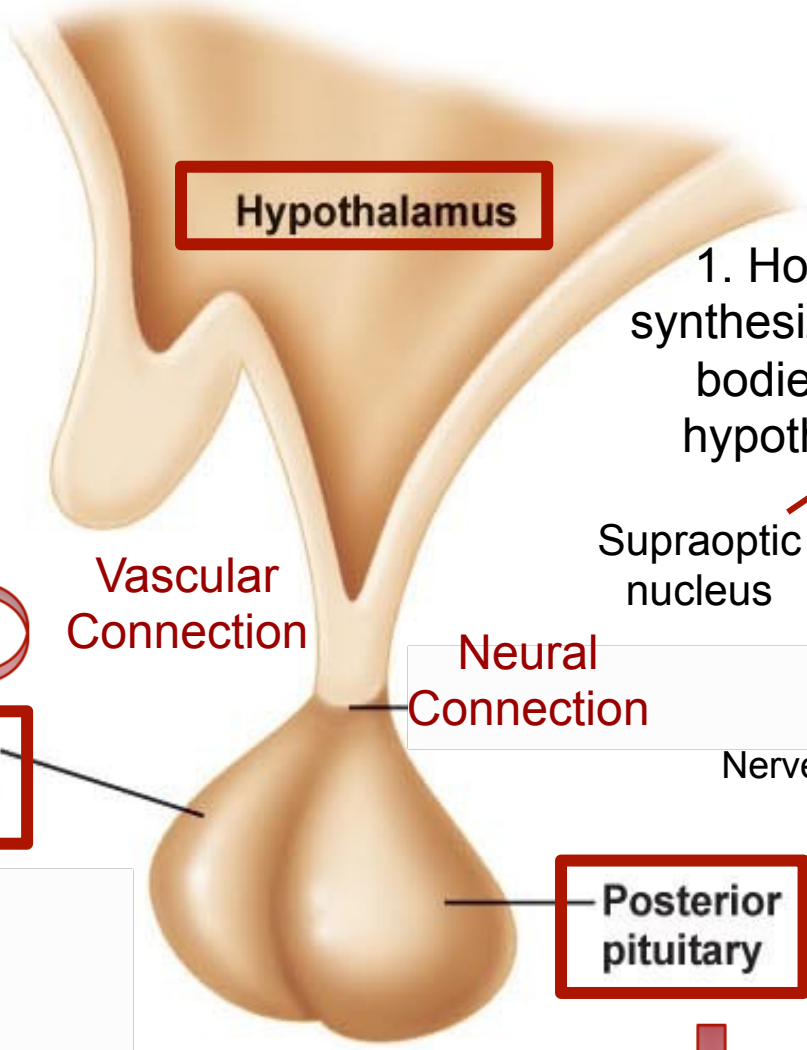
Anterior lobe hormones

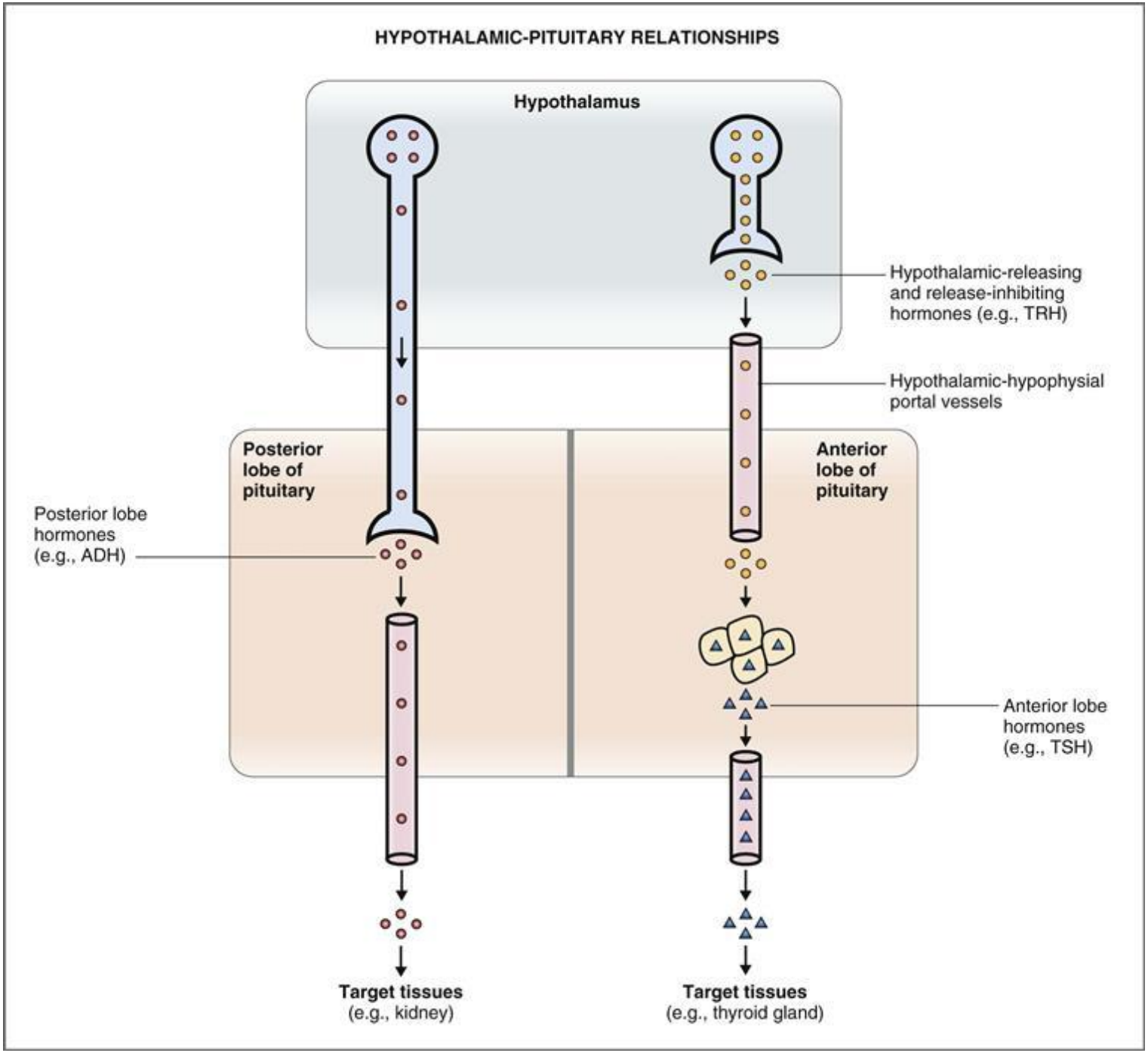


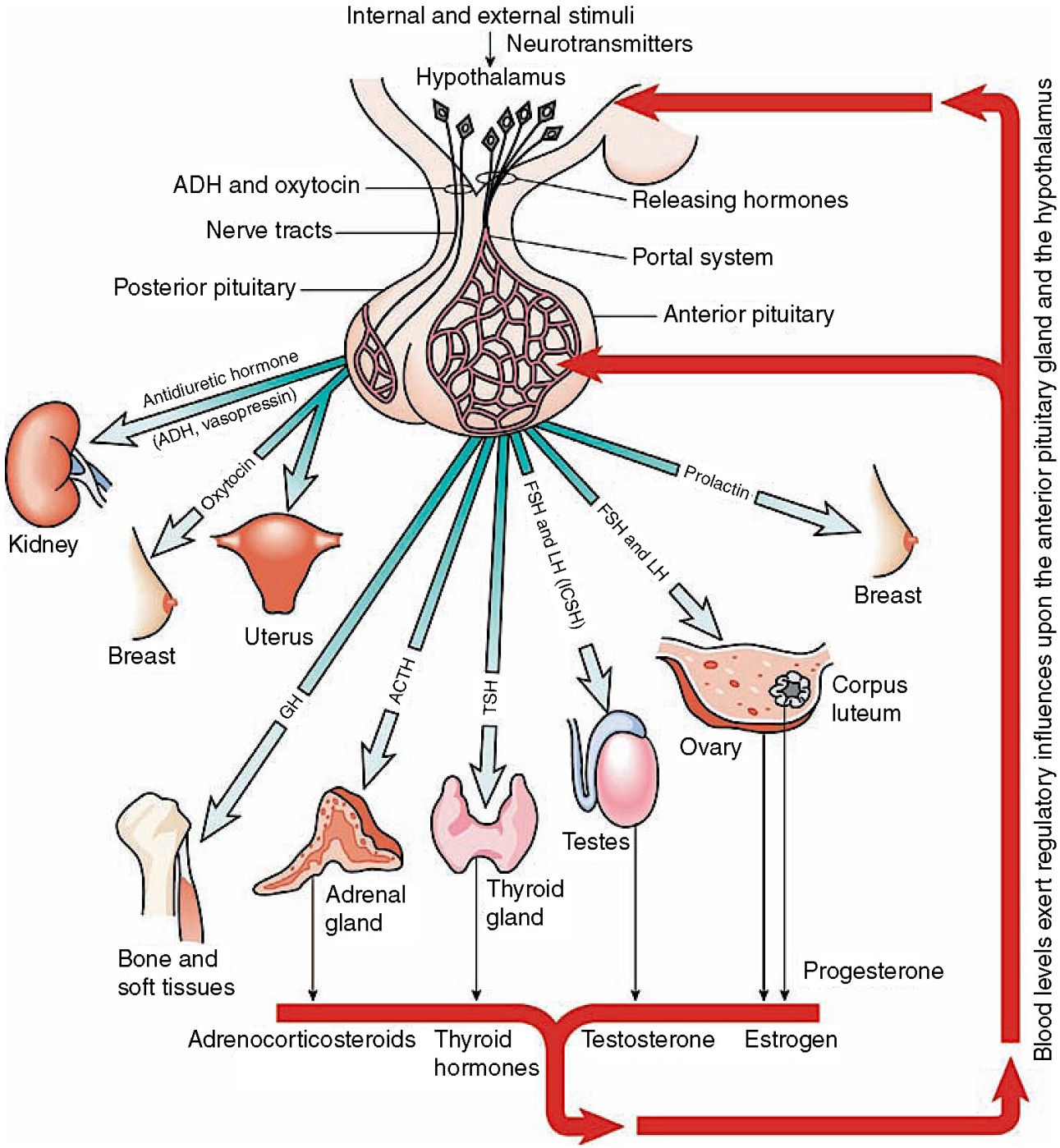
Hormones

	Hormone	Major target organ(s)	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
	Adrenocorticotropic 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

Overview

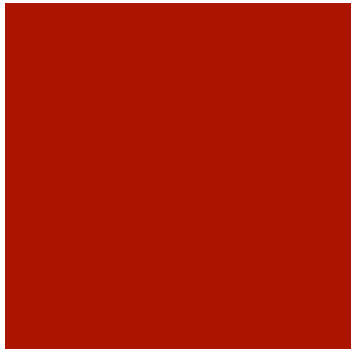

Hypothalamic hormone control secretion
Releasing Factors
Inhibitory Factors
Conducted through: Hypothalamic-hypophyseal portal vessels
Hypothalamus
Vascular Connection
Neural Connection
Anterior pituitary
Posterior pituitary
1. Hormones synthesized by cells in hypophysis
2. To Target Glands
1. Hormones synthesized by cell bodies in the hypothalamus
Supraoptic nucleus
Paraventricular nucleus
Nerve Fibers: Hypothalamic-hypophyseal tract
2. To General Circulation


HYPOTHALAMIC-PITUITARY RELATIONSHIPS
Hypothalamus
Hypothalamic-releasing and release-inhibiting hormones (e.g., TRH)
Hypothalamic-hypophysial portal vessels
Posterior lobe of pituitary
Anterior lobe of pituitary
Posterior lobe hormones (e.g., ADH)
Anterior lobe hormones (e.g., TSH)
Target tissues (e.g., kidney)
Target tissues (e.g., thyroid gland)


Internal and external stimuli
Neurotransmitters
Hypothalamus
ADH and oxytocin
Releasing hormones
Nerve tracts
Portal system
Posterior pituitary
Anterior pituitary
Antidiuretic hormone
(ADH, vasopressin)
Oxytocin
Prolactin
FSH and LH (ICSH)
FSH and LH
GH
ACTH
TSH
Kidney
Breast
Uterus
Breast
Corpus luteum
Ovary
Testes
Adrenal gland
Thyroid gland
Bone and soft tissues
Progesterone
Adrenocorticosteroids
Thyroid hormones
Testosterone
Estrogen
Blood levels exert regulatory influences upon the anterior pituitary gland and the hypothalamus

References

- Constanzo, Linda (2011): Physiology. 5th edition, Lippincott Williams & Wilkins.
- Hall, John Edward, and Arthur C. Guyton. *Guyton And Hall Textbook Of Medical Physiology*. 12th ed. Philadelphia: W.B. Saunders Company, 2006. Print.



Thank you for your attention!