

TOPIC: THE HYPOTHALAMUS & PITUITARY GLAND

Hypothalamus & Pituitary Gland

◆ _____ between the nervous and endocrine systems.

Hypothalamus: maintains _____ and controls autonomic functions.

◆ Controls release of hormones from pituitary.

Infundibulum: _____ like structure connecting the hypothalamus and pituitary.

Pituitary (hypophysis): Communicates with other _____ glands.

◆ _____ to the hypothalamus.

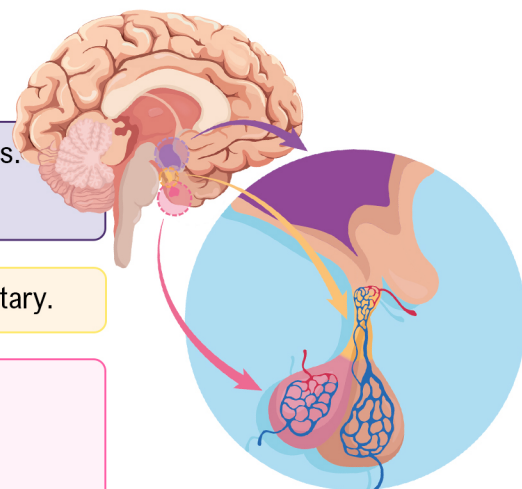
▸ Anterior pituitary: stimulated by hormones from the hypothalamus.

▸ Posterior pituitary: made of _____ extending from the hypothalamus.

◆ **Tropic Hormones:** trigger the release of _____ hormones.

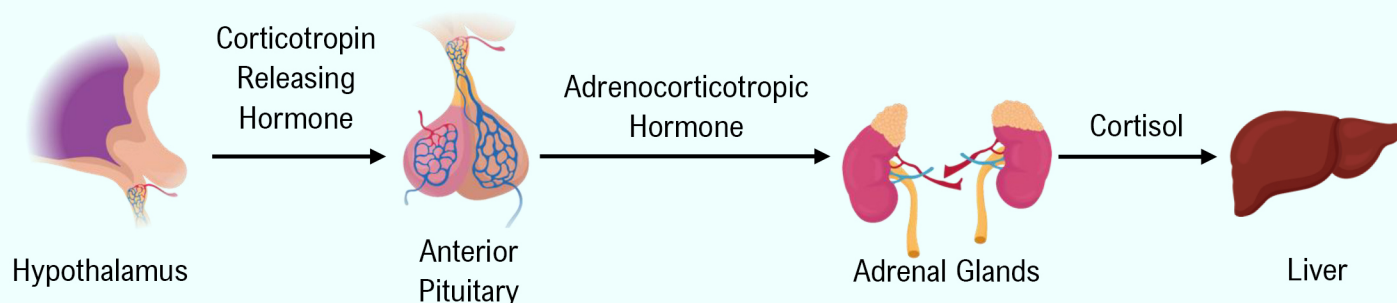
▸ Tropic hormones from the hypothalamus act on the _____ pituitary.

▸ Tropic hormones from the pituitary act on other _____.



EXAMPLE

A scientific study demonstrated that studying for exams can lead to an increase in a student's cortisol levels due to stress. Some of the steps of the stress response involving cortisol are shown below. Circle any steps that involve tropic hormones.



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PRACTICE

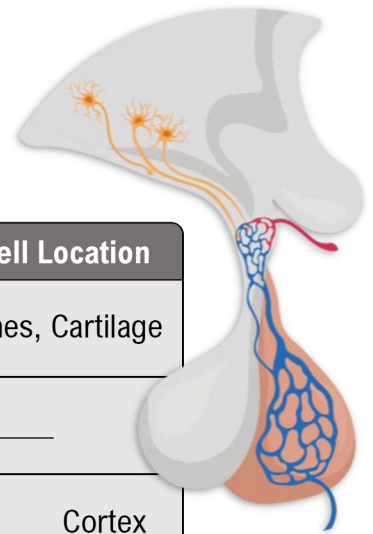
Which of the following describes a *tropic* hormone?

- a) Insulin is a hormone that causes the body to produce glycogen, removing sugar from the bloodstream.
- b) Thyroid stimulating hormone signals the thyroid gland to release the hormone thyroxine.
- c) Epinephrine is a hormone that leads to many different physiological changes in many different tissues.
- d) Estrogen is a lipid soluble hormone, and therefore can pass through the cell membrane.

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Anterior Pituitary

- ◆ Anterior pituitary is stimulated by _____ **hormones** from the hypothalamus.
- ◆ *Hypothalamic-Hypophyseal Portal System:*
 - Connects capillaries of the hypothalamus to _____ of the anterior pituitary.



Stimulated / Inhibited by:	Hormones of the Anterior Pituitary	Target Cell Location
Growth Hormone-Releasing Hormone (GRH)	_____ Hormone (GH)	Liver, Bones, Cartilage
Thyrotropin-Releasing Hormone (TRH)	_____ Stimulating Hormone (TSH)	_____
Corticotropin-Releasing Hormone (CRH)	_____ Corticotrophic Hormone (ACTH)	_____ Cortex
Gonadotropin-Releasing Hormone (GnRH)	_____ Hormone (LH)	Ovaries & Testes
	_____ Stimulating Hormone (FSH)	
Prolactin-Inhibiting Hormone (PIH)	_____ (PRL)	Breasts

🧠 Anterior pituitary hormone memory tool: **FLAT PeG**

EXAMPLE

Imagine that you are a doctor. You have a male patient showing low levels of thyroid hormone (T4), low levels of cortisol (produced by the adrenal cortex), and low levels of testosterone. You believe the cause is a tumor in the hypothalamus. Based on your understanding of the role of the hypothalamus in the endocrine system, would you expect the tumor to be blocking the normal function of the hypothalamus or causing overstimulation of the hypothalamus? Explain your reasoning.

Blocking or overstimulating function? _____

Reasoning: _____

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The following hormones are all produced by the pituitary gland. Which hormone is NOT released by the anterior pituitary?

-
- | | |
|---------------------|---|
| a) Oxytocin. | c) Adrenocorticotrophic Hormone (ACTH). |
| b) Prolactin (PRL). | d) Thyroid Stimulating Hormone (TSH). |

PRACTICE

What is the primary function of the hypothalamic-hypophyseal portal system in hormone transport?

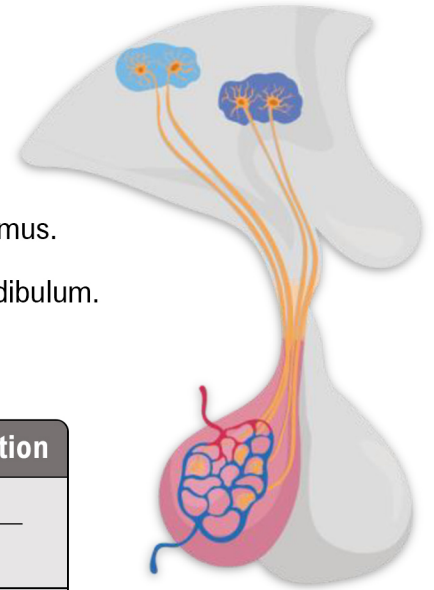
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- a) It transports hormones from the anterior pituitary to the hypothalamus.
 - b) It allows hormones from the hypothalamus to reach the anterior pituitary directly.
 - c) It carries hormones from the anterior pituitary to the general circulation.
 - d) It carries tropic hormones directly from the hypothalamus to the different endocrine glands around the body.

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Posterior Pituitary

- ◆ _____ portion of the pituitary, made largely of _____ tissue with direct connection to hypothalamus.
- ◆ Posterior pituitary functions as an _____ of the hypothalamus.
 1. **Paraventricular** and **Supraoptic** nuclei: hormones are synthesized in hypothalamus.
 2. **Hypothalamic-Hypophyseal Tract:** hormones travel down _____ through infundibulum.
 3. **Posterior pituitary:** _____ potentials lead to release of hormones.

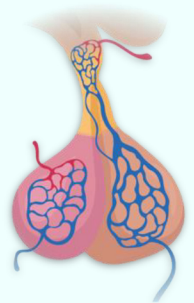
Stimulated by:	Hormones of the Posterior Pituitary	Target Cell Location
Hypothalamic neurons	_____ hormone (ADH) (Vasopressin)	_____
Hypothalamic neurons	_____	Uterus, breasts



EXAMPLE

Fill in the table below on the differences between the anterior and posterior pituitary glands.

	Anterior Pituitary	Posterior Pituitary
Structure that connects to the hypothalamus		
Hormones released		



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PRACTICE

Which of the following statements about the posterior pituitary is true?

- a) The posterior pituitary is connected to the hypothalamus via the hypothalamic-hypophyseal portal system.
- b) The posterior pituitary releases hormones that are synthesized in the hypothalamus.
- c) The posterior pituitary relies on tropic hormones to signal when to release ADH and oxytocin.
- d) The posterior pituitary releases tropic hormones that target several other endocrine glands.