

## Section 13.1: Review Answers

### Student Textbook page 442

- Homeostasis is the relative constancy of the internal environment of the body. The endocrine system is self-regulating and helps to regulate other body systems, thereby maintaining homeostasis.
- Students' answers may contain one of the following:
  - Some nervous system tissues secrete hormones; for example, cells in the hypothalamus produce antidiuretic hormone that is stored in the posterior pituitary.
  - Several chemicals function as both neurotransmitters and hormones, depending on their location in the body. For example, epinephrine acts as a neurotransmitter between certain neurons in the nervous system, as well as a hormone released by the adrenal glands in the fight-or-flight response.
  - The regulation of several physiological processes involves both the nervous and endocrine systems acting in conjunction with each other. When a mother breast-feeds her baby, the baby's suckling initiates sensory messages in the mother's neurons that travel to the hypothalamus, which in turn triggers the pituitary to release a hormone called oxytocin. Oxytocin travels in the bloodstream to the mammary glands of the breast, causing the secretion of milk.
- The chart below summarizes the answer to this question.

Gland	Hormone	Major Effect
Posterior Pituitary	A. antidiuretic hormone (ADH)	promotes the retention of water by the kidneys
	B. oxytocin	stimulates the release of milk by the mammary glands
	C. oxytocin	stimulates uterine muscle contractions during childbirth
Anterior Pituitary	D. human growth hormone	stimulates cell division, bone and muscle growth, and metabolic functions
	E. adrenocorticotropic hormone (ACTH)	stimulates the adrenal cortex to secrete glucocorticoids
	F. thyroid-stimulating hormone	stimulates the thyroid gland

Gland	Hormone	Major Effect
	G. follicle-stimulating hormone (FSH) and luteinizing hormone (LH)	FSH stimulates production of ova in the ovaries; LH stimulates sex hormone production from the ovaries and triggers ovulation
	H. FSH and LH	FSH stimulates the production of sperm in the testes; LH stimulates sex hormone production in the testes
	I. prolactin	stimulates milk production from the mammary glands

- An example of a negative feedback loop for a mechanical system is a thermostat:
 

room temperature cools below 20 °C → thermostat detects low temperature → electronic signal to furnace → temperature increases → temperature gets above 20 °C → thermostat senses warmer temperature → electronic signal to furnace → furnace stops.

In humans, this system would look similar to this:  
 skin senses body temperature above 37 °C → brain compares temperature to normal set point → effectors respond (sweat glands release water, capillaries in skin dilate, kidneys conserve water) → body temperature drops → brain compares temperature to normal set point → effectors respond (sweat glands stop, capillary beds in skin constrict, kidneys no longer conserve water)
- Since tropic hormones stimulate another gland to produce a hormone, the above-average amount of this new hormone could be what is stimulating the pancreas to produce high levels of insulin.