I. The Endocrine System
• A. Hormones and Other Signaling Molecules

• 1. _______________ are hormones and secretions that can bind to target cells and elicit in them a response.

• 2. There are _______ main types of signaling molecules

• _______________ are secreted from endocrine sources and some neurons, and are then transported by the blood to remote targets.

• _______________ are secreted from neurons and act on immediately adjacent target cells for a short time.

• _______________ are secreted from cells of many different tissues; they act locally and are swiftly degraded

• _______________, which are secreted by exocrine glands, have targets outside the body; they integrate social activities between animals.

II. Signaling Mechanisms
• A. The Nature of Hormonal Actions

• 1. The sources of _________________ may be collectively called the _________________, which shows intimate connections with the nervous system.

• 2. Different _________________ different cellular response mechanisms.

• 3. Not all cells have _______________ for all hormones; the cells that respond are selected by the means of the type of receptor they possess.
B. Characteristics of Steroid Hormones

1. ________________, assembled from ____________, cross membranes readily.

2. Steroids ________________ or ____________ protein synthesis by switching certain genes on or off.

   They bind to ________________ in the nucleus, and then activate transcription.

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III. The Hypothalamus and Pituitary Gland

A. The ________________ and ________________ work jointly as the neural-endocrine control center.

1. The ________________ is a portion of the brain the monitors internal conditions and emotional states.

2. The ________________ is a pea-sized gland connected to the hypothalamus by a stalk.

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The ________________ of the pituitary consists of nervous tissue and releases two neurohormones made in the hypothalamus.
• The ___________________________ consists of glandular tissue and secretes six hormones and controls the release of others.

• B. Posterior Lobe Secretions

• 1. The ________________________ of neuron cell bodies in the hypothalamus ________________ into the posterior lobe of the pituitary.

• 2. Two hormones are released into the capillary bed.

• a. ______________________________ acts on the walls of kidney tubules to control the body’s water and solute levels.

• b. ______________________________ triggers uterine muscle contractions to expel the fetus and acts on mammary glands to release milk.

Figure 36.5a
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Figure 36.5b
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• C. Anterior Lobe Secretions

• 1. The anterior lobe releases six hormones that stimulate (“tropic”) other endocrine glands:

• __________________________ stimulates the adrenal cortex

• __________________________ stimulates the thyroid gland

• __________________________ stimulates egg formation in females and sperm formation in males

• __________________________ also acts on the ovary to release the egg and on the testes to release the sperm.
• _______________ acts on the mammary glands to sustain milk production.

• _______________, or _______________, acts on body cells in general to promote growth.

• 2. The _______________ produces releasing and inhibiting hormones that target the anterior pituitary.

IV. Abnormal Pituitary Outputs

• A. The body does not produce ______________ quantities of each hormone.

• B. But experience has shown that ______________, no matter how tiny, are critical to normal body functioning.

• 1. In childhood, too little ______________ can cause pituitary dwarfism, while too much causes gigantism.

• 2. ______________ of ______________ in adulthood causes thickening of skin and bones called ______________.

V. Feedback Control of Hormonal Secretions

• A. A shift in the amount of hormone in the blood causes a feedback mechanism to operate.

• 1. With ______________, an increase or decrease in the concentration of a hormone triggers events that inhibit further secretion.

• 2. With ______________, an increase in the concentration of hormone triggers events that stimulate further secretion.
• B. Negative Feedback from the Adrenal Cortex

  • 1. One ________________ is located on top of each kidney.

  • 2. Among the secretions of the outer portion are the ________________ such as ________________, which control blood glucose levels.

    ________________ secretions is an example of a negative feedback loop.

    When blood levels of glucose ________________ (as in hypoglycemia), the hypothalamus releases CRH -> anterior pituitary -> ACTH -> adrenal cortex -> cortisol, this prevents muscle cells from withdrawing glucose from the blood.

    When the body is ________________, as in painful injury, the nervous system provides an override mechanism in which the levels of cortisol remain high to promote healing.

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C. Local Feedback in the Adrenal Medulla

  • 1. The inner medulla portion secretes ________________ and norepinephrine under direction from sympathetic nerves from the hypothalamus.

  • 2. Its secretions mobilize the body during times of excitement or stress (“fight-or flight”) response.
D. Cases of Skewed Feedback from the Thyroid

- 1. The human ________________ lies at the base of the neck in front of the trachea.

- 2. Its hormones, ________________ and triiodothyronine, influence metabolic rates, growth, and development.
  
  a. These two hormones ________________ critical amounts of iodine.

  b. If the blood levels of iodine are ________________, the pituitary responds with too much TSH causing the thyroid gland to enlarge abnormally in what we call a goiter.

V. Direct Responses to Chemical Changes

A. Secretions from Pancreatic Islets

- 1. The ________________ is dual function gland; its exocrine function is to secrete digestive enzymes.

- 2. Certain cells within the pancreas have an endocrine function:
  
  a. ________________ cells secrete glucagon, which causes glycogen stored in the liver to be converted to glucose, raising its levels in the blood.

  b. ________________ cells secret insulin, which stimulates the uptake of glucose by liver, muscle, and adipose to reduce glucose levels in the blood, especially after a meal.
• c. ____________ cells secrete somatostatin, which can inhibit the secretion of glucagon and insulin.

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• 3. ________________ is a disease resulting from imbalances of insulin: its effects include weight loss, water-solute problems, ketone production, and possible death.

  • a. In ________________, insulin is no longer produced because the beta cells have been destroyed by an autoimmune response; treatment is by insulin injection.

  • b. In ________________, the insulin levels are near normal but the target cells cannot respond to the hormone; controlling diet is an effective treatment.