**Topic D.5: Hormones and Metabolism**

**Essential Idea: Hormones are not secreted at a uniform rate and exert their effect at low concentrations.**

**Statements & Objectives:**

**D.5.U1 Endocrine glands secrete hormones directly into the bloodstream.**

State the function of endocrine glands.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

State the function of hormones.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

**D.5.U2 Steroid hormones bind to receptor proteins in the cytoplasm of the target cell to form a receptor–hormone complex.**

Describe the mechanism of steroid hormone action.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

List two example steroid hormones.

(**List** Give a sequence of brief answers with no explanation.)

**D.5.U3 The receptor–hormone complex promotes the transcription of specific genes.**

List locations at which a steroid hormone binds its receptor.

(**List** Give a sequence of brief answers with no explanation.)

Outline one example of a steroid hormone promoting transcription of specific genes.

(**Outline** Give a brief account or summary.)

**D.5.U4 Peptide hormones bind to receptors in the plasma membrane of the target cell.**

State the location at which a protein hormone binds its receptor.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

List two example protein hormones.

(**List** Give a sequence of brief answers with no explanation.)

Define “second messenger system.”

**(Define** Give the precise meaning of a word, phrase, concept or physical quantity.)

**D.5.U5 Binding of hormones to membrane receptors activates a cascade mediated by a second messenger inside the cell.**

List the two most common second messengers.

(**List** Give a sequence of brief answers with no explanation.)

Describe the mechanism of epinephrine action.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

**D.5.U6 The hypothalamus controls hormone secretion by the anterior and posterior lobes of the pituitary gland.**

Draw a diagram to illustrate the relationship between the hypothalamus and pituitary.

**(Draw**: Represent by means of a labeled, accurate diagram or graph, using a pencil. A ruler(straight edge) should be used for straight lines. Diagrams should be drawn to scale. Graphs should have points correctly plotted (if appropriate) and joined in a smooth curve. )

Describe how releasing factors regulate anterior pituitary action.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

Describe how neurosecretory cells carry hormones to the posterior pituitary.

(**Describe** Give a detailed account or picture of a situation, event, pattern or process.)

Outline how negative feedback is involved in the secretion of ADH from the posterior pituitary.

(**Outline** Give a brief account or summary.)

**D.5.U7 Hormones secreted by the pituitary control growth, developmental changes, reproduction and homeostasis.**

Outline the role of the hypothalamus as a link between nervous and endocrine systems.

(**Outline** Give a brief account or summary.)

List hormones secreted by the anterior and posterior pituitary.

(**List** Give a sequence of brief answers with no explanation.)

**D.5.A1 Some athletes take growth hormones to build muscles.**

State that growth hormone is a peptide hormone.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

Outline the mechanism of action of growth hormone.

(**Outline** Give a brief account or summary.)

Evaluate the use of growth hormones by athletes.

(**Evaluate** To assess the implications and limitations; to make judgments about the ideas, works, solutions or methods in relation to selected criteria.)

**D.5.A2 Control of milk secretion by oxytocin and prolactin.**

List the source, target and function of oxytocin and prolactin as related to milk secretion.

(**List** Give a sequence of brief answers with no explanation.)

**D.5.NOS Cooperation and collaboration between groups of scientists—the International Council for the Control of Iodine Deficiency Disorders includes a number of scientists who work to eliminate the harm done by iodine deficiency.**

Outline consequences of iodine deficiency.

(**Outline** Give a brief account or summary.)

State the goal of the ICCIDD.

(**State** Give a specific name, value or other brief answer without explanation or calculation.)

**Key Terms**

Hormone

​steroid hormone action

​second messenger system

posterior lobe

​ADH

prolactin

​peptide hormone

​cascade reaction

​G-protein

​supraoptic nucleus

endocrine gland

​transcription

​hypothalamus

neurosecretory cells

​growth hormone

​iodine deficiency

​lipid hormone

hydrophilic

​FSH

​paraventicular nucleus

steroid

protein hormone

pituitary gland

​metabolism

​target cell

ICCIDD

​Estrogen

​calcium ion

​LH

​infundibulum

​receptor proteins

​epinephrine

​anterior lobe

​negative feedback

oxytocin

​chemical messenger

​goiter

​cyclic AMP

​oxytocin

​insulin