

Study Guide

Exercise and Hormonal Responses

Module 1- Hormones and Hormonal Control

Define the following terms:

- Neuroendocrinology
- Hormone

Study Questions

1. Explain in a general sense how hormones exert their effects on the body.
2. How do the endocrine and nervous systems work together? What is the primary goal of their interdependence?
3. What are the different classes/structures of hormones?
4. Identify and explain the four factors influencing the concentration of a hormone in the blood.
5. Describe the relationship between hormones and their receptors.
6. Explain in detail the three main mechanisms of hormone action:
 - a. Altering the activity of DNA in the nucleus
 - b. Second Messenger system
 - c. Membrane Transport

Module 2- Action and Regulation of Hormones

Define the following terms:

- Endocrine glands
- Androgens
- Catecholamines

Study Questions

1. List the major organs in the body that act as endocrine glands. What hormones does each gland release?
2. What hormones are released by the hypothalamus? What are the actions of these hormones?
3. What hormones are released by the pituitary (specify between the anterior pituitary and the posterior pituitary)? What are the actions of these hormones?
4. What are the primary actions of growth hormone? How is growth hormone regulated through positive feedback? How is it regulated through negative feedback?

5. What is the primary action of antidiuretic hormone (ADH)? How does this hormone respond to exercise?
6. What are the two hormones secreted by the thyroid? What are their actions?
7. Describe the structure of the adrenal glands. What hormones are secreted by the different regions of the gland?
8. How does the type of receptor impact function of the catecholamines?
9. Describe the role of aldosterone in regulation of fluid and blood pressure.
10. Explain the renin-angiotensin II mechanism in detail.
11. What are the main actions of cortisol? How is cortisol regulated/controlled?
12. Which hormones are secreted by the pancreas? What are their actions?
13. What is the role of insulin in regulation blood glucose? What is the role of glucagon?
14. Explain the role of insulin in the development of diabetes mellites.
15. What are the actions of testosterone?
16. What are the actions of estrogen?

Module 3- Hormones and Substrate Mobilization During Exercise

Study Questions

1. What are the two main factors that influence the type of substrate used during exercise?
2. What is the primary substrate used at the onset of exercise?
3. Describe the relationship between exercise intensity and glycogen depletion.
4. What hormone is the primary stimulator of glycogenolysis?
5. Glycogenolysis is under dual control, meaning that a secondary pathway to glycogenolysis exists. Explain this alternative mechanism?
6. How is blood glucose maintained during exercise (4 mechanisms)? Which hormones are involved and how?
7. Describe the changes in the following hormones during graded and prolonged exercise, and discuss how those changes influence the four mechanisms used to maintain the blood glucose concentration: insulin, glucagon, cortisol, growth hormone, epinephrine, and norepinephrine.

Hormone Summary Table

Hormone	Secreted by (Gland)	Hormone Actions	Effect of Exercise	Effect on Fuel/Substrate Use
Adrenocorticotrophic Hormone (ACTH)				
Luteinizing Hormone (LH)				
Thyroid Stimulating Hormones (TSH)				
Growth Hormone (GH)				
Insulin like Growth Factors (IGFs)				
Antidiuretic Hormone (ADH)				
Thyroxine (T4)/ Triiodothyronine (T3)				
Calcitonin				

Study Guide | Exercise and Hormonal Responses

Hormone	Secreted by (Gland)	Hormone Actions	Effect of Exercise	Effect on Fuel/Substrate Use
Epinephrine				
Norepinephrine				
Aldosterone				
Insulin				
Somatostatin				
Testosterone				
Estrogen				
Cortisol				