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USP41

Anatomy and Physiology for Sports Massage

Learning Outcome 7





Learning Outcome 7:

Know the structure and function of the endocrine system

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At the end of this learning outcome, you will be able to:

- a) Describe the structure of the endocrine system
- b) Explain the role of hormones
- c) Name key hormones and their actions



The following slides are presented by sections, a-c

a. Describe the structure of the endocrine system



a. Describe the structure of the endocrine system *Location and role of glands*





a. Describe the structure of the endocrine system *Location and role of glands (gender differences)*



Female endocrine system



Male endocrine system

a. Describe the structure of the endocrine system *Homeostasis Examples*



Body temperature - This is controlled to maintain the temperature at which the body's **enzymes** work best, which is usually 37°C.

Blood sugar level - This is controlled to provide cells with a constant supply of **glucose**. It is controlled by the release and storage of glucose, controlled by insulin.

Water content - This is controlled to protect cells by stopping too much water from entering or leaving them.

Water content is controlled by water loss from:
•the lungs - when we exhale
•the skin - by sweating
•the body - in urine produced by the kidneys



a. Describe the structure of the endocrine system Homeostasis – Negative Feedback

Negative feedback

Homeostatic control is achieved using **negative feedback mechanisms**:

•if the level of something rises, control systems reduce it again

•if the level of something falls, control systems raise it again





a. Describe the structure of the endocrine system Homeostasis – Negative Feedback



a. Describe the structure of the endocrine system Control of body functions – Glucose homeostasis example



HOW DOES INSULIN WORK?



- Glucose Homeostasis: the balance of insulin and glucagon to maintain blood glucose.
- Insulin: secreted by the pancreas in response to elevated blood glucose following a meal.

b. Explain the role of hormones



b. Explain the role of hormones *Hormone Secretion*



- A hormone is a chemical that is made by specialist cells, usually within an endocrine gland, and it is released into the bloodstream to send a message to another part of the body.
- It is often referred to as a 'chemical messenger'.
- Hormones are found in all multicellular organisms and their role is to provide an internal communication system between cells located in distant parts of the body.
- Hormones affect many physiological activities including growth, metabolism, appetite, puberty and fertility.

In the human body, hormones are used for two types of communication.

- The first is for communication between two endocrine glands, where one gland releases a hormone which stimulates another target gland to change the levels of hormones that it is releasing.
- The second is between an endocrine gland and a target organ, for example when the pancreas releases insulin which causes muscle and fat cells to take up glucose from the bloodstream.



b. Explain the role of hormones Hormone Secretion

- For the body to function effectively it is carefully controlled.
- Homeostasis is the regulation of conditions in the body such as temperature, water content and carbon dioxide levels.
- The nervous system and hormones are responsible for the maintenance of a constant internal environment.



c. Name key hormones and their actions



c. Name key hormones and their actions *Key hormones*



- Thyroxine
- Adrenaline
- Noradrenaline
- Human Growth hormone
- Melatonin
- Cortisol
- Insulin
- Glucogen
- Oestogen
- Progesterone
- Testosterone
- Adrencorticotropic hormone (ACTH)

c. Name key hormones and their actions *Hormone Secretion (for reference)*



Where Hormone Is	Hormone	Function
Produced		
Adrenal	Aldosterone	Helps regulate salt and water balance by causing the kidneys to retain salt and water and excrete potassium
	Cortisol	Has widespread effects throughout the body and anti-inflammatory action. Maintains blood sugar level, blood pressure, and muscle strength. Helps control salt and water balance
	Dehydroepiandrosterone (DHEA)	Has effects on bone, mood, and the immune system
	Epinephrine and norepinephrine	Stimulate the heart, lungs, blood vessels, and nervous system
Hypothalamus	Corticotropin-releasing hormone	Stimulates release of adrenocorticotropic hormone
	Gonadotropin-releasing hormone	Stimulates release of luteinizing hormone and follicle-stimulating hormone
	Growth hormone–releasing hormone	Stimulates release of growth hormone
	Somatostatin	Inhibits release of growth hormone, thyroid-stimulating hormone, and insulin
	Thyrotropin-releasing hormone	Stimulates the release of thyroid-stimulating hormone and prolactin
Ovaries	Estrogen	Controls the development of female sex characteristics and the reproductive system
	Progesterone	Prepares the lining of the uterus for implantation of a fertilized egg and readies the mammary glands to secrete milk
Pancreas	Glucagon	Raises the blood sugar level
	Insulin	Lowers the blood sugar level. Affects the processing (metabolism) of sugar, protein, and fat throughout the body
Parathyroid	Parathyroid hormone	Controls bone formation and the excretion of calcium and phosphorus
Pituitary	Corticotropin	Controls the production and secretion of hormones by the adrenal glands
	Growth hormone	Controls growth and development. Promotes protein production
	Luteinizing hormone and follicle-stimulating hormone	Control reproductive functions, including the production of sperm and semen in men and egg maturation and menstrual cycles in women. Control male and female sexual characteristics (including hair distribution, muscle formation, skin texture and thickness, voice, and perhaps even personality traits)
	Oxytocin	Causes muscles of the uterus to contract during childbirth and after delivery and stimulates contractions of milk ducts in the breast, which move milk to the nipple
	Prolactin	Starts and maintains milk production in the ductal glands of the breast (mammary glands)
	Thyroid-stimulating hormone	Stimulates the production and secretion of hormones by the thyroid gland
	Vasopressin (antidiuretic hormone)	Causes kidneys to retain water and, along with aldosterone, helps control blood pressure
Testes	Testosterone	Controls the development of male sex characteristics and the reproductive system
Thyroid	Calcitonin	Tends to decrease blood calcium levels and helps regulate calcium balance
	Thyroid hormones	Regulate the rate at which the body functions (metabolic rate)

What next?

- All sections of learning outcome 7 for unit USP41 will be assessed in through portfolio evidence.
- Refer to your VTCT Level 3
 Diploma in Sports Massage
 Therapy learner record of
 assessment handbook for
 direction.

