



Unit 9

1

1. LECTURE NOTES FOR UNIT NINE – ENDOCRINE SYSTEM

I. FUNCTIONS OF THE ENDOCRINE SYSTEM

- A.
- B.
- C.

II. HORMONES AND THEIR FUNCTIONS:

A. Description of Hormones

1. secretions of endocrine organs or glands that enter the _____ and have an effect on a target _____, _____, or _____ at some other location in the body
2. over _____ hormones are found in the body.
- 3.

B. Functions of Hormones

1. regulates
(The blood and the extracellular fluid)
2. regulates
3. regulates
4. maintains _____ despite emergency environmental interruptions such as infection, trauma, starvation, emotional stress, dehydration, hemorrhage, and temperature extremes
5. regulates some activities of the _____
6. plays a role in
7. contributes to the process of _____

III. GLANDS OF THE ENDOCRINE SYSTEM

A. LOCATIONS OF THE MAJOR GLANDS

Gland	Location
Pituitary	
Adrenal Glands	
Thyroid	
Pancreas	

B. FUNCTIONS AND HORMONES OF THE MAJOR GLANDS

1. PITUITARY GLAND (HYPOPHYSIS)

often called the " _____ " gland because it secretes hormones that control other endocrine glands

A. Hormones secreted by the anterior pituitary gland

1. Human Growth Hormone (hGH) or Somatotropin

- a.
- b.
- c.
- d.
- e.

2. Thyroid Stimulating Hormone (TSH) or Thyrotropin

- a.
- b.

3. Adrenocorticotrophic Hormone (ACTH)

- a.

2. THYROID GLAND HORMONES

A. Thyroid Hormones

1. Thyroxine (T4)

(The thyroid gland also produces T3 (Triiodothyronine) and Calcitonin which will not be discussed in this manual).

B. Actions of the Thyroxine

- 1.
2. regulates cellular metabolism
 - a.
 - b.
 - c.
3. regulates _____ and _____ by working in conjunction with _____ and _____ to accelerate body _____
4. enhances the actions of the catecholamines, _____, _____ and can increase _____, _____, _____ and _____

C. Thyroid gland needs _____ to produce its hormones.

3. ADRENAL MEDULLA GLAND

- A. Hormones of the adrenal medulla are _____ and _____ (also called adrenaline and noradrenaline)
- B. The adrenal medulla is the _____ of the adrenal gland.
- C. Functions of the adrenal medulla hormones
 - 1. almost _____ of the secretions from adrenal medulla is epinephrine.
 - 2. responsible for the " _____ " response which is of the sympathetic division of the autonomic nervous system.
 - 3. helps the body cope with stress
 - a. increases
 - b. increases
 - c. increases
 - d. constriction
 - e. increases
 - f. dilate
 - g. increase efficiency of
 - h. increase blood
 - i. stimulates

4. ADRENAL CORTEX GLAND

- A. Hormones of the adrenal cortex include cortisol.
- B. The adrenal cortex is the _____ portion of the adrenal gland.
- C. Functions of cortisol include:
 - 1. represents _____ of all the glucocorticoids, a group of hormones that helps to regulate _____ activity.
 - 2. helps to regulate _____ and _____ to stress.
 - 3.
 - 4.
 - 5. Functions in response to the release of _____ from the _____ gland.
 - 6. Chronic secretion of cortisol, such as found with chronic stress, may impair the proper functioning of _____.

5. THE PANCREAS AND ITS HORMONES

A. Hormones of the Pancreas

- 1.
- 2.

B. Functions of the pancreatic hormones

1. is both an _____ and an _____ gland because it produces both hormones which are secreted into the blood and digestive enzymes which are secreted into ducts.

2. Glucagon

- a. principle physiological activity is to _____
- b. main target tissue is the _____
- b. accelerates the conversion of _____ into _____
(_____)
- d. promotes the formation of _____ from lactic acid (_____)
and certain _____ (_____)
- e. enhances the release of _____ into the blood

3. Insulin

- a. principle physiological activity is to _____
- b. accelerates the transport of _____ from the _____ into the _____.
- c. accelerates the conversion of _____ into _____ (_____)
- d. accelerates the entry of amino acids into cells and the synthesis of _____
- e. accelerates the conversion of _____ or other nutrients into fatty acids (_____)
- f. _____ glycogenolysis
- h. _____ gluconeogenesis
- i. primarily influenced by _____
- j. also influenced by increased blood levels of certain _____

IV. STRESS AND THE GENERAL ADAPTATION SYNDROME

A. Stress and Stressors

- 1.
2. a stressor is
 - a.
 - b.
 - c.
 - d.
 - e.
 - f.
 - g.
 - h.
3. any stress will trigger a very wide range of physiological responses termed the *Stress Response* or *General Adaptation Syndrome*

B. General Adaptation Syndrome (GAS) --- (Hans Selye)

1. repeated exposure to stress or stressors tend to reestablish a basis for homeostasis
2. must have an adaptation period where the amount of stress is reduced or no adaptation can occur
3. if continually exposed to a stress a person will eventually be overcome by that stress and _____.

C. Reaction to Stress

1. Alarm Reaction (Fight or Flight Response)

- a. response is _____
- b. brings large amounts of _____ and _____ to organs that are most important for counteracting the stressor
 1. _____ increases alertness
2. _____ fight or flee from stress
 3. increased _____ and contractility
 4. increase _____ in liver
- c. stress responses characterizing the alarm stage
 1. _____ heart rate and contractility
 2. _____ of blood vessels to the skin and viscera
 3. _____ of blood vessels to the brain and skeletal muscles
 4. spleen discharges stored _____ to increase total blood volume
 5. red blood cell production _____
 6. blood clotting mechanisms are _____
 7. liver converts large amounts of stored glycogen to glucose (_____)
 8. body temperature _____ causing _____
 9. _____ breathing rate
 10. _____ in digestive activity
 11. increased production of _____ and _____ that prolong many of the fight or flight responses

2. Resistance Reaction

- a. a longer term reaction by the body to a stressor
- b. primarily initiated and controlled by hypothalamic hormones
- c. increased synthesis of _____
- d. increased tissue _____ thereby providing an additional ATP source
- e. conservation of _____ to retain _____ and maintain fluid volume
- f. increased elimination of _____
- g. all of these reactions allow for the body to continue to oppose the stressor for prolonged periods of time
- h. generally successful in seeing individuals through a stressful period

3. Exhaustion Stage

- a. if the stressor is not combated and controlled, eventually vital organs will _____ because of loss of _____ ions eliminated by the body's attempt to retain Na^+ during the Resistance Reaction Stage
- b. will eventually lead to tissue _____ and _____ if not reversed
- c. an individual's general health is largely determined by their ability to withstand stressors

Prefixes, Suffixes, and Root Words

a	without
acr/o	extremity or extremities
aden/o	gland
adren/o	adrenal gland
adrenal/o	adrenal gland
-al	pertaining to
ana	up, back, apart
andr/o	male
angi/o	vessel
-ary	pertaining to
calc/i	calcium or stone
cata	to break down or apart
cortic/o	cortex
-crine	to secrete
dips/o	thirst
-dipsia	thirst
diure	to urinate
-drome	running
dys	painful or difficult
-ectomy	removal or excision
-emia	referring to a blood condition
end/o	within
endocrin/o	endocrine
-esis	pertaining to
eu	true, good, normal
ex/o	outside, out
-gen	to produce
gluc/o	sugar
glyc/o	sugar
gonad/o	gonads or the reproductive
organs	
hormon	to excite
hyper	above, greater than
hypo	below, less than
-ic	pertaining to
-ism	state of or condition of
-itis	inflammation of or infection
of	
kal/i	potassium
lact	milk
-malacia	softening
-megaly	enlargement
men/o	menstruation

natri	sodium
neur/o	nervous, neuron
-oid	resembling
-ologist	one who studies, a specialist
-ology	the study of
-oma	tumor, mass
ophthalm/o	eye
-osis	condition of
pancreat/o	pancreas
parathyroid/o	parathyroid
-pathy	disease
-penia	deficiency or lack of
-phagiaeating (or swallowing)	
pineal/o	pineal gland
pituit/o	pituitary gland
-plasia	growth or development
poly	many
pro	to come before
-rrhea	discharge or flow
syn	with, together
thym/o	thymus gland
thyr/o	thyroid gland
thyroid/o	thyroid gland
-tic	pertaining to
toxic/o	poison
-tropic	influencing
-uria	to urinate

Medical Terms

acromegaly	enlargement of the
extremities	
adenoma	tumor of a gland
adenomalacia	softening of the adrenal gland
adrenalectomy	removal of the adrenal gland
adrenocorticohyperplasia	
	increased development of the
	adrenal cortex
adrenocorticotropic	
	pertaining to influencing the
	adrenal cortex
adrenopathy	disease of the adrenal gland
amenorrhea	absence of menstrual flow

ana(bolism)	referring to a building up process (required for growth and repair of body tissues such as dehydration synthesis)	hormone	to excite (refers to a group of chemical messengers secreted into the blood by glands which have an effect on other body organs).
antidiuretic	pertaining to against urination	hypercalcemia	high levels of calcium in the blood
calcipenia	deficiency of calcium	hyperglycemia	high levels of sugar in the blood
cata(bolism)	referring to a destructive process or one that breaks down substances (such as hydrolysis or digestion)	hyperkalemia	high levels of potassium in the blood
dysmenorrhea	painful menstrual flow	hyponatremia	high levels of sodium in the blood
endocrine	to secrete within or the endocrine system (refers to a system of glands that secrete their products [hormones} directly into the bloodstream)	hyperparathyroidism	condition of excessive parathyroid secretion
endocrinologist	one who studies the endocrine system or an endocrine system specialist	hyperthyroidism	condition of excessive thyroid secretion
endocrinopathy	disease(s) of the endocrine glands or system	hypocalcemia	low levels of calcium in the blood
exocrine	to secrete without (refers to those organs which secrete their products through ducts such as salivary glands and the pancreas). [Please note: the pancreas is both an endocrine gland and an exocrine gland).	hypoglycemia	low levels of sugar in the blood
euthyroid	resembling normal thyroid function	hypokalemia	low levels of potassium in the blood
exophthalmic	pertaining to eyes slightly out	hyponatremia	low levels of sodium in the blood
glucocorticoid	"resembling sugar from the cortex." Refers to a group of hormones produced by the adrenal cortex that play a role in sugar metabolism.	hypothyroidism	condition of low thyroid secretion
glycosuria	sugar in the urine	neurohormone	"to excite from nerves" Refers to hormones produced by nervous tissue
gonadotropic	pertaining to influencing the reproductive organs	pancreatitis	inflammation of the pancreas
		parathyroidoma	mass or tumor in the parathyroids
		pineal	pertaining to the pineal gland
		pituitary	pertaining to the pituitary gland
		polydipsia	excessive thirst
		polyphagia	excessive hunger
		polyuria	excessive urination (Note: the three "polys" are classic symptoms of diabetes mellitus).

prolactin	pertaining to before milk (This hormone stimulates the production of milk by the mammary glands)	GTT	glucose tolerance test
		Na ⁺	sodium
		K	potassium
		sq	subcutaneous
syndrome	symptoms that run together	U	units
thyroidectomy	removal of the thyroid gland	UA	urinalysis
thyrogenic	produced by the thyroid gland	Ö	increased amount
		ð	decreased amount
thyroparathyroidectomy		>	greater than
	removal of the thyroid and parathyroids	<	less than
thyrotoxicosis	- toxic condition of the thyroid gland. (This is related to hyperactivity of the thyroid gland).		
thyrotropic	pertaining to influencing the thyroid gland		

Medical Abbreviations

BS	blood sugar
FBS	fasting blood sugar

3. DISEASES AND DISORDERS FOR UNIT NINE – ENDOCRINE SYSTEM

A. Acromegaly:

B. Cretinism:

C. Cushing's Syndrome:

D. Diabetes Mellitus:

E. Dwarfism:

F. Gigantism:

G. Goiter:

H. Grave's Disease:

I. Hyperthyroidism:

J. Myxedema:

5. STUDENT ACTIVITIES FOR UNIT NINE – ENDOCRINE SYSTEM

WORKSHEET - Endocrine System

Name _____ Period: _____

1. Identify the three functions of the Endocrine system.

2. Describe a hormone and how it functions in the body.

3. Complete the Chart

Gland	Location	Hormone(s)
Pituitary		1. 2. 3.
		1. Thyroxine
	Superior to the kidneys	1. Adrenal Cortex Hormone A. 2. Adrenal Medulla Hormones A. B.
		Insulin and glucagon

4. Describe the action thyroxine hormone has in the body.

5. What hormone from the pituitary gland stimulates the release of thyroxine from the thyroid gland?

6. How does epinephrine and norepinephrine help the body cope with stress?

7. Compare and contrast the effects of insulin and glucagon on the body.

8. Why is the pituitary the “master gland” of the body?

9. Give a function of each of the hormones on the chart:

Hormone	Function(s)
HGH	
TSH	
ACTH	

10. Define Stress:

11. Identify stressors in the body.

12. What hormone from the pituitary gland stimulates the release of cortisol from the adrenal cortex?

13. Determine which of the two reactions the statements below describe:

Alarm Reaction- AR or Resistance Reaction RR

- _____ A. Response Immediate
- _____ B. Increased HR and Contractility
- _____ C. Long term reaction
- _____ D. Increased synthesis of ATP
- _____ E. Fight or Flight from stress
- _____ F. Helps individuals through stressful periods
- _____ G. Body temperature increases causing sweating
- _____ H. Controlled by hypothamic hormones

14. Describe the Exhaustion Stage.

