

HOWARD UNIVERSITY
 COLLEGE OF ARTS AND SCIENCES
 COMPREHENSIVE SCIENCES

LIFE SCIENCES LECTURE TIMELINE
 Fall 2017

UNIT VII: HOMEOSTASIS

<u>WEEK(S)</u>	<u>LECTURE TOPIC(S)</u>	<u>TEXTBOOK CHAPTER(S)</u>
October 31 st - November 2 nd	<p>-definition: HOMEOSTASIS is the state of balance equilibrium, that is established and maintained through the action and the interaction of several factors (substances)</p> <p>- there are GENERAL FACTORS and SPECIFIC FACTORS that function, usually at the cellular level, to coordinate the multiple activities that occur (e.g., metabolism, cell division, growth, etc.) in cells/tissues/organs</p> <p>- GENERAL FACTORS include the following: (1) enzymes, (2) hormones, (3) membranes and (4) pigments</p> <p>- SPECIFIC FACTORS include (1) nerves (unique to animals), (2) pigments, (3) immunity factors, (4) tropisms and taxis movements, (5) genes and DNA, (6) biorhythms and (7) behavior (in invertebrate and vertebrate animals)</p> <p>- for <u>single-celled organisms</u>, the following maintain the integrity of the internal environment:</p> <ul style="list-style-type: none"> ▪ regulation of the entry and exit of materials through the cell membrane ▪ regulation of chemical reactions that occur in the cell (facilitated by enzymes) <p>- for <u>multi-celled organisms</u>, the following apply:</p> <ul style="list-style-type: none"> ▪ regulation of the entry and exit of materials through the cell membrane ▪ regulation of chemical reactions that occur in the cell (facilitated by enzymes) ▪ coordination of activities of all cells within tissue or an organ ▪ coordination of activities of all organs ▪ regulation of the interaction between the individual and the external environment <p>factor #1 ENZYMES are organic catalysts (substances that accelerate or, retard, the <u>rate</u> at which chemical reactions occur)</p> <p>- function(s)/types</p> <ul style="list-style-type: none"> ▪ oxidases-oxidize (breakdown) molecules into components ▪ reductases – reduce (build-up) molecules from components 	<p>1 (1.2, pp.7); 28.2, pp.481; 37, pp.650-651; 658-660</p> <p>Chapter 5.3, pp. 82-83</p>

LECTURE TOPIC(S)TEXTBOOK CHAPTER(S)October 31st-November 2nd

- parts of an enzyme
 - apoenzyme – protein molecule
 - coenzyme – a vitamin or element such as Co⁺⁺
 - apoenzyme + coenzyme = holoenzyme (functional as oxidase or reductase)
- substrate – substance worked upon (i.e., proteins, sugars, etc.)
- locations of enzymes
 - cytoplasm, chloroplasts, mitochondria, hollow organs – i.e., stomach, etc.
- factors that may affect enzyme activity
 - pH, temperature, time
- names of general enzymes
 - oxidase
 - reductase
 - nuclease
 - hydrolase
 - transaminase
 - phosphatase
 - dehydrogenase
- names of specific enzymes
 - catecholase
 - hydrolase
 - rennin
 - catalase
 - amylase
 - pepsin
 - trypsin
 - lipase
 - lactase
 - sucrase

IMPORTANT TOPICS:

- * GENE – ENZYME DISEASES AND DISORDERS
- * VITAMINS as COENZYMES
- * COMMERCIAL ENZYMES

factor #2 – MEMBRANES are porous structures that facilitate the entry and the exit of substances (gases, salts, small organic molecules, etc.) to and from living cells

- many cell organelles (mitochondrion, chloroplast) are comprised of membranes
- structure and composition (protein and lipids; 6 - 10 nanometers thick)
- biophysical processes (Osmosis, Diffusion, Brownian Motion)
- physiological processes (active transport, plasmolysis, plasmoptysis)
- turgor pressure

Chapter 4.3, pp. 56-57

- solution contents (solute + solvent)
 - isotonic, hypotonic, hypertonic solutions

LECTURE TOPIC(S)

TEXTBOOK CHAPTER(S)

IMPORTANT TOPICS:

- * PHAGOCYTOSIS
- * PINOCYTOSIS
- * TRANSPIRATION IN PLANTS
- * THE FUNCTION of the CELL WALL
- * PLASMOLYSIS
- * PLASMOPTYSIS

factor #3 – HORMONES are substances that affect the occurrence or the rate of occurrence of an active or process (i.e., cell division, spermatogenesis, flowering, oogenesis, growth, metabolism, etc.)

- specific plant hormones
 - abscisic acid
 - auxins
 - cytokinins
 - gibberellins
 - florigen
 - phytochromes
 - ethylene

Chapter 27.7

- specific animal hormones
 - invertebrates
 - ecdysone
 - vertebrates
 - the role of the nervous system
 - the hypothalamus
 - the role of the pituitary gland
 - the endocrine glands
 - endocrine hormones

Chapter 31.2

IMPORTANT TOPICS:

- * ENDOCRINE DEFICIENCY DISEASES
- * OOGENESIS
- * SPERMATOGENESIS
- * GROWTH and DEVELOPMENT in PLANTS
- * GROWTH and DEVELOPMENT in ANIMALS

factor #4 - PIGMENTS are liquid, organic substances (lipid or protein) processed (e.g., photosynthesis, transport of O₂, etc.)

plant pigments

- chlorophyll
- carotene
- anthocyanin

animal pigments

- hemoglobin
- cyanoglobin
- melanin
- rhodopsin

pp. 100-101

pp. 220, 490,564, 622

LECTURE TOPIC(S)

factor #5 - NERVES - receive external or internal stimuli and transmit electrical impulses to a site of interpretation where a response is elicited

- the neuron
- primitive nerve systems
- advanced vertebrate nerve systems
 - the central nervous system (CNS)
 - the peripheral nervous system (PNS)
 - the autonomic nervous system (ANS)

TEXTBOOK CHAPTER(S)

Chapter 29

EXAM III- Units VI and VII