

Biomedical Sciences Contents, Free Sample and References

Course 1 (BSC-1) – 48 pages

Cellular structure

Overview of thermodynamics

Amino acids and proteins

Protein misfolding diseases

Enzymology

Carbohydrates

Lipids

Overview of metabolism

Nucleic acids

Genetic Diseases

Overview of immunology

Autoimmune diseases

Hypersensitivity reactions

Course 2 (BSC-2) – 42 pages

Organization of the human body

Overview of organ systems

Circulatory system

Cardiovascular diseases

Anemias

Digestive system and related hormones

Digestive disorders

Reparatory system

Respiratory diseases

Urinary system

Kidney and urinary tract disorders

Sensory systems

Course 3 (BSC-3) – 42 pages

Endocrinology

Overview of different types of hormones

Functions of hormones

Hormonal diseases

Vision

Vision disorders

Musculoskeletal System

Overview of hematopoiesis

Diseases of the musculoskeletal system

Course 4 (BSC-4) – 41 pages

Overview of body planes and movements

Central Nervous System

Peripheral nervous system

Serotonin and dopamine systems

Histamine

Bradykinin

Opioids

GABA

CNS disorders

Skin

Skin Diseases

Free Sample

From BSC-2

Classification of blood pressure in adults

Class	Systolic (mmHg)	Diastolic (mmHg)	Recommendations
Normal	Below 130	Below 85	Recheck in 2 years
High normal	130 – 139	85 – 89	Recheck in 1 year and advice lifestyle changes
Stage 1 (mild) hypertension	140 – 159	90 – 99	Confirm within 1 month and advice lifestyle changes
Stage 2 (moderate) hypertension	160 – 179	100 – 109	Refer to a source of care within 1 month
Stage 3 (severe) hypertension	180 or higher	110 or higher	Refer to a source of care immediately or within 1 week depending on patient's condition

Some causes of hypertension:

- Kidney disorders
- Hormonal disorders (hyperthyroidism, hyperaldosteronism, Cushing's disease)
- Arteriosclerosis
- Acute lead poisoning
- Certain drugs (NSAIDs, oral contraceptives, corticosteroids, cyclosporine, erythropoietin, cocaine, alcohol abuse and excessive amount if licorice).

From BSC-3

In general, hormones are categorized into **four structural groups**, with members of each group having many properties in common:

- Peptides and proteins
- Steroids
- Amino acid derivatives
- Fatty acid derivatives - Eicosanoids

Peptides and Proteins

Peptide and protein hormones are products of translation and are polymers of amino acids. They vary considerably in size and post-translational modifications, ranging from peptides as short as three amino acids to large, multi-subunit glycoproteins. Many protein hormones are synthesized as prohormones (inactive hormones), then proteolytically cleaved to generate their mature (active) form. Peptide hormones are processed in the **endoplasmic reticulum**, transferred to the **Golgi** and packaged into secretory vesicles for export. They can be secreted by one of two pathways:

- **Regulated secretion:** The cell stores the hormone in secretory granules and releases it in “bursts” when stimulated. It is the most common pathway and allows cells to secrete a large amount of hormone over a short period of time. E.g. growth hormone, vasopressin
- **Constitutive secretion:** The cell does not store the hormone, instead the hormone is secreted from secretory vesicles as it is synthesized. E.g. thyroid hormone, luteinizing hormone

Examples of peptide hormones:

Luteinizing hormone, parathyroid hormone, calcitonin, follicle-stimulating hormone, corticotropin, growth hormone, antidiuretic hormone, oxytocin, natriuretic peptide, insulin, somatostatin, cholecystokinin, gastrin, and leptin.

Steroids

Steroids are lipids that are derivatives of **cholesterol**. The first and rate-limiting step in the synthesis of all steroid hormones is the **conversion of cholesterol to pregnenolone**. Pregnenolone is formed on the inner membrane of **mitochondria** then shuttled back and forth between mitochondrion and the endoplasmic reticulum for further enzymatic processing.

Steroid hormones can be classified into **five groups** based on the receptors to which they bind: glucocorticoids, mineralocorticoids, androgens, estrogens, and progestagens.

References and Websites

- Compendium of Therapeutic Choices, 2019
- Compendium of Pharmaceuticals and Specialties, 2021
- Compendium of Therapeutics for Minor Ailments, 2019
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