

**ANATOMY DEPARTMENT  
COLLEGE OF MEDICINE  
KING SAUD UNIVERSITY**

Human Anatomy is primarily the scientific study of the morphology of the human body. It is a basic medical science, which is taught to medical students in their first years of medical school.

It is convenient to subdivide the study of human anatomy into several different ways, as:

- Gross anatomy
- Microscopic anatomy (Histology)
- Developmental anatomy (Embryology)
- Cross sectional anatomy

All these aspects of learning of the structure of human body go side by side. Generally, students learn gross anatomy and microscopic anatomy from anatomical models, skeleton, textbooks, atlases, diagrams, photographs, lectures and tutorials. The study of microscopic anatomy is aided by practical experience of examining histological slides under a microscope. Gross anatomy is generally learnt with practical experience of dissecting cadavers.

In this college, different disciplines of anatomy are covered in two years.

1. Course Objectives:

The main objectives of the course are:

- To provide the students with core information of the anatomical sciences on which they can build a professional life time of continuing learning.
- To understand the correlation between the structure and function of the body organs and systems.
- To help students think logically and apply their knowledge of anatomy in understanding the mechanism of diseases.

## 2. Instructional Strategies:

- Didactic lectures: given on selected topics
- Tutorials: preselected topics are given in a more informal setting. Active students' participation is encouraged.
- Practical sessions: include dissection of relevant region of body, demonstration on prosected material, and examination of histological slides.

# FOUNDATION BLOCK HISTOLOGY

## *1. GENERAL OBJECTIVES:*

*By the end of this block, the student should:*

- Identify the principles of microtechniques.
- Identify the components of the cell in correlation with their functions with special emphasis on their electron microscopic structures.
- Identify the types, microscopic structures and distributions of epithelial tissues.
- Identify the types, microscopic structures and distribution of connective tissue proper.
- Identify the types, microscopic structures and distribution of cartilage.
- Identify the types, microscopic structures and distribution of bone.
- Discuss the development of bone.
- Identify the microscopic structures of different types of muscles.
- Identify the microscopic structures of nervous tissue.
- Identify the microscopic structures of lymphoid organs.

**FOUNDATION BLOCK  
HISTOLOGY**

**Lecture 1**

**Title: Histological microtechniques and Cell Structure.**

**Title: (I) Histological microtechniques :( pages 1-10)**

**Objectives:**

- \*Definition of Histology
- \*Preparation of histological sections
- \*Light Microscopy
- \*Basophilic & acidophilic staining
- \*Electron Microscopy.

**Title: (II) Cell nucleus: (pages 49-68)**

**Objectives:**

- \*Nuclear envelope
- \*Chromatin& nuclear matrix
- \*Nucleolus

**Title: (III) Cell cytoplasm: (pages 11-48)**

**Objectives:**

\*Components of cytoplasmic matrix:

A- Cytosol (cytoplasmic matrix)

B- Cytoplasmic organelles:

Cell membrane (plasma lemma)

Mitochondria

Ribosome

Rough ER

Golgi apparatus

Secretory vesicles

Lysosomes

Peroxisomes

Smooth ER

Centrioles

Microtubules

Cilia & Microvilli

Flagella

Filaments

C- Cytoplasmic inclusions

## **Practical 1**

Identify the electromicrographs of:

1. Nucleus
2. Cell Membrane
3. Mitoch
4. RER
5. SER
6. Golgi apparatus
7. Centrioles
8. Cilia
9. Microvilli

## Lecture 2

### Epithelial Tissue (pages 85-110)

#### **Title: (I) Epithelial membranes (Epithelia):**

##### **Objectives:**

- \* Simple epithelium
- \* Stratified epithelium
- \* Cell junctions:
  - 1-Tight junctions (impermeable)
  - 2-adhering junction (anchoring) junction
  - 3-Gap junctions

#### **Title: (II) Epithelial Glands:**

##### **Objectives:**

- \* Exocrine Glands:
- \* Endocrine Glands:

## **Practical 2**

1. Simple cuboidal epithelium (e.g. thyroid gland).
2. Simple columnar epithelium with goblet cells (e.g. small intestine).
3. Pseudo stratified columnar ciliated epithelium with goblet cells (trachea).
4. Non-keratinized stratified squamous epithelium (e.g. esophagus)
5. Keratinized stratified squamous epithelium (e.g. skin).
6. Transitional epithelium (e.g. urinary bladder).

## Lecture 3

**Title: Connective tissue proper: (proper 111-130)**

### **Objectives:**

#### **1- Components of C.T.**

C.T. fibers:

(Types; characters, staining,  
sites, producing cells)

C.T. cells:

(Types; structure & functions)

Ground substances

Basement membrane

#### **2- Types of C.T. proper:**

a- Loose (areolar C.T.)

b- Adipose C.T.

c- Dense ordinary C.T. (Fibrous C.T.)

d- Elastic C.T.

e- Reticular C.T.

### **Practical 3**

1. Dense fibrous C.T. (regular type): e.g. tendon.
2. Elastic C.T. (e.g. aorta).
3. Reticular C.T. (silver stain): e.g. liver.
4. Adipose C.T.

## Lecture 4

**Title: Cartilage and Bone:** (pages: 131-156)

### Title: (I) Cartilage:

#### **Objectives:**

I-Types and structures:

a- Hyaline Cartilage

Articular cartilage

b- Fibro cartilage

Intervertebral joints

c- Elastic cartilage (e.g. ear pinna)

II-Growth of Cartilage

### Title: (II) Bone:

#### **Objectives:**

1- Components of Bone:

a- Periosteum.

b- Endosteum.

c- Bone cells.

d- Bone matrix.

2- Types of bone:

a-Compact bone.

b-Spongy( Cancellous) bone.

3- Development of bone (bone formation):

a-Intramembranous ossification.

b-Endochondrial ossification.

4-Bone Growth and Remodeling.

## **Practical 4**

1. Hyaline cartilage

2. Elastic cartilage (e.g. ear pinna)

3. Compact bone

4. Spongy (cancellous) bone

## Lecture 5

**Title: Muscle tissue: (pages:157-184)**

### **Objectives:**

- 1-Skeletal muscle
- 2-Cardiac muscle
- 3-Smooth muscle

### **Practical 5**

1. Skeletal muscle (L.S.)
2. Skeletal muscle (T.S.)
3. Cardiac muscle
4. Smooth muscle

## Lecture 6

**Title:** Nervous tissue:(pages: 185-218)

### **Objectives:**

#### **1-Components of Nervous Tissue:**

- a- Neurons
- b-Synapses
- c-Neuroglia

#### **2-Peripheral nervous system:**

- a-Peripheral nerves
- b-Ganglia:
  - Dorsal root ganglion (Spinal ganglia)
  - Autonomic ganglia

#### **3- Central nervous system:**

- Gray matter and white matter
- Spinal cord
- Cerebral cortex
- Cerebellar cortex
- Neuroglia

- 4- Nerve endings: (a) Receptors: e.g. Pacinian corpuscles,  
Muscle spindle.  
(b) Effectors: e.g. Neuromuscular junction.

## **Practical 6**

1. Peripheral nerve trunk (T.S. and L.S.)
2. Dorsal root ganglion (spinal ganglia)
3. Muscle spindle (T.S.)

## Lecture 7

**Title: Lymphoid Tissue: (pages: 273 - 302)**

### **Objectives:**

- \*Lymphoid Organs
- 1- Lymph nodes.
- 2- Spleen.
- 3- Tonsils.
- 4- Thymus.

### **Practical 7**

1. Lymph node
2. Spleen
3. Palatine tonsil
4. Thymus

## ***SUGGESTED TEXTBOOKS FOR HISTOLOGY***

### **1. For theoretical:**

#### **Color Textbook of Histology**

L.P. Gartner and J.L. Hiatt  
W.B. Saunders Company  
An imprint of Elsevier  
Philadelphia, Pennsylvania.  
The Third Edition.

### **2. For Practical:**

#### **Di Fiore's Atlas of Histology**

V.P. Eroschenko  
Lippincott Williams Wilkins  
A Wolters Klumer Company  
Philadelphia, New York, London.  
The latest edition.

# Histology

## Practical session (1)

### Cell Nucleus

In electron micrographs of the cell nucleus, the student should identify the following components:

- 1- Nucleolus.
- 2- Heterochromatin.
- 3- Euchromatin.
- 4- Nuclear envelope.
- 5- Perinuclear cisterna.
- 6- Nuclear pores.

### Cell Cytoplasm

In electron micrographs of the cell, the student should identify the following structures:

- 1- Cell membrane.
- 2- Mitochondria.
- 3- Golgi apparatus.
- 4- Rough endoplasmic reticulum.
- 5- Smooth endoplasmic reticulum.
  
- 7- Centrioles.
- 8- Cilia.
- 9- Microvilli.