



<b>Course Code</b> MED-202	<b>Course Title</b> Histology I	<b>ECTS Credits</b> 6
<b>School</b> Medical School	<b>Semester</b> Fall (Semester 3)	<b>Prerequisites</b> Completion of Year 1
<b>Type of Course</b> Required	<b>Field</b> Medicine	<b>Language of Instruction</b> English
<b>Level of Course</b> Undergraduate	<b>Year of Study</b> 2nd	<b>Lecturer(s)</b> Dr Despina Moissidou
<b>Mode of Delivery</b> Face-to-face	<b>Work Placement</b> N/A	<b>Co-requisites</b>

#### Objectives of the Course:

The main objectives of this course are:

- To acquire a basic background in histology and to understand the properties of cells and their interactions with one another as components of tissues and organs.
- To understand how structure and function correlate at the microscopic level.
- To be able to describe the normal structure and function of various cell types, tissues, and organs, and to differentiate their histological structures from each other through examination.
- To acquire basic background on embryology and to understand the first weeks of development.
- To describe the growth of the foetus and the maturation of the organ systems.
- To discuss the various birth defects for each organ system development.

#### Learning Outcomes:

##### Week 1

##### **LOBs covered during lectures:**

##### Histology

1. Describe the method of tissue preparation for histological examination.
2. Outline the principles of histochemistry and immunohistochemistry.
3. Describe the function of the different types of microscopy utilized in histology.

##### Embryology

4. Describe oogenesis (female gametogenesis) and spermatogenesis (male gametogenesis).
5. Discuss the first week of development, from the ovarian cycle to cleavage and blastocyst formation.
6. Discuss examples of birth defects of the first week development.

##### **LOB covered during practical:**

7. Outline the different steps taken to prepare a biopsy specimen for visualization.

## **Week 2**

### ***LOBs covered during lectures:***

#### **Histology**

8. Outline the histological features of plasma membrane, and cellular organelles correlating them with their function.
9. Describe the membranous and non-membranous organelles of the cell.
10. Define the histological characteristics of an apoptotic cell.
11. Identify the different stages of mitosis and meiosis from microscopic images.

#### **Embryology**

12. Discuss the day-by-day development during the second week of gestation (Day 8 – Day 13).
13. Outline the development of embryoblast and trophoblast.
14. Explain what is meant by abnormal implantation and ectopic pregnancy.

## **Week 3**

### ***LOBs covered during lectures:***

#### **Histology**

15. Explain the distinguishing features of the four major tissue types (epithelial, connective, muscle, nervous).
16. List the different types of epithelial cells and briefly discuss the function of each (apical, lateral, basal).
17. Describe the accessory structural features of epithelial cells such as microvilli, cilia and cell-to-cell contacts.
18. Distinguish between exocrine and endocrine glands and give examples of each.

#### **Embryology**

19. Describe gastrulation, and vasculogenesis.
20. Outline the formation of the notochord and the establishment of axes.
21. Briefly discuss teratogenesis and birth defects associated with laterality.

### ***LOB covered during practical:***

22. Identify the different types of epithelial tissue under the microscope

## **Week 4**

### ***LOBs covered during lectures:***

#### **Histology**

23. List the classification of connective tissue and their major histologic features.
24. Describe the two major classes of connective tissue cells.
25. Describe the different components of the ECM and their microscopic features.
26. Briefly discuss the characteristics of special connective tissue.

#### **Embryology**

27. Discuss the derivatives of the ectodermal germ layers and their defects.
28. Discuss the derivatives of the mesodermal germ layers and their defects.
29. Discuss the derivatives of the mesodermal germ layers and their defects.

### ***LOB covered during practical:***

30. Identify the different types of connective tissue under the microscope.

#### **Week 5**

##### ***LOBs covered during lectures:***

##### **Histology**

31. Describe the histology and function of the different layers of the heart.
32. Outline the different microscopic features of arteries and veins.
33. Identify the differences between different types of arteries (from elastic artery to arteriole) and veins (from large vein to venule).

##### **Embryology**

34. Discuss the formation of the heart tube.
35. Outline the formation of aorticopulmonary and the atrial septa.
36. Outline the formation of atrioventricular and interventricular septa.
37. Outline examples of clinical correlations of heart development.

##### ***LOB covered during practical:***

38. Distinguish between artery and vein in a tissue microscopic specimen,
39. Identify heart tissue in a microscopy specimen.

#### **Week 6**

##### ***LOBs covered during lectures:***

##### **Histology**

40. Describe the histology of the conducting portion of respiratory system (nasal cavity, pharynx, larynx, trachea, bronchi).
41. Discuss the histology of the respiratory portion of the system (intrapulmonary bronchial tree, bronchioles, and alveoli).

##### **Embryology**

42. Describe the formation of the gut tube, the body cavity and the thoracic cavity.
43. Describe the formation of upper and lower respiratory system.
44. Clinical correlations of respiratory development

##### ***LOB covered during lab practical:***

45. Distinguish between the trachea, bronchi and bronchiole in a microscopic specimen.

#### **Midterm exam**

#### **Week 7**

##### ***LOBs covered during lectures:***

##### **Histology**

46. Describe the general histological features of the tongue, and the salivary glands.
47. Describe the general histological morphology of the teeth.
48. Outline the different histological features of the upper GI tract (oesophagus and stomach) and describe the function of the accessory cells.
49. Outline the different histological features of the lower GI tract (small and large intestine, rectum) and describe the function of the accessory cells.

### Embryology

50. Outline the derivatives of the foregut, midgut and hindgut.
51. Discuss the formation of the mesenteries and the anal canal.
52. Discuss birth defects of gastrointestinal development.

#### ***LOB covered during lab practical:***

53. Identify the histological features of tongue, glands, oesophagus, stomach, small and large intestine tissue by microscopic examination.

### Week 8

#### ***LOBs covered during lectures:***

#### Histology

54. Explain the two models that describe the structure of the liver with regards to functional units (lobule vs acinus).
55. Describe the zonal distribution of hepatocytes and its functional significance.
56. Outline the major morphological features of the gallbladder and pancreas.

#### Embryology

57. Discuss the development of foetus.
58. Outline the structure of the placenta and its components (decidua basalis and villous chorion).
59. Outline structure of the umbilical cord, and amniotic fluid.
60. Discuss birth defects related to placenta and cord development.

#### ***LOB covered during lab practical:***

61. Identify the microscopic architecture of the liver based on the lobular and acinus model.
62. Identify the histological features of the gallbladder and the pancreas.

### Week 9

#### ***LOBs covered during lectures:***

#### Histology

63. Describe the major histological features of the pituitary gland, hypothalamus and pineal gland.
64. Outline the three classes of hormones secreted by the endocrine system.
65. Describe the general mechanism of hormone secretion regulation.

#### Embryology

66. Outline changes at the end of pregnancy, and time of birth.
67. Describe birth defects and prenatal diagnosis.

#### ***LOB covered during lab practical:***

68. Differentiate between principal cells and oxyphil cells in the parathyroid gland.

## Week 10

### **LOBs covered during lectures:**

#### Histology

69. Describe the major histological features and general function of the thyroid gland.
70. Describe the histology and function of the parathyroid gland.
71. Describe the major histological features and general function of adrenal glands.

#### Embryology

Revision

### **LOB covered during lab practical:**

72. Distinguish between the zona glomerulosa, zona fasciculata, zona reticularis and medulla of the adrenal gland.
73. Identify the histological features of thyroid and parathyroid glands.

## Week 11

### **LOBs covered during lectures:**

#### Histology

74. Outline the different cell types found in the blood and describe their morphological features.
75. List the different stages of haemopoiesis.
76. Describe the histological features of the lymphatic vessels.
77. Describe the histological features of the spleen, thymus and lymph node.

#### Embryology

Revision

### **LOB covered during lab practical:**

78. Identify the major types of cells in a blood smear.
79. Identify the structure of spleen, thymus and lymph nodes in a microscopic specimen.

## Week 12

#### Histology

Revision

### **Course Contents:**

#### Histology

- Introduction to Histology
- Human Cells: Histological features of organelles and cellular processes.
- Tissues: Concepts and Classification
  - Epithelial Cells and Glands
  - Connective Tissue and ECM I & II
- Cardiovascular System
- Respiratory System
- Gastrointestinal System

- Digestive System I (Tongue, teeth and salivary glands)
- Digestive System II (Oesophagus, Stomach, Small Intestine, Large Intestine and Rectum)
- Digestive System III ( Liver, Gallbladder and Pancreas)
- Endocrine System
  - Overview of the Endocrine System: Pituitary Gland/ Hypothalamus/ Pineal Gland
  - Thyroid, Parathyroid Gland and Adrenal Gland
- Haemopoietin and Lymphoreticular System
  - Blood
  - Lymphatic System

### Embryology

- Introduction to embryology and first week of development
- Second week of development: bilaminar germ disc
- Third week of development: trilaminar germ disc
- The embryonic period: the three germ layers
- Heart development
- The gut tube and the body cavities
- Respiratory development
- Gastrointestinal development.
- Foetus and Placenta
- Birth defects and prenatal diagnosis.

### Learning Activities and Teaching Methods:

Lectures, Laboratory Practical Sessions.

### Assessment Methods:

Laboratory report (10%), Midterm Exam (30%), and Final Exam (60%). Assessment is by Single Best Answers (SBAs) and Short Answer Questions (SAQs).

### Required Textbooks/Reading:

Authors	Title	Edition	Publisher	Year	ISBN
Wojciech Pawlina, Michael H. Ross	Histology: A Text and Atlas with correlated cell and molecular biology	7 <sup>th</sup> Edition	Wolters Kluwer/ Lippincott Williams & Wilkins	2015 INT'L Ed	9781469889313
Sadler, Thomas	Langman's Medical Embryology	12 <sup>th</sup> Edition	Wolters Kluwer/ Lippincott Williams & Wilkins	2016	978-1451113426

### Recommended Textbooks/Reading:

Authors	Title	Edition	Publisher	Year	ISBN
Young, Barbara	Wheater's functional histology: a text and colour atlas	6 <sup>th</sup> Edition	Churchill Livingstone/Elsevier	2013	9780702047473

Kierszenbaum Abraham	Histology and Cell Biology: An Introduction to Pathology	4 <sup>th</sup> Edition new	Elsevier/Sanders	2015	978-0323313308
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