

# University of Salahaddin

# College of Education

# Department of Biology

**Subject: Histology (Theoretical)**

**Course Book – 2nd year Code:EdB0201**

**Lecturer's name: Dr. Sarwar Nawzad Jafar**

**Academic Year: 2023/2024**

**Course Book**

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| **1. Course name** | **Histology and Embryology EdB0201** |
| **2. Lecturer in charge** | **Sarwar Nawzad Jafar**  |
| **3. Department/ College** | **Dept. of Biology / College of Education** |
| **4. Contact** | **e-mail:** **sarwar.jaaffar@su.edu.krd** |
| **5. Time (in hours) per week** |  |
| **6. Office hours** |  |
| **7. Course code** | **EdB0201** |
| **8. Teacher's academic profile** |  I finished High school in 2001 and attended to College of Education, Biology Department/Salahaddin University /Erbil from 2001-2005, I was among the top 10 students in Biology class and college level with a grade of 80.396.In April 2007 started working as an official employee in the Biology department as an assistant biologist my role was to assist the head of the biology department helping lecturers in biology laboratories and teaching students the practical parts. I got my master’s degree and animal physiology in 2012 with a grade of 83. Then I got my PhD in animal physiology in June 2020.My academic title is Lecturer now, and I have taught various courses during my career as a lecturer, including Animal Physiology, Anatomy and Physiology, Histology, and Ecostatistics. |
| **9. Keywords** |  |
| 1. **Course overview:**

Each lecturer utilizes a histological structural biological approach, emphasizing the specialized properties and activities of the basic tissue components as the key to understanding the functions of each organ, structure, and functions of these organs at the cellular level as understanding basic histological techniques such as specimen preparation and microscopy ability to differentiate between routine H & E & other special.As well as offers a comparative survey of the structure and functioning of the chordates with emphasis on the vertebrates as well as includes a laboratory and microscopic study of the anatomy of selected vertebrates. Also provides an introduction to animal development through the study of reproduction, early embryology, Histogenesis, organogenesis, and morphogenesis. The roles of determination, differentiation, growth, morphogenesis, and pattern formation will be emphasized to know both the traditional taxonomy & and major clades to which the embryos belong.In the lab sections the students should be able to:* 1. Proper handling of the light microscope (& and other special techniques) & and use it to study cell and tissue
	2. Microscopic Identification of various types of normal cells
	3. Microscopic Identification of the histology of various types of normal body organ systems
	4. Understanding the structure, organization, and function of different organ systems in the body
	5. Ability to differentiate between routine H & E and other special Stains
	6. Be able to identify the following in embryo:
		1. Relative amount of yolk in eggs: Microlecithal, Mesolecithal, Macrolecithal
		2. Cleavage patterns: holoblastic, meroblastic & discoidal.

Identify these developmental stages and associated structures in embryonic frog development. |
| 1. Course objective:

A- This section meets the following programmatic goals for the B.S. Biology degree program:* + To give general histological principles through the study of the structure and function of each type of tissue.
	+ Proper Handling the light microscope (and other special techniques) and use it to study cell tissue
	+ Microscopic Identification of various types of normal cells
	+ Microscopic Identification of the histology of various types of normal body organ systems
	+ Understanding the structure, organization, and function of different organ systems in the body
	+ To show how the tissue is sectioned and examined under microscopy.
	+ To provide required knowledge of animal biology systems and organismal levels.
	+ Be able to identify the following in embryo:
	+ Relative amount of yolk in eggs: Microlecithal, Mesolecithal, Macrolecithal
	+ Cleavage patterns: holoblastic, meroblastic, and discoidal.
	+ Identify these developmental stages and associated structures in embryonic frog development.

At the end, the students should be able to:* + Critical Thinking:
	+ Differentiate between disease and normal cell Content:
		1. Identify the primary cell types of each organ in the human body at the light and electron microscopic levels
		2. Identify the primary stains used in identifying normal and diseased cells and describe the chemistry of the staining process. Identify and describe the function of all major cellular organelles.
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| 1-Know both the traditional taxonomy & and major clades to which the embryos belong.a. Know at least 1 shared derived trait that can “deﬁne” each clade.1. Be able to identify the following in an embryo:
	1. Relative amount of yolk in eggs: microlecithal, mesolecithal, macrolecithal
	2. Cleavage patterns: holoblastic, meroblastic & discoidal.
	3. Identify these developmental stages & and associated structures in embryonic frog development:
2. Fertilized egg or zygote: animal & and vegetal pole
3. Blastula (blastocoel, micromeres & macromeres)
4. Gastrula (blastocoel, archenteron, notochord, yolk plug, blastopore, anterior vs posterior regions)
5. Neurula (neural plate & neural folds, anterior vs posterior regions)
6. In the chick find these homologous structures to the blastopore: Hensen’s node & primitive streak.
7. Primary germ layers (ectoderm, mesoderm or endoderm) & examples of adult tissues each may form.

i. Identify the 3 major types of mesoderm: epimere (somites), mesomere (intermediate) & hypomere (lateral plate mesoderm). Give an example of an adult tissue that is derived from each type.1. Identify these structures or organs in both frog & chick embryos, as noted: eye, lens, otic capsule, notochord, somites, neural tube or neural folds, brain, pharyngeal arches and heart.
2. Identify these additional organs in the tadpole (they remain small or difficult to see in early chick stages): liver,kidney, and gut or intestine.
3. Compare the amphioxus specimens to the frog & chick embryos.
4. Leads students toward understanding of the male and female reproductive system. To identified gametes production and fertilization.
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| 1. **Student's obligation**

Success in histology and embryology depends on the student's understanding of the objectives. These are:* + To learn the microscopic anatomy of the tissues and organs of the human body.
	+ **To** learn histological terms and concepts for identification and precise communication.
	+ To develop a systematic thinking process as a means to identify histological preparations correctly.
	+ To understand the relationship between microscopic structure and function.
	+ To understand the preparative procedures used in histology and how they affect the visual image.

By methodically reviewing images in this database they will learn to identify cells, tissues, organs, and parts of organs correctly. So learn to do this, not by memorizing the images, but rather, by learning how morphological features relate to function and by understanding which features are most diagnostic of organ systems and organs of the systems. In medicine, physiology, and Biochemistry as in histology, this intellectual process involves art as well as science. The art lies in knowing which questions to ask, and in what order, in our systematic process of elimination.1. The students are required to do closed-book exam at the middle and end of the semester. As well as required to do report on different types of tissues and structural systems, in addition to doing weekly homework.
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| **14. Assessment scheme**The students are required to do close book exams mid and final of the semester. As well as required to report on different types of tissues and structural systems.In general:The students are required to do two closed book exams two times during the academic year besides the laboratory assignment;theoretical exams & quizzes: 15% Laboratory exams & quizzes: 35% Final Exam: 50% |
| 1. **Student learning outcome:**

A-Each course consists of almost 11-12 lectures and 3h practicals directly related to the lectured material and designed to develop student’s practical scientific skills. After completing the course students should be familiar with the basic animal type of tissues and its relation to body systems. I believe that good lecturing must have some entertainment value to keep students awake and interested. To be sure, organization and clarity of presentation are very important, but the delivery needs to be such that students look forward to learning. I try to accomplish this with frequent changes of pace, anecdotes, direct class participation and by conveying my true passion for my work which is relate to function and by understanding which features are most diagnostic of organ systems and organs of the systems. In medicine, physiology, Biochemistry as in histology, this intellectual process involves art as well as science. The art lies in knowing which questions to ask, and in what order, in our systematic process of elimination.The students should be able to:* 1. Anatomical and histological descriptions of the reproductive system.
	2. Describe different types of fertilization.
	3. Differentiate among different type cleavages.
	4. Understanding Gametogenesis.

Compare the amphioxus specimens to the frog & chick embryos. |
| 1. **Course Reading List and References:**
	1. **Leslie P. Gartner & Janes L. Hiatt (2014). Color Atlas and Text of Histology 6th Edition.**
	2. **Junqueira,L.C. & Carneiro. J. (2013). Basic Histology: Text&Atlas.13th Edition.**
	3. **William J. Krause (2005). Krause’s Essential Human Histology for Medical Students 3rd Edition**
	4. **Kuehnel (2004). Color Atlas of Cytology, Histology, and Microscopic Anatomy 4th Editio**
	5. **Photographic Atlas of Histology, Michael J. Leboffe.William, A.; Beresford, M.A., D. Phil ©Professor of Anatomy Department, WestginiaUniversity, Morgantown, USA.**

**7).Junqueira,L.C. & Carneiro. J. (2005). Basic Histology: Text&Atlas.11ed.** |
|  | **Course programmed: Subject will be programmed on Sunday from 8:30 -10:30 and 10:30 - 12:30 A.M.** | **Lecturer** |
| No. | **Subject** | **Dr Sarwar N Jafar (2 hrs)** |
| 1. | Introduction to Histology, Tissue processing  |  |
| 2. | Cellular attachments |
| 3. | Simple Epithelia & Stratified Epithelia |
| 4. | Glandular epithelia |
| 5. | Connective Tissue I C.T. Proper and Types |
| 6. | Connective Tissue II - Cartilage and Bone |
| 7. | Connective tissue III - Blood and Bone Marrow |
| 8. | Muscle Tissue Skeletal , Cardiac, and Smooth |
| 9. | Nerve Tissue : Brain parts, Neurons, Neuroglia |
| 10. | Integument (skin) system : thick &thin skin |
| 11. | Circulatory System. |
| 12. | Digestive System I - Oral Cavity , II - Tract |
| 13. | Digestive System II - Tract &Glands |
| 14. | Urinary System |
| 15. | Respiratory System |
| **19. Examinations:****Selective examples histology exams.****Q1- Tabulate differences between the following with drawing:****1-Merocrine & apocrine sweet gland. 2-Main differences among tonsils.****3-Gastrulation in Amphioxus & frog.****Q2-Tick (T, True) or (F, False) to the following statement and then correct the false ones: (30M) 1- Medium sized veins have the thickest layer of tunica adventitia.****2- Lymphocyte largest circulating WBC.****Q3-Fill blanks with suitable scientific words**1. **Simple squamous that lines body cavities and cover organs called while simple**

**squamous that lines the inside of blood vessels and capillaries called --.**1. **There are four zones that are identifiable in endochondral ossification ----------------------------------------------,-------------**

**------------------------------,-------------------------------------and------------------------------------------------****Q4: Deﬁne: Serosa, Brown fat****Q5-What are the types of epithelium in the following?**1. **Skin**
2. **Esophagus**
3. **Urinary bladder**

**Q3-Enumerate the functions of?**1. **Skin**
2. **Myelin**

**Q6-Draw & label pseudostratified epithelium. Q7-Choose the most appropriate:** |
| **White fat**1. **Brown fat**
2. **Red ﬁbres**
3. **Epithelium**

** Skin color is due to pigment called**1. **Hemosiderin**
2. **Lipofuscin**
3. **Melatonin**
4. **Melanin**

**Q8-Answer with true or false (there is the penalty for wrong answers)**1. **Lymphoid tissue is found in the intestinal tract**
2. **The thymus increases in size with age**
3. **The neutrophils have the highest count in human blood**
4. **Cardiac muscles have the ability for mitosis**
5. **Central nervous system includes spinal nerves & and ganglia**

**10. Mention in order the layers of the epidermis.11. Enumerate the types of hair in humans.**1. **Describe the gross appearance of different types of cartilage**
2. **Enumerate the main functions of bone.**
3. **Discuss the apical cell surface specialization.**
4. **What are the characteristic features found in human face skin?**
5. **The type of muscle in the tongue is……**
6. **The white fiber has a diameter than red fiber**
7. **The central dark line that bisects the muscle fiber (by E.M) is…………**
8. **The epithelial lining of urinary bladder is ….……………**
9. **What is lymphocyte?**
10. **What are the light & electron microscopical features of cardiac muscles?**
11. **What are the features of human hair?**
12. **What are the layers that separate air from blood in the lung?**
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| 1. **What is capillary?**
2. **Mention (in order) layers of skin from uppermost to lower most layer.**
3. **What is membrane?**
4. **Regarding connective tissue:**

 ***Define*** ***Classify*** ***Mention the types*** ***What are the functions?*** ***What are the components?***1. **How lymphatic vessels differ from blood vessels?**
2. **What are osteoblasts & osteoclasts?**
3. **Pseudostratified epithelium:**

 ***Define*** ***What are the functions?*** ***Mention the location.***1. **What is lymphocyte?**
2. **What are the light & electron microscopical features of cardiac muscles?**
3. **Define the epithelium, functions & classification. Give examples.**
4. **What are the cells found in the respiratory tract?**
5. **What are the histological differences between artery & vein?**
6. **What are the functions of bone, & how bone is formed?**
7. **What are granulocytes & a granulocytes?**
8. **Compare between different types of adult human cartilage.**
9. **What are the factors that determine human’s skin color?**
10. **: Compare between cardiac & smooth muscles in:**
	1. **T- Tubules, striation, site, neural control, response to injury**
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