الكلية	الصيدلة
القسم	العلوم المختبرية السريرية
المادة باللغة الانجليزية	Histology
المادة باللغة العربية	علم الانسجة
المرحلة الدراسية	الاولى
اسم التدريسي	م.م عذراء بشير راضي
عنوان المحاضرة باللغة الانجليزية	**Introduction of Histology**
عنوان المحاضرة باللغة العربية	مقدمة في علم الانسجة
رقم المحاضرة	الاولى
المصادر والمراجع	Junqueira's Basic Histology: Text and Atlas

محتوى المحاضر

Histology is the study of tissues at the microscopic level. It involves examining the structure, function and composition of cells, tissues, and organs under a microscope.

Histology also is essential in understanding how tissues are organized in the body and how they function. It is a key field in biology, medicine, and pathology as it helps in diagnosing diseases, understanding cellular processes and exploring how different organs work together.

Tissues

- A unity of cells with a similar structure that as a whole express a definite and unique function.

- Epithelial, connective, muscle, nervous

Organs

- A unity of tissues with a more complex set of functions, defined by the combination of structure and function of the comprising tissues

Systems of organs

- A group of organs united by similar functions.
- Cardiovascular, nervous, integumentary, musculoskeletal, respiratory, digestive, excretory, endocrine, lymphatic, reproductive
- **Introduction**
- Histological technique deals with the preparation of tissue for microscopic examination.

Specimens In Histology

- **Biopsy:** piece of tissue or organ taken from living human being.
- **Autopsy**: piece of tissue or organ taken from dead body.
- **<u>Ex: blood, CSF, ascites fluid, pleural effusion fluid.</u>**
- **How to study the specimen**
- **1. Gross:** colour, size, surface, texture, consistency.
- **2. Microscopical examination:** examine under microscope.

1. **Fixation**

This is the process by which cells and tissue are fixed in a physical and chemical state so that they will withstand subsequent treatment with various reagents with minimum loss of architecture .

This should be approximately 10-20 times the volume of the specimen. Fixative should surround the specimen on all sides.

The aim of this step are:

- To prevent autolysis.
- To preserve tissue as nearly as possible to living state.
- To prevent damage during subsequent procedures.
- To give a suitable texture.
- To prevent growth of bacteria.
- To render tissue receptive to subsequent staining.

2. **Dehydration:**
3. This process is done to pull the water from sample, and carried out by using alcohol in various dilutions(by using increasing strength of alcohol; e.g. 50%, 70%, 90% and 100%.). Acetone is another agent can be used process step is done by use :

1. Xylol: cheap, rapid and tends to harden tissue on prolong application.

2. Chloroform: makes tissue less brittle than xylol it cause shrinkage on prolong use.

4. Embedding

This is allowed to occur at melting point temperature of paraffin wax, which is 54-60oC. Volume of wax should be about 25-30 times the volume of tissues.

The samples were placed within the melted paraffin wax, using labeled

copper metal embedding model (L-shape).

Tissue impregnated with wax for **two reasons**:

1. To surround tissue with substance to support it to put on slide without injury.

2. To enable natural cavities of tissue to be filled with wax thus preserving their relationship to each other.

5. Sectioning

The block was trimmed with blades then sectioned by rotary microtome with a thickness of 5 µm, these thin sections were floated in water bath and picked up on a slide covered by very thin layer of mayer's albumin (egg albumin 50ml, glycerin 50ml and thymol).

Microtomy

Is a tool used to cut extremely thin slices of material, known as sections microtomes are used in microscopy , allowing for the preparation for observation under transmitted light or electron radiation. microtomes use steel, glass, or diamond blades depending upon the specimen being sliced and the desired thickness of the sections being cut. in a microtome
is used to cut **4-6 um-thick** tissue sections which are mounted on a glass microscope slide after drying

Drying: Put The Slide For (10-15) Min In Oven At 65C

6. Staining

Staining is a process by which we give color to a section.
There are hundreds of stains available.
The stains can be stain or special stains.
The **hematoxylin / eosin** stain is usually abbreviated as **H&E** stain and is routinely used
It gives the nucleus a blue color & the cytoplasm & the extracellular matrix a pinkish color.

Steps of Staining with Hematoxylin-Eosin (H&E)

1. **Xylene wait for 1 min to remove the substance that are not embedded in slide.**
2. **Alcohol 100% wait for 1 min.**
3. **Alcohol 90% wait for 1 min.**
4. **Alcohol 80% wait for 1 min.**
5. **Alcohol 70% wait for 1 min.**
7. **Alcohol absolute wait for 1 min.**
8. **Hematoxylin wait for 5-10 min.**
9. **Wash with tab water.**
10. **Eosin wait for 1-2 min.**

11. **Wash with tab water.**
12. **Dry by using oven.**
13. **Clear by xylene and then using Canada balsam.**