



Al-Mustaqbal University
College of Science
Forensic Evidence Department



جامعة المستقبل
AL MUSTAQBAL UNIVERSITY

كلية العلوم قسم الادلة الجنائية

Lecture (1)

عنوان المحاضرة

Introduction, Overview of Methods, Classification of Histology and Tissue Preparation

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المرحلة : الثانية

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Introduction, Overview of Methods, Classification of Histology and Tissue Preparation

Introduction to Histology

Histology is a branch of biological and medical sciences concerned with the **microscopic study of tissues**.

It focuses on understanding the **structural organization of cells within tissues** and how this structure relates to their function.

Histology serves as a fundamental science that bridges **cell biology** and **gross anatomy**, and it plays a crucial role in understanding normal body structure as well as disease processes.

Four types of tissue



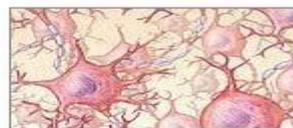
Connective tissue



Epithelial tissue



Muscle tissue



Nervous tissue

ADAM.

Importance of Studying Histology

The study of histology is important because it:

- Explains the microscopic structure of tissues and organs
- Helps correlate **structure with function**
- Forms the basis for understanding pathological changes
- Assists students in recognizing normal versus abnormal tissues
- Is essential for students of medicine, dentistry, laboratory sciences, nursing, and life sciences



Definition of Tissue

A tissue is defined as a **group of similar cells**, together with their **intercellular (extracellular) material**, that work collectively to perform a **specific function** in the body.

Classification of Histology

Histology is classified into two main branches:

1. General Histology

General histology deals with the study of the **basic tissues of the body**, focusing on:

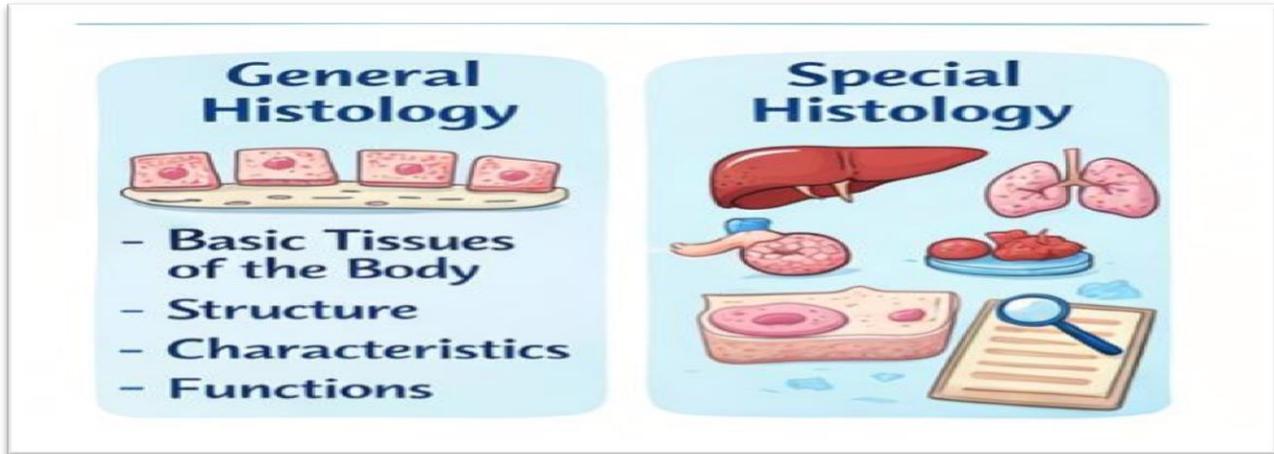
- Structure
- General characteristics
- Functions

2. Special Histology

Special histology studies the **microscopic structure of individual organs**, such as:

- Liver
- Kidney
- Heart
- Lung

It explains how different tissues are organized within each organ.

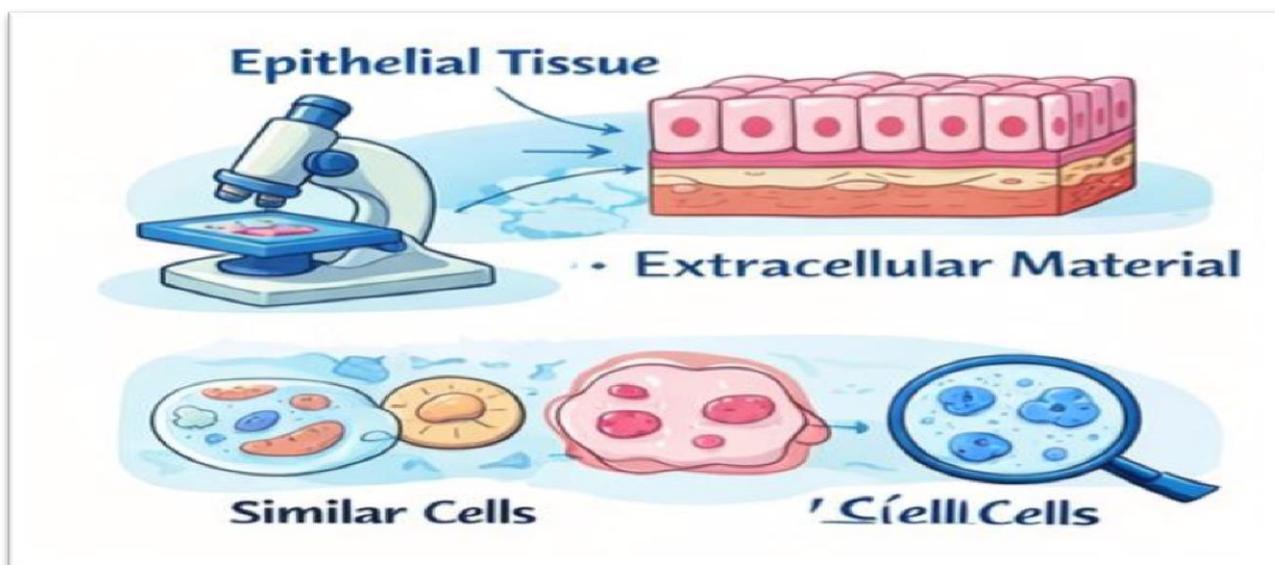


Basic Types of Tissues in the Human Body

The human body is composed of **four basic tissue types**:

1. Epithelial Tissue

- Covers body surfaces
- Lines internal organs and cavities
- Functions in protection, absorption, and secretion





2. Connective Tissue

- Supports and connects other tissues
- Includes bone, cartilage, blood, and connective tissue proper

3. Muscle Tissue

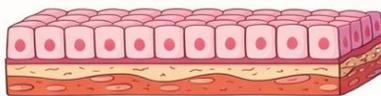
- Responsible for movement
- Characterized by its ability to contract

4. Nervous Tissue

- Responsible for communication and control
- Found in the brain, spinal cord, and nerves

Four Basic Tissue Types

Epithelial Tissue



— Covers and Lines —

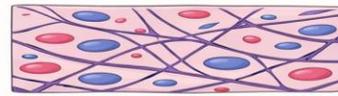


Skin



Organs

Connective Tissue



— Supports and Binds —



Bone



Blood

Muscle Tissue



— Movement and Contraction —



Muscle



Heart

Nervous Tissue



— Signals and Nerves —



Brain



Spinal Cord

Overview of Methods Used in Histology

Histological study depends on **special preparation methods** that allow tissues to be examined under the microscope.

Fresh tissues are usually:

- Soft
- Transparent
- Easily damaged



Therefore, they must be treated carefully to preserve their structure and cellular details.

Concept of Tissue Preparation

Tissue preparation refers to a **series of organized scientific steps** used to:

- Preserve tissue structure
- Prevent decomposition
- Make tissues suitable for microscopic examination

These steps are essential for accurate observation and study.

Theoretical Principles of Tissue Preparation

The preparation of tissues is based on several key principles:

- Preservation of normal cellular morphology
- Prevention of autolysis and chemical changes
- Stabilization of cellular components
- Clear visualization of microscopic details

Why Do We Need Tissue Preparation?

Tissue preparation is necessary because:

- Natural tissues are transparent and difficult to observe
- Cells rapidly deteriorate outside the body
- Preparation enhances contrast and visibility
- It allows differentiation between tissue components

Difference Between Histology and Cytology

Histology

- Study of tissues as a whole
- Focuses on tissue organization and architecture

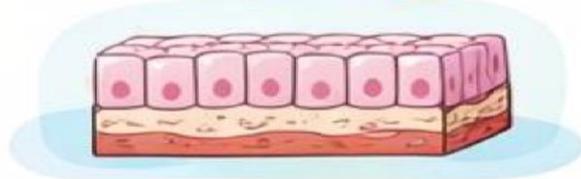


Cytology

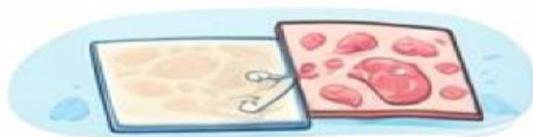
- Study of individual cells
- Concentrates on cellular structure and components

Concept of Tissue Preparation

Histology

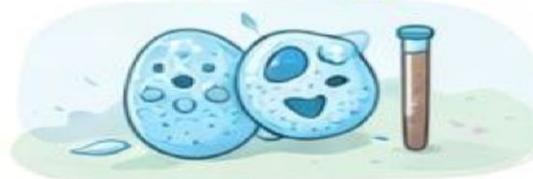


Natural Tissues
→ Hard to See



Cells Deteriorate
Quickly

Cytology



- Enhances Contrast



Differentiation
of Structures

Relationship of Histology to Other Sciences

Histology is closely related to:

- Cell Biology
- Anatomy
- Physiology
- Pathology
-

Understanding histology provides a strong foundation for these disciplines.



Summary

- Histology is a fundamental medical science
- It studies the microscopic structure of tissues
- It is classified into general and special histology
- Tissue preparation is essential for microscopic study
- Theoretical knowledge is required before practical application