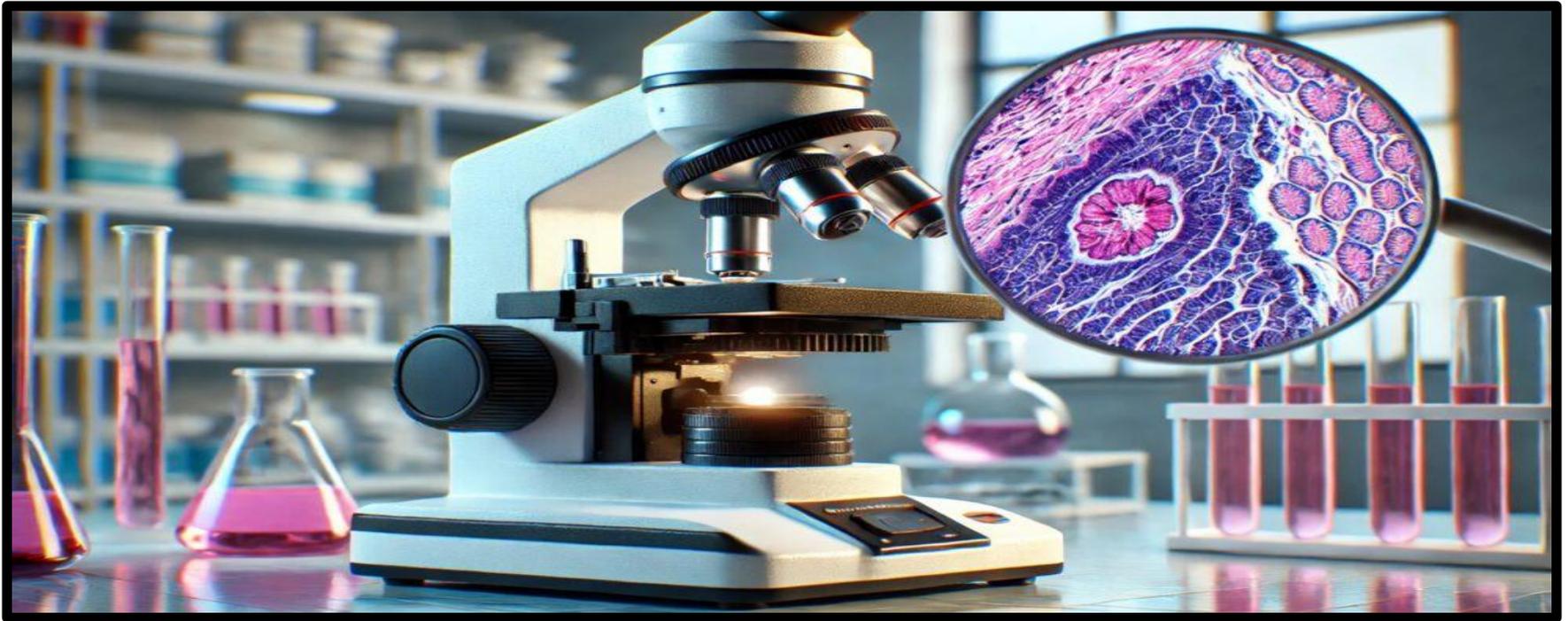


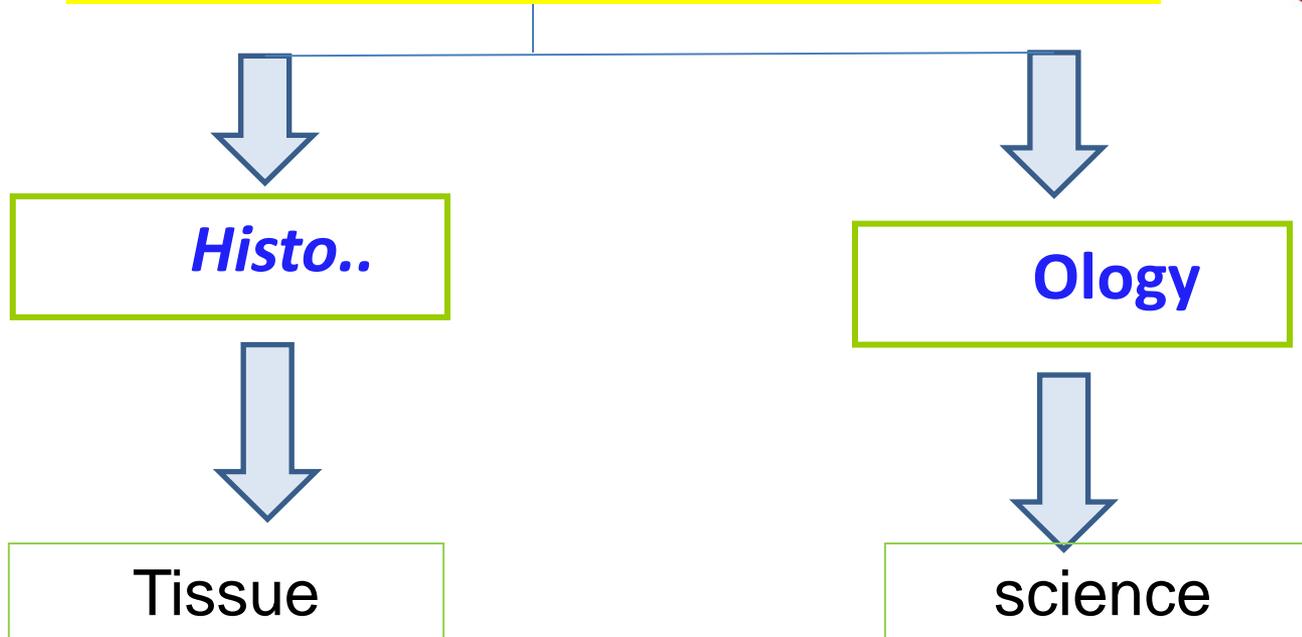
INTRODUCTION TO GENERAL HISTOLOGY



***By:* Heba Sharaf Eldin**

Associate Professor of Histology & Cell Biology

What *is* Histology

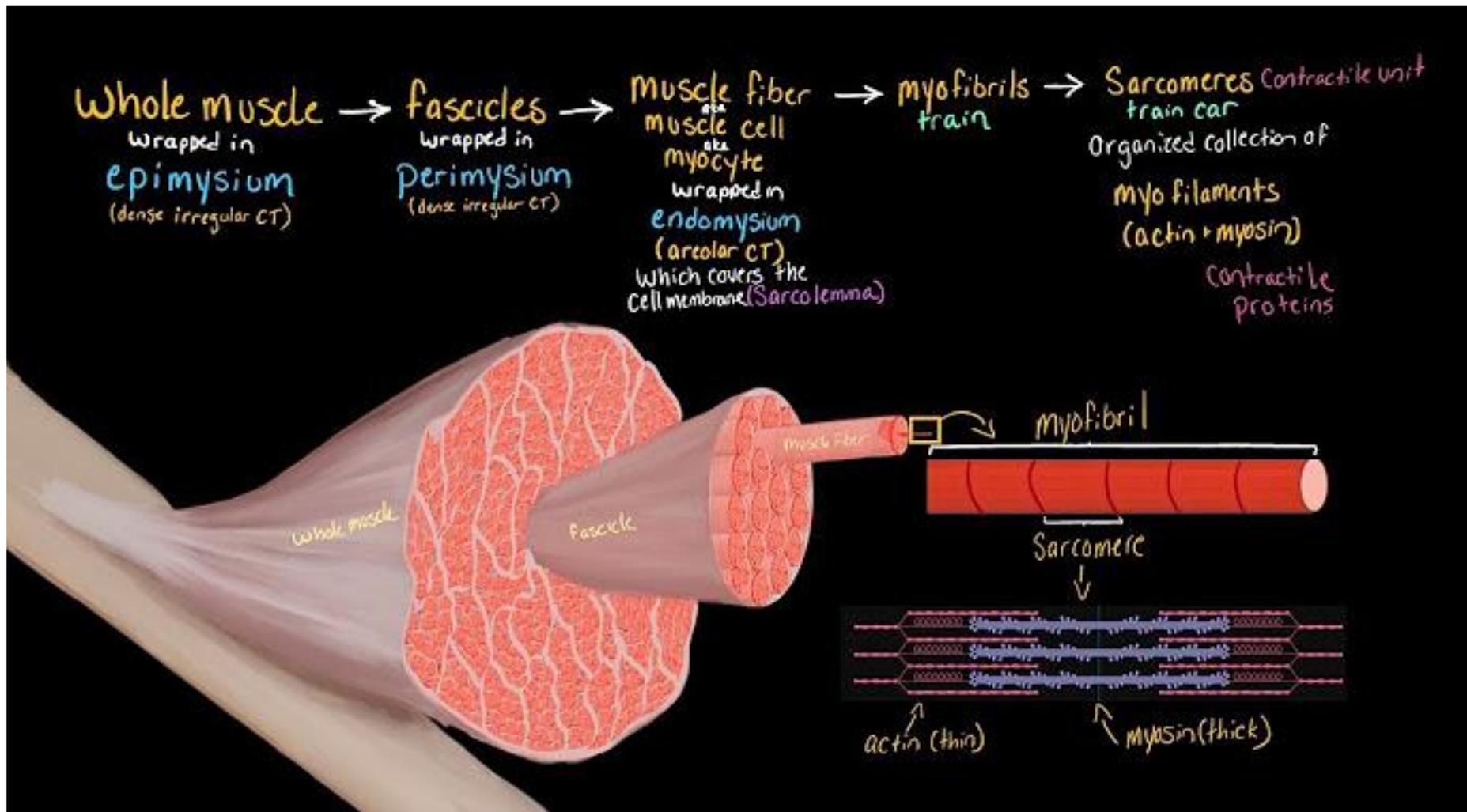


Histology is:

The study of **normal structure of the cells and tissues of the body**, and how they are arranged to constitute organs, mainly By using **microscopes**.

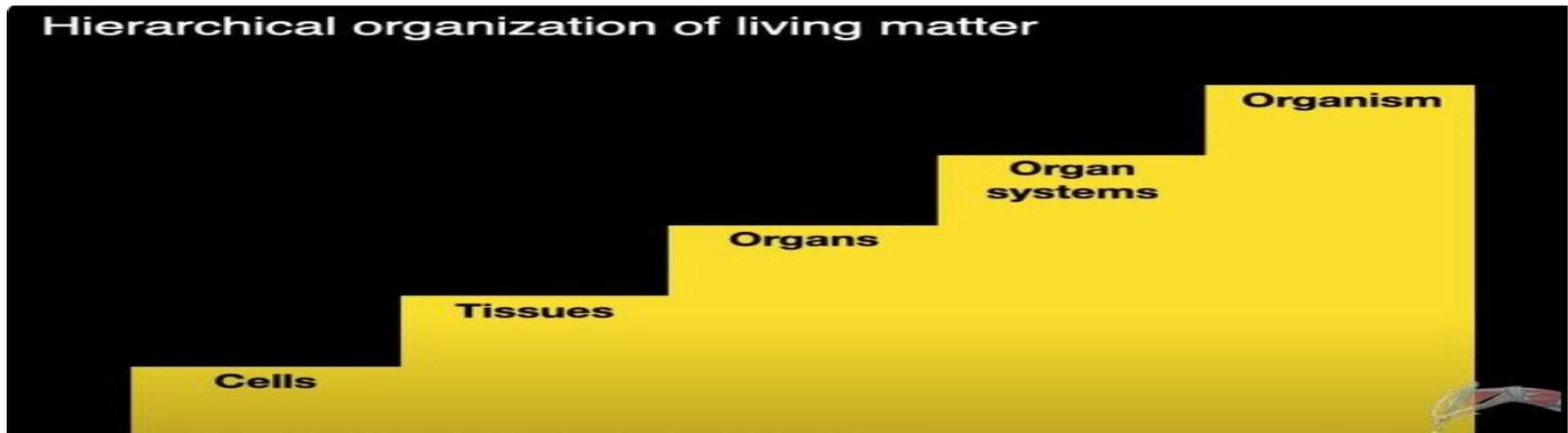
Another definition for **Histology** is:

The Study of **microscopic anatomy** (microanatomy) of biological tissues.



Hierarchical organization of the human body

- **Atoms** binds to form **molecules**.
- **Molecules** binds to form **organelles** and **cells**.
- Different types of **cells** form together different types of **tissues**.
- Different types of **tissues** together form body **organs**.
- Different related **organs** form **body systems**.
- Different **body systems** form the entire **organism**.



1-CELL: the smallest structural & functional unit in the body.

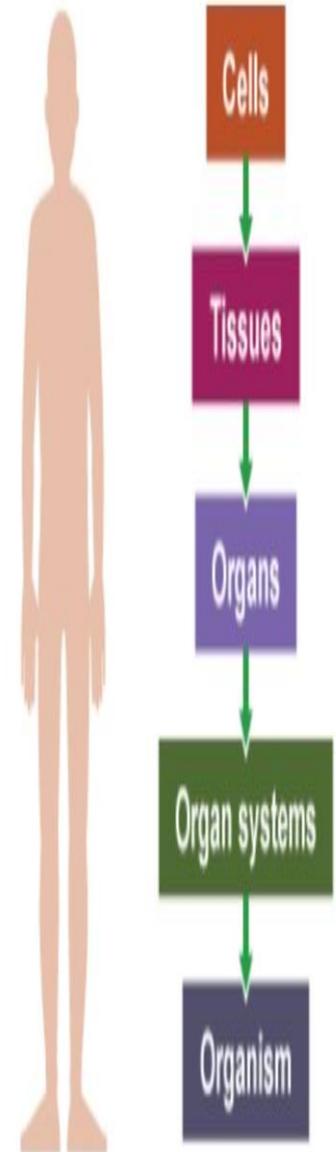
2-TISSUE: are formed of **similar cells** having the same general character and perform a particular function+ ECM.

They are 4 basic tissues:

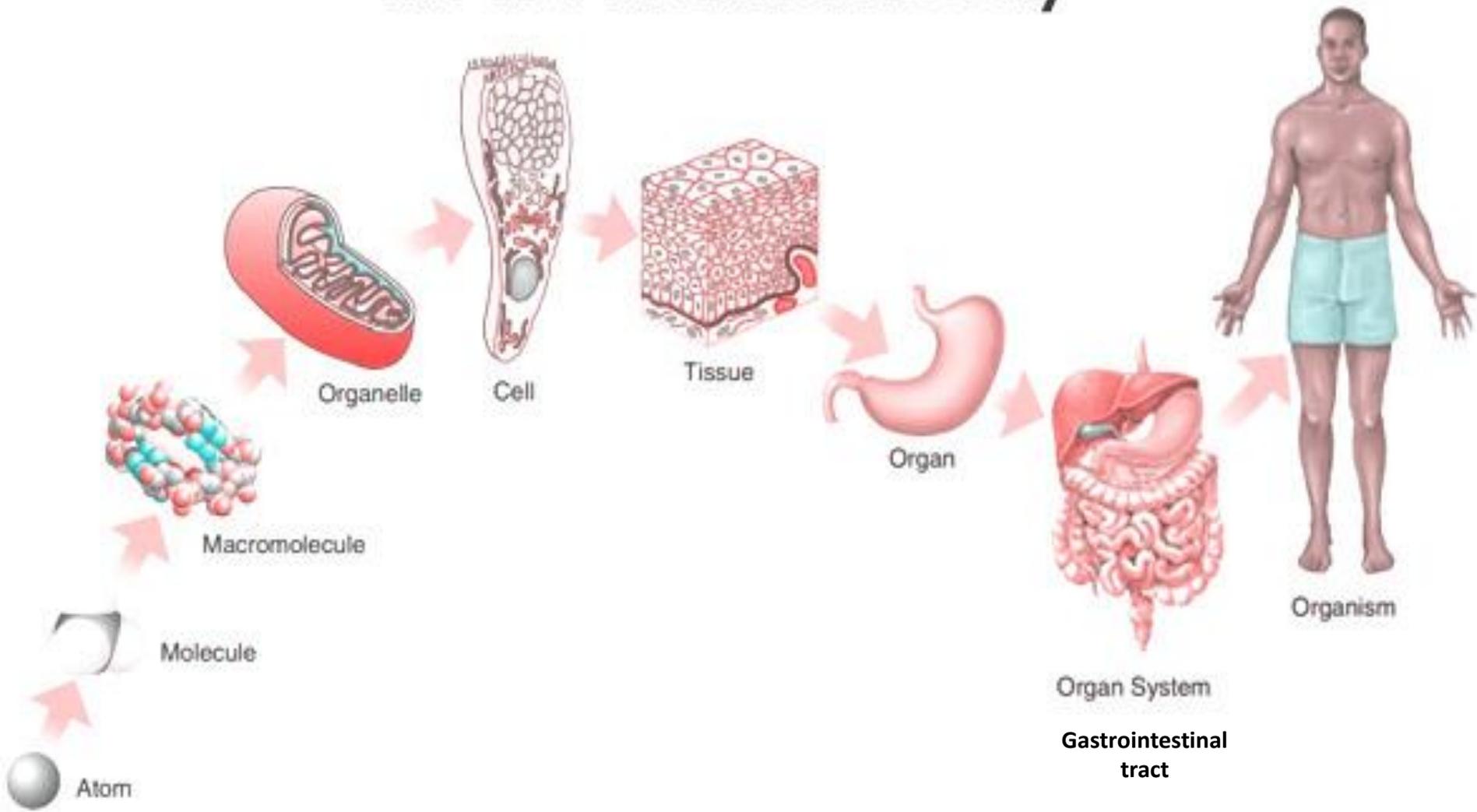
- Epithelial tissue.
- Connective tissue.
- Muscular tissue.
- Nervous tissue.

3-ORGANS : are composed of **the 4 basic tissues** in various proportions to perform special function.

4-SYSTEMS : different **related** organs together perform more complex function.



Levels of Organization in the Human Body

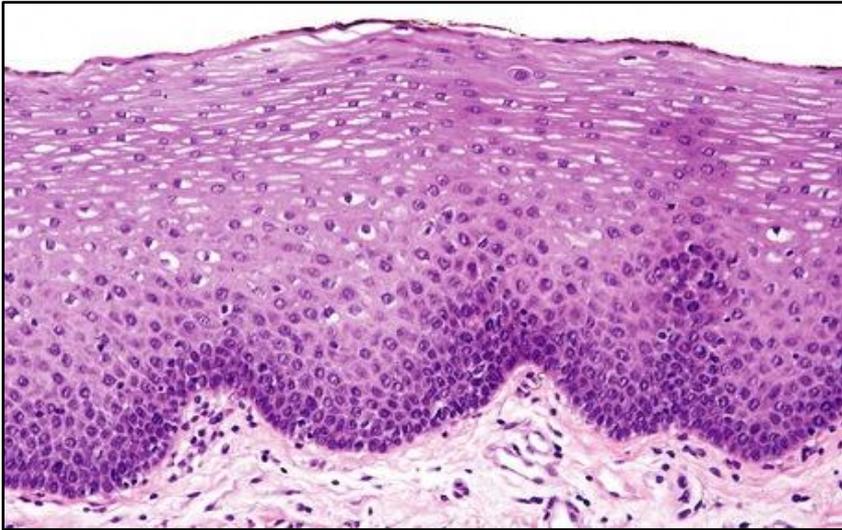


Why it *is* essential to study Histology

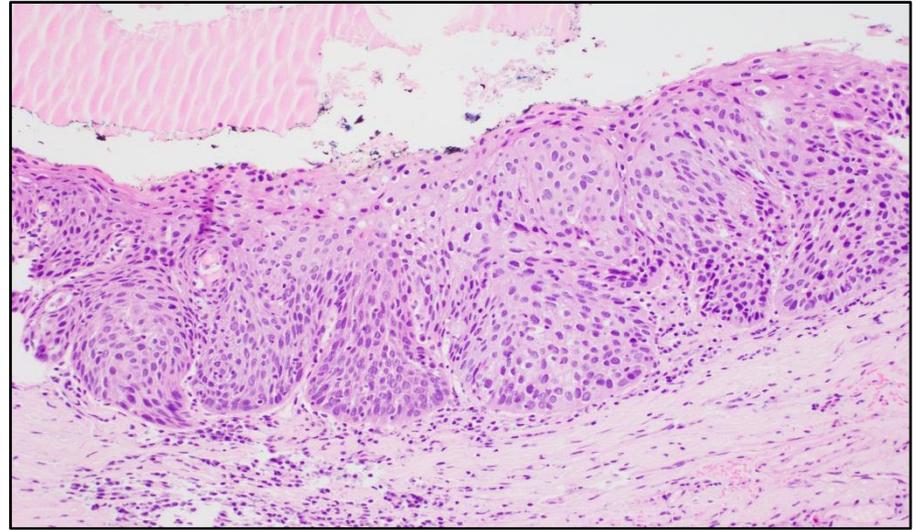


- ✓ **Histological structure** determines the **functions** of different tissues and organs.
- ✓ **Comparing** the **normal** structure of cells and tissue versus **abnormal** ones is essential for an understanding of **pathology**.
- ✓ **General histology** course gives a foundation for subsequent studies in **oral histology** and **pathology** courses.

e.g: When *diseases* such as cancer or inflammation affect a tissue, there are often *specific changes* in the microscopic structure of the tissue known as ***histopathology or pathology***.



Normal buccal mucosa



Dysplasia of the buccal mucosa

✓ Histology *involves:*

The study of the structure of different cells and tissues and their arrangement.

✓ The study of the correlation between the structure and the functions of the cells and tissues specific to each organ.

N.B:

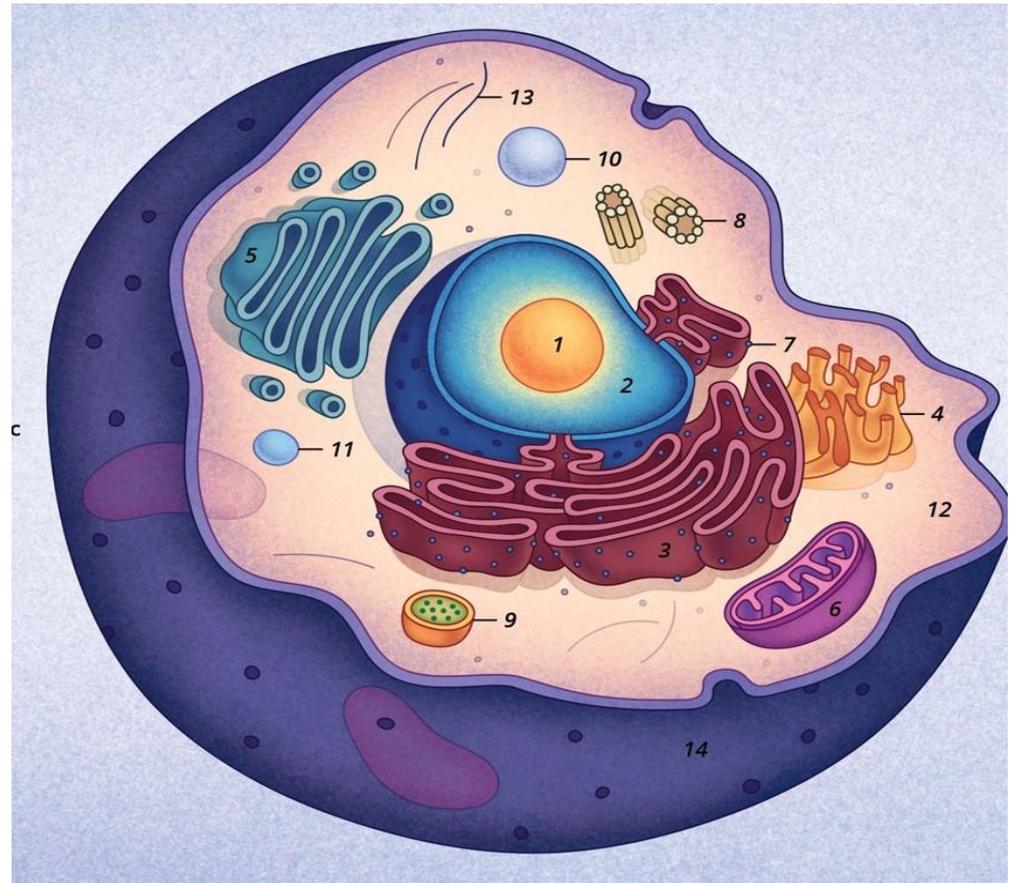
Advances in biochemistry, molecular biology, physiology, immunology, and pathology are essential for a better knowledge of tissue biology.

The cell

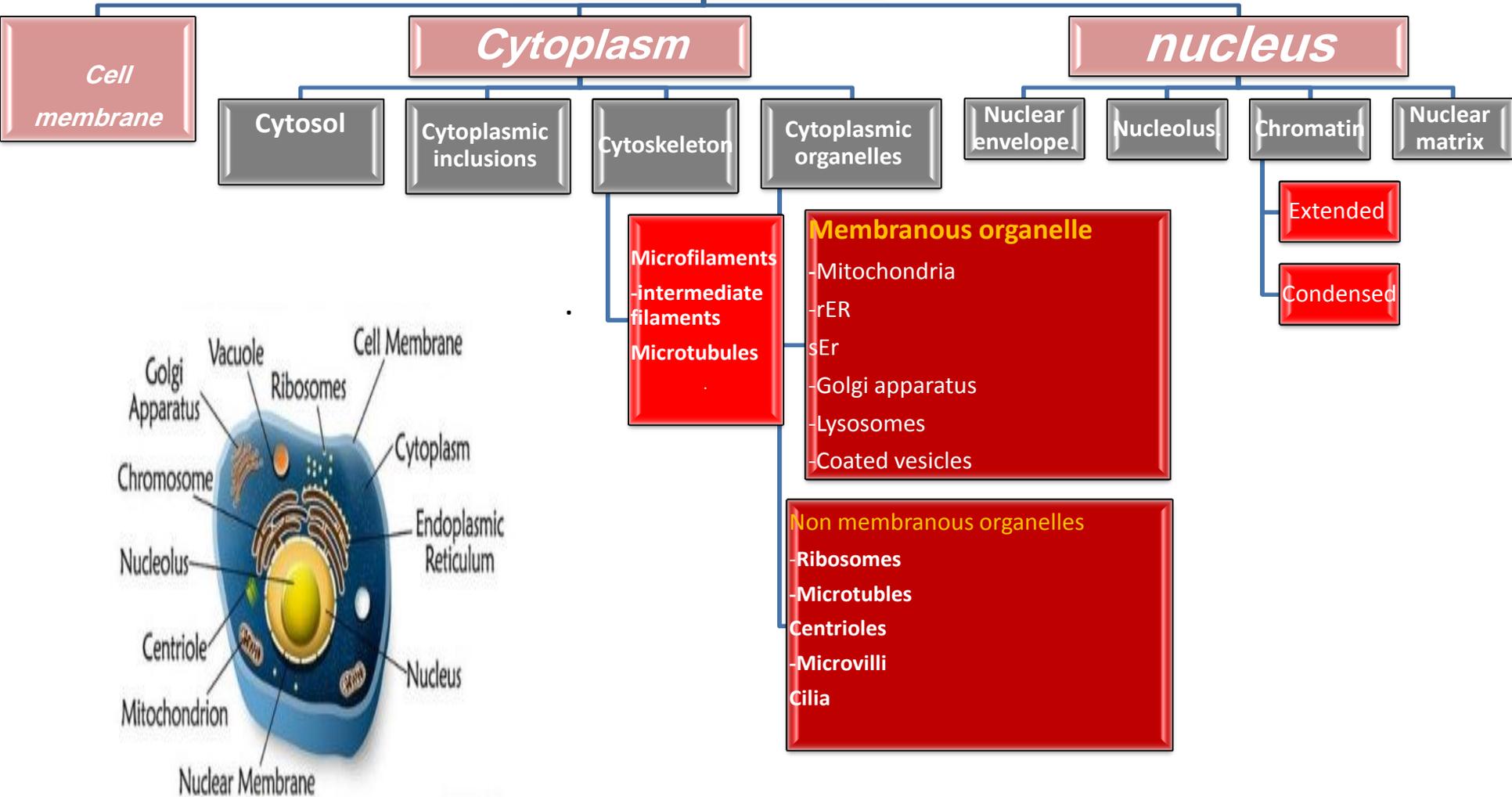
The cell is the *structural* and *functional* unit of the organism.

Refresh your information

1. Nucleolous
2. Nucleus
3. rER
4. sER
5. Golgi apparatus
6. Mitochondria
7. rER
8. Centoriole
9. Lysosome
10. Coated Vesicle
11. Transporting Vesicle
12. Cytosole
13. Filaments
14. Cell membrane



The cell



Human tissues

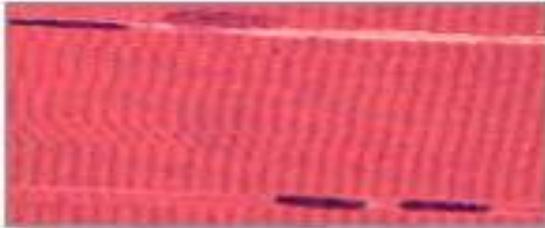
Four types of tissue



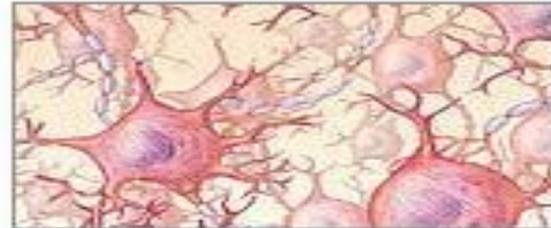
Connective tissue



Epithelial tissue



Muscle tissue



Nervous tissue

4Tissues

Cells

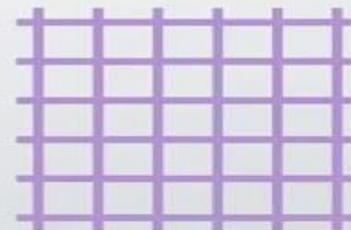
**Extra-ceullar
Matrix**

ECM consists of many kinds of
macromolecules

cells



matrix



How to study histology



By using microscopies.

As

The **small size** of **cells and matrix components** makes histology dependent on the use of microscopes and molecular methods of study.



How to study histology

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graph TD; A[How to study histology] --> B[Histological sections preparations]; A --> C[Staining]; A --> D[Examination]; B --> E[Microtechniques]; C --> F["-Haematoxylin & eosin (H & E): Routine stain"]; C --> G["-Others"]; D --> H[Microscopes];
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Histological sections preparations

Microtechniques

Staining

-Haematoxylin & eosin
(H & E): Routine stain
-Others

Examination

Microscopes

Types of microscopes

Magnification

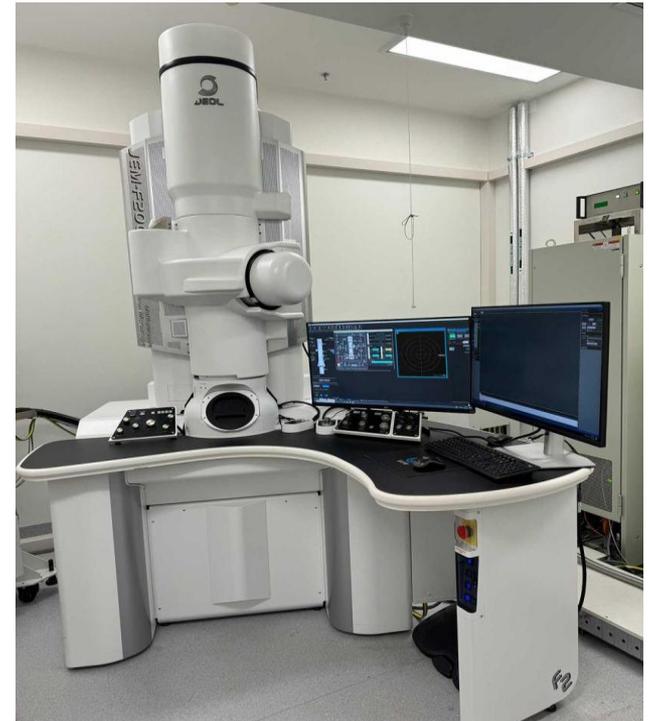
Light microscope

X Up to 1000

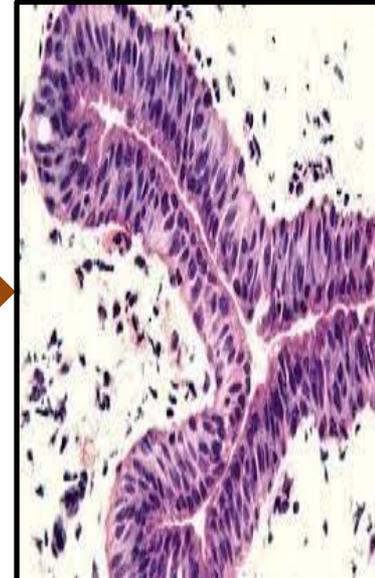


Electron microscope

Around 1,000,000



Light microscope



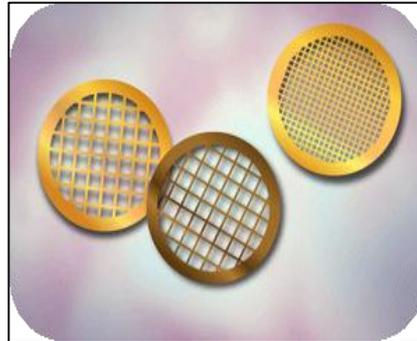
**Tissue
processing**

Staining

**Microscopic
examination**

**Photomicrograph
Acquisition**

Electron microscope

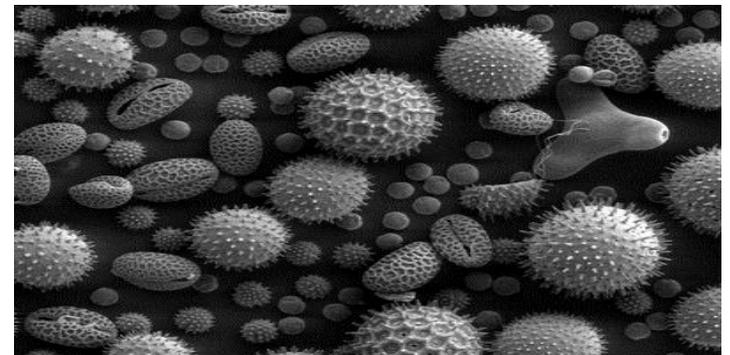


Tissue processing & staining

Microscopic examination



Transmission (TEM)



Scanning (SEM)

General Histology

Course Intended learning outcomes (CILOS)

At the end of this course You will be able to gain :

- Knowledge and understanding.
- Practical and specific skills.
- Competences.

Knowledge and understanding

- ✓ Recognize the basic methods of studying histology and know the basic steps in preparing specimens for light and electron microscopic examination.
- ✓ Describe in details the structural characteristics of the basic human tissues and relate the structure to their functions.
- ✓ Identify the structural characteristics of different human body organs and systems and relate the structure to their functions.
- ✓ List the characteristics different between tissues and organs.
- ✓ Correlate between histological structure and function of different tissues and organs.

Practical and specific skills

- ✓ Use the light microscope efficiently.
- ✓ Handling the histological slides and learn how to examine them under light microscope.
- ✓ Analyze electron photomicrographs related to the cells of different tissues and organs during practical classes.

Competences

- ✓ Apply the information described above to successfully complete the biomedical science courses that follow.
- ✓ Demonstrate the ability for doing the laboratory assignments which involves answering questions, solving problems and thinking critically to arrive at a decision.

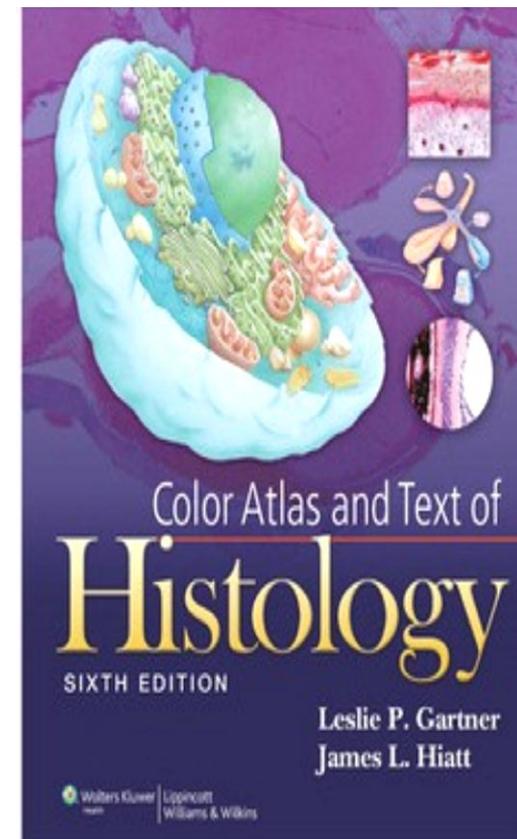
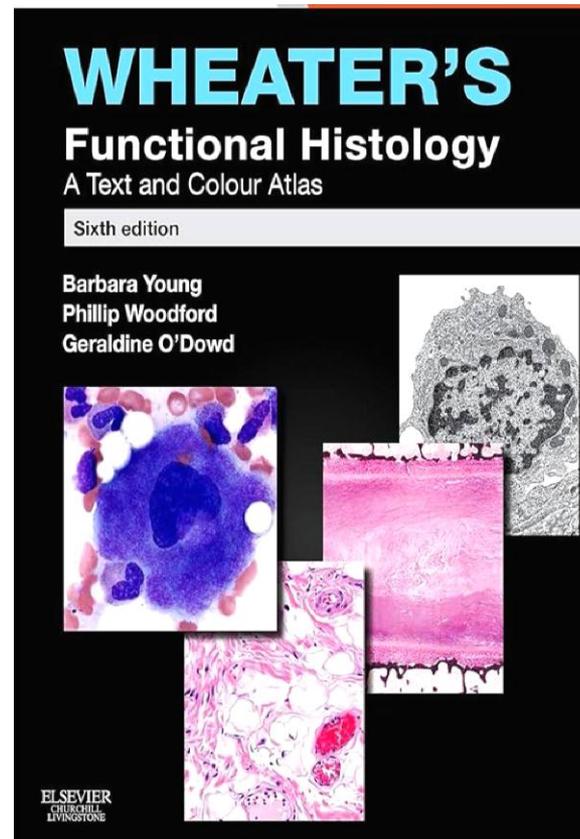
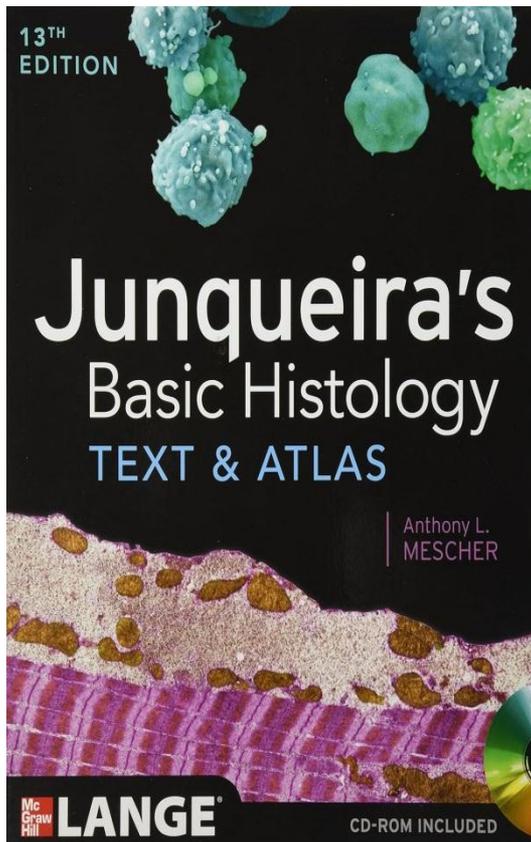
Your curriculum

Topic	Lectures	Practical
Introduction to Histology and Histological techniques	4	2
Epithelium	3	2
Connective tissue	2	2
Blood	3	2
Cartilage	1	2
Bone	3	
Muscle tissue	3	2
Nerve tissue	3	2
Cardio-vascular system	1	2
Lymphatic (immune) system	3	
Integumentary system	1	2
Introduction to Respiratory system	1	
Gastrointestinal tract	2	2
Urinary system	1	2
Endocrine system	2	
Male genital system	1	2
Female genital system	1	
Special sense	1	



References

Text books



MCQ

When a group of organs work together to perform a particular function they create a/an

- System
- Organism
- Tissue
- Tract

Which of the following is the correct order of organization in living things from least organized to most organized?

- a. Organ, cell, tissue, system
- a. System, organ, tissue, cell
- a. Cell, tissue, organ, system.
- a. Cell, organ, tissue, system

Advances in all of the following are essential for a better knowledge of tissue biology EXCPET :

- Biochemistry
- Molecular biology
- Physiology
- Radiology

Thank you

