

## Lecture 1

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# INTRODUCTION TO HISTOLOGY

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**2<sup>nd</sup> Grades**

**General Histology & Embryology Theory (DENT-297-298)**

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# Learning Outcome

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- What is Histology
- Brief History about Histology & Embryology
- Levels of organization in biology

# HISTOLOGY

- **Histology** (from the Greek words **histos** meaning “**tissue and web**” and **-logia** meaning “**science**”) is the microscopic study of the cells and tissues of plants and animals.
- **Human histology:** is the science that study the human cells and tissues.
- Histology is commonly conducted by examining cells and tissues under a **light microscope** or **electron microscope** after sectioning and staining the samples.



Lecturer: Dr. Sara B. Miran

# Brief History

- **Histology:** The study of tissues began with the invention of the microscope in the 17th century. **Marcello Malpighi** is considered a pioneer in histology. The 19th century saw significant advances with the development of cell theory and staining techniques, allowing for more detailed examination of tissues.

# Brief History

- **Embryology:** Early ideas about development date back to **Aristotle**, but significant progress was made in the 17th century with **William Harvey's** studies.
- The 19th century was marked by **Karl Ernst von Baer's** discovery of the mammalian egg and the formulation of embryonic development laws.
- The 20th century brought genetic insights, linking embryology with modern developmental biology.



# Levels of Organization in Biology

- 1. Atoms:** The basic units of matter, such as carbon, oxygen, and hydrogen.
- 2. Molecules:** Combinations of atoms, such as water (H<sub>2</sub>O), proteins, and DNA.
- 3. Cells:** The basic units of life, made up of various molecules. Cells can be specialized for different functions (e.g., muscle cells, nerve cells).
- 4. Tissues:** Groups of similar cells that work together to perform a specific function (e.g., epithelial tissue, connective tissue).




# Levels of Organization in Biology

**5. Organs:** Structures composed of different types of tissues that work together to perform specific functions (e.g., heart, lungs).





**6. Organ Systems:** Groups of organs that function together to carry out complex bodily functions (e.g., the digestive system, respiratory system).

**7. Organism:** A living individual that consists of multiple organ systems functioning together (e.g., a human, plant, or animal).

# Levels of Organization in Biology

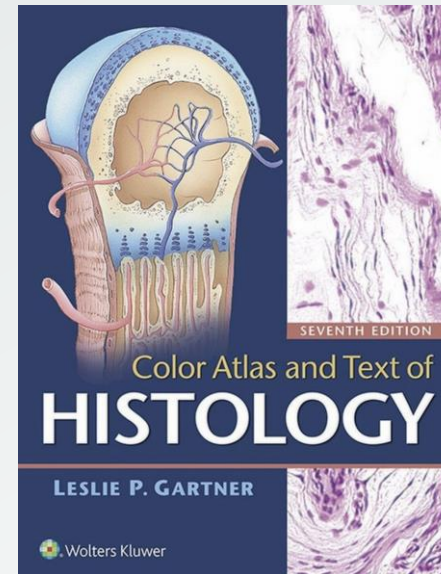
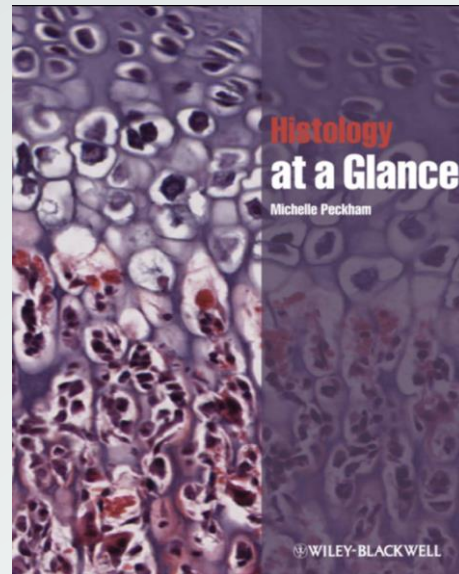
Level of Organization	Explanation	Example
 Atomic Level	Atoms are defined as the smallest unit of an element that still maintains the property of that element.	Carbon, Hydrogen, Oxygen
 Molecular Level	Atoms combine to form molecules which can have entirely different properties than the atoms they contain.	Water, DNA, Carbohydrates
 Cellular Level	Cells are the smallest unit of life. Cells are enclosed by a membrane or cell wall and in multicellular organisms often perform specific functions.	Muscle cell, Skin cell, Neuron



 Tissue Level	Tissues are groups of cells with similar functions	Muscle, Epithelial, Connective
 Organ Level	Organs are two or more types of tissues that work together to complete a specific task.	Heart, Liver, Stomach
 Organ System Level	An organ system is group of organs that carries out more generalized set of functions.	Digestive System, Circulatory System
 Organismal Level	An organism has several organ systems that function together.	Human

# REFERENCES

1. Leslie P. Gartner. Color atlas and text of histology. 7th ed. England: Wolters Kluwer; 2018.
2. Michelle Peckham. Histology at a glance. 1st ed. UK: Wiley-Blackwell; 2011.





**Any Questions or Comments?**