

SNS COLLEGE OF ALLIED HEALTH SCIENCE
Affiliated to The Tamil Nadu Dr. M.G.R Medical University, Chennai



DEPARTMENT OF PHYSICIAN ASSISTANT

COURSE NAME : ANATOMY

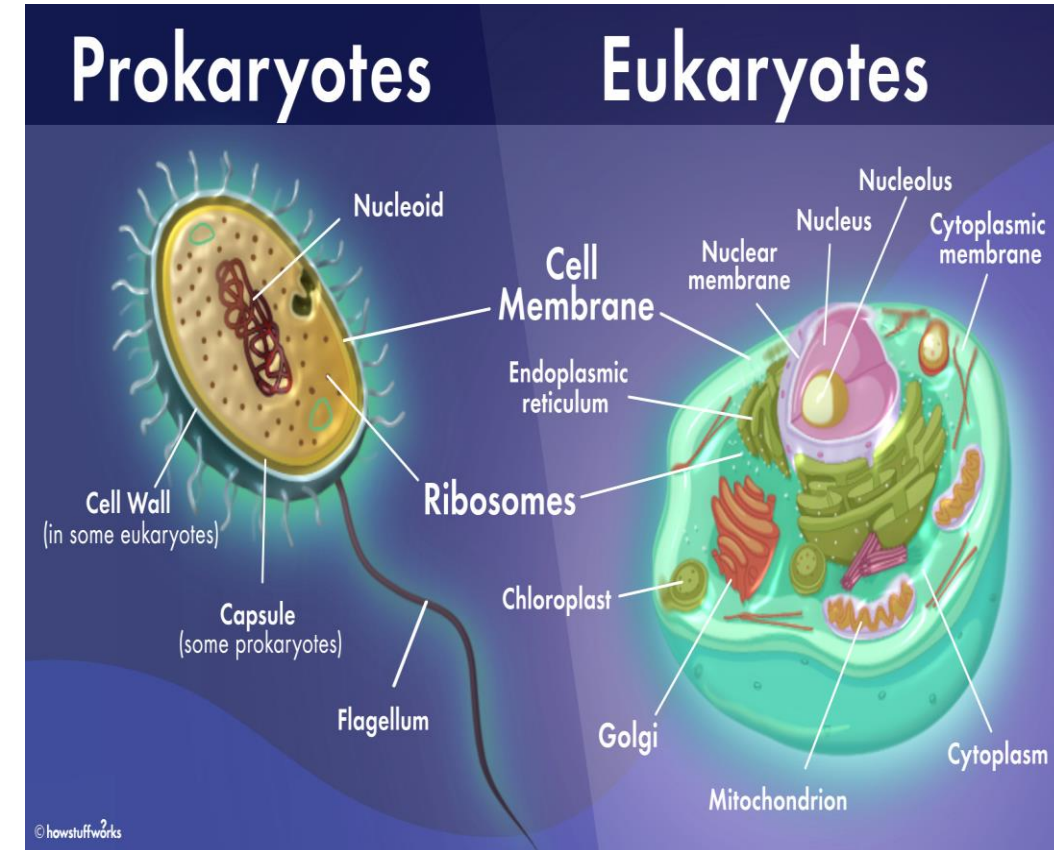
UNIT : INTRODUCTION TO HUMAN ANATOMY

TOPIC : TYPES OF CELLS AND THEIR ARRANGEMENTS

FACULTY NAME : Ms. SINEKA M

INTRODUCTION

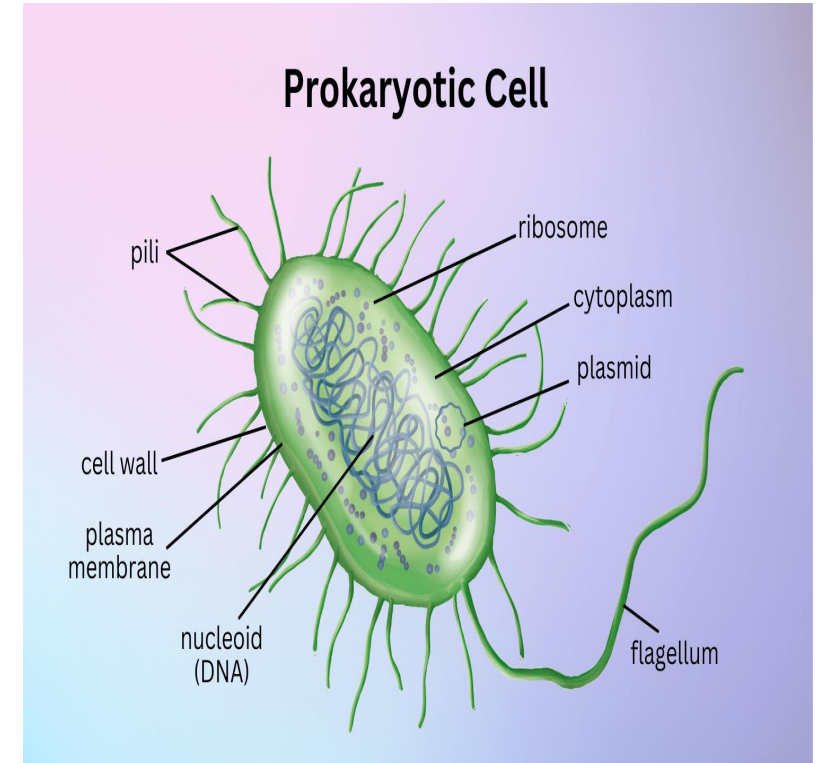
- Anatomy fundamentally categorizes cells into two major types: **prokaryotic and eukaryotic.**
- In multicellular organisms, eukaryotic cells are further specialized into distinct types that are organized into four basic tissue arrangements: **epithelial, connective, muscle, and nervous.**



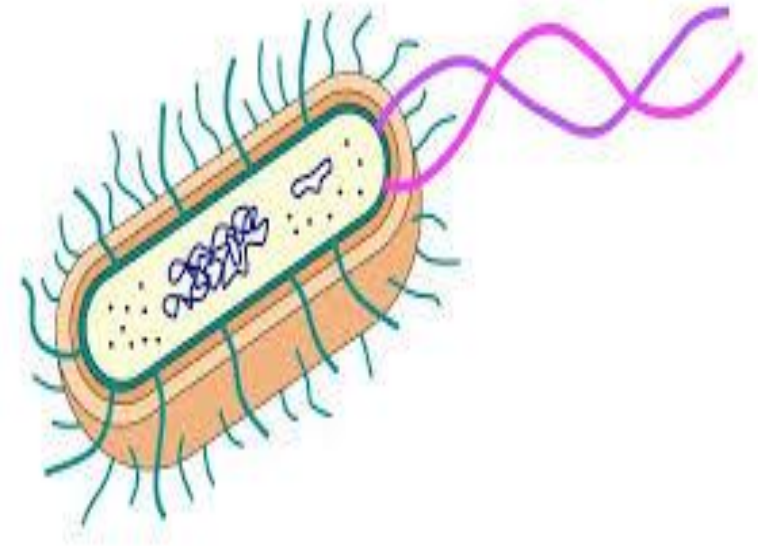
CLASSIFICATIONS OF CELLS

Prokaryotic cells

- **Simple structure:** These are the oldest and most simple types of cells, including all bacteria and archaea.
- **No nucleus:** They lack a membrane-bound nucleus and other complex, membrane-bound organelles.

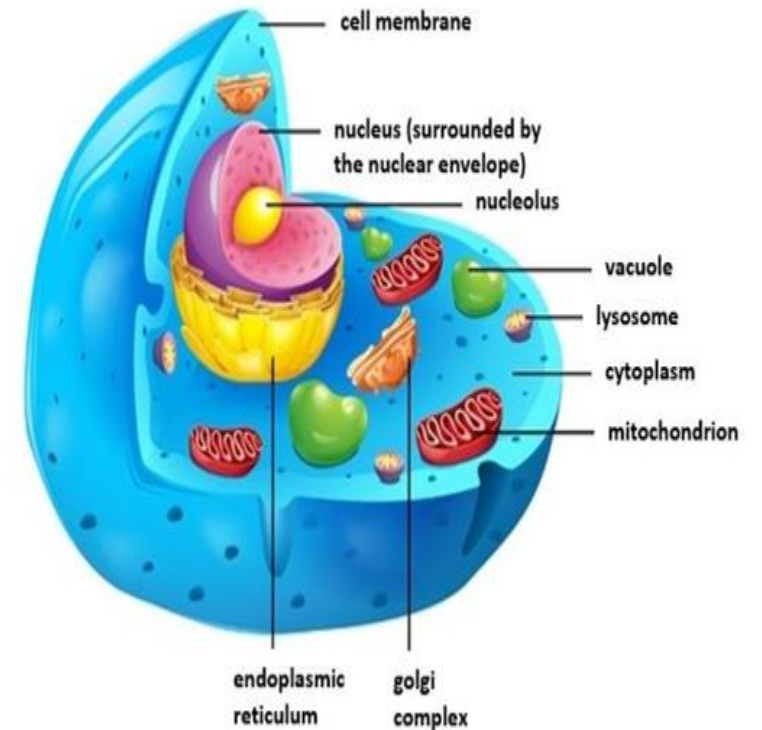


- **Genetic material:** Their DNA is typically a single circular chromosome located in a region of the cytoplasm called the nucleoid.
- **Size:** They are significantly smaller than eukaryotic cells, typically 0.2–2.0 micrometers in diameter.

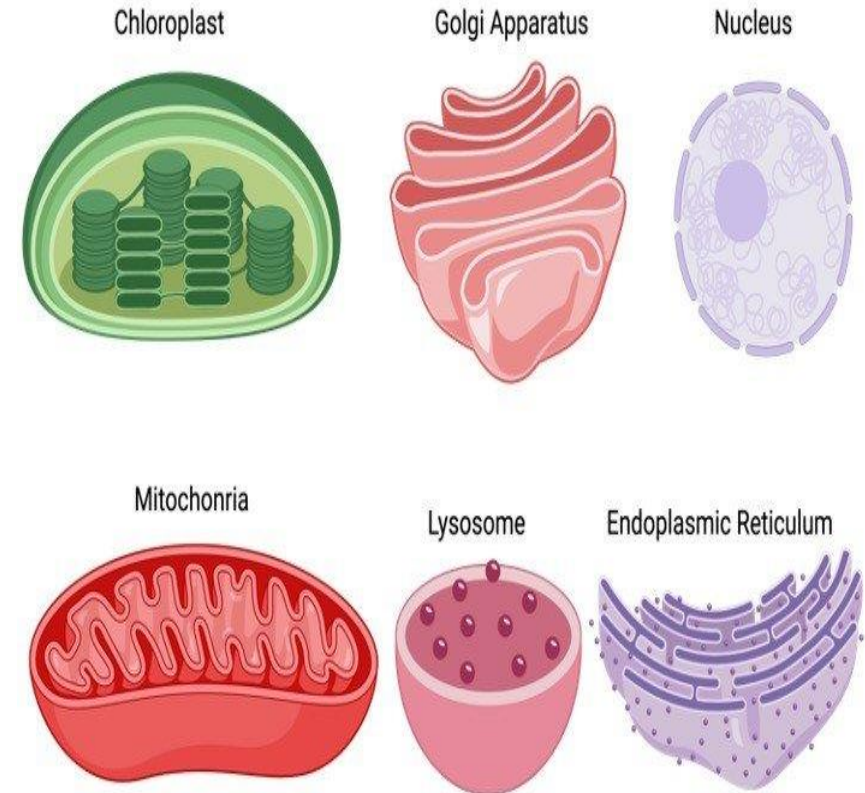


Eukaryotic cells

- **Complex structure:** These cells are larger and more complex, with a wide range of membrane-bound organelles.
- **True nucleus:** A primary feature is the presence of a true nucleus, which houses the cell's DNA.

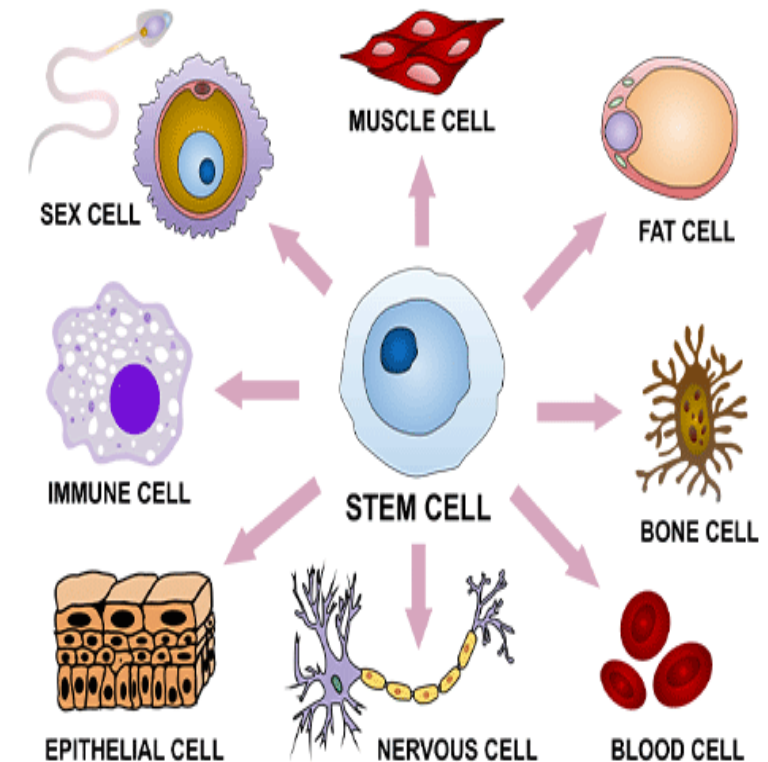


- **Organelles:** They contain specialized compartments called organelles that perform distinct functions, such as mitochondria for energy production and the endoplasmic reticulum for molecule synthesis and transport.
- **Examples:** Eukaryotic cells make up all animals, plants, fungi, and protists.

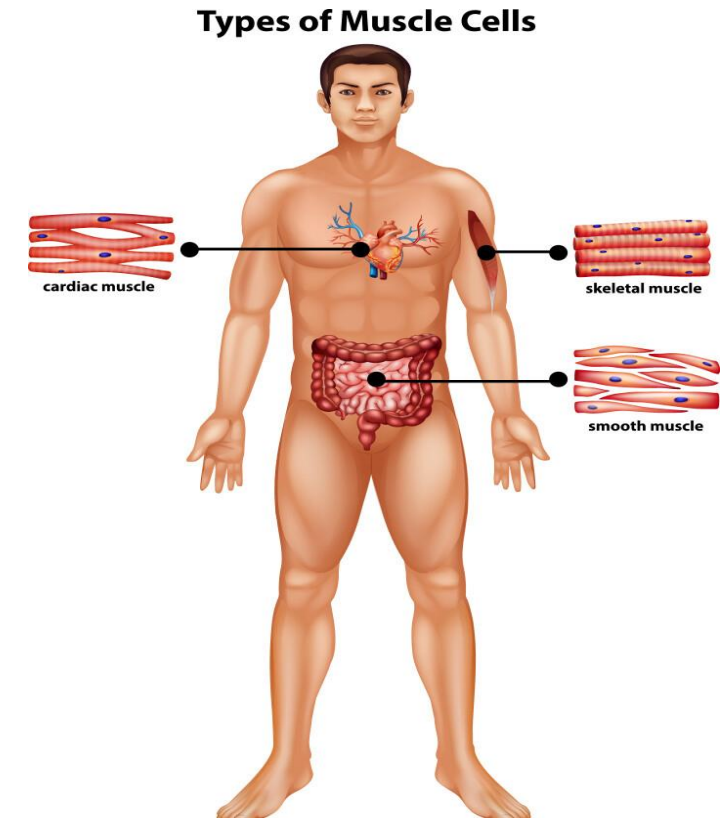


SPECIALIZED EUKARYOTIC CELLS

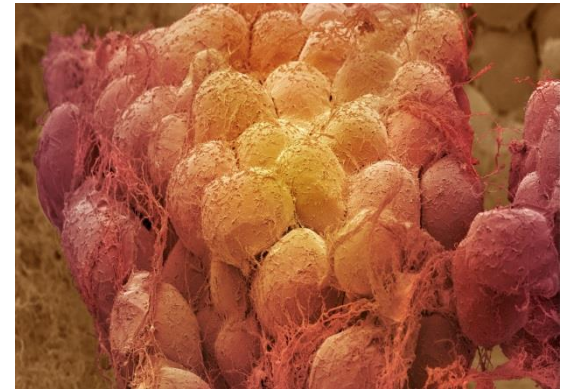
- **Red blood cells (Erythrocytes):** Disk-shaped cells that **transport oxygen** throughout the body via hemoglobin.
- **Nerve cells (Neurons):** **Transmit electrical signals** through long projections called axons and dendrites to facilitate communication.



- **Muscle cells (Myocytes):** Long, cylindrical cells containing proteins like actin and myosin that allow for **contraction and movement**
- **Bone cells:** Osteoblasts **build new bone**, osteoclasts break it down, and osteocytes maintain the bone matrix.

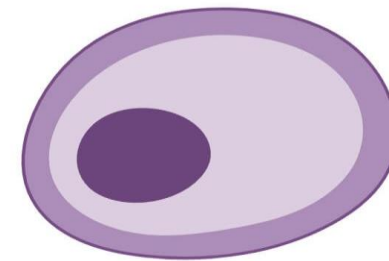


- **Skin cells (Epithelial cells):** Form a **protective barrier**. Keratinocytes produce keratin, and melanocytes produce the pigment melanin.
- **Fat cells (Adipocytes):** **Store energy** in the form of triglycerides.

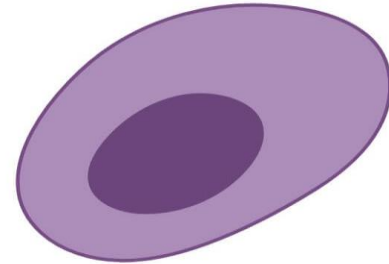


- **Cartilage Cells:** Chondrocytes produce and maintain **cartilaginous matrix** in joints and other structures.
- **Stem cells:** Undifferentiated cells that can develop into specialized cells to **replace damaged or lost cells.**
- **Sex Cells:** Sperm and ova responsible for **reproduction.**

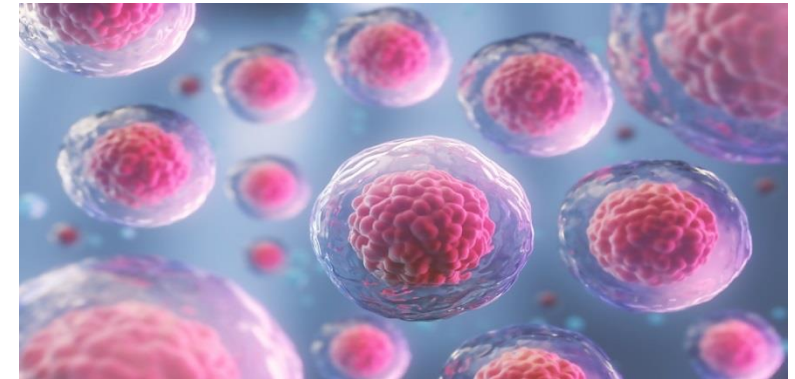
Cartilage Cells



Chondrocyte

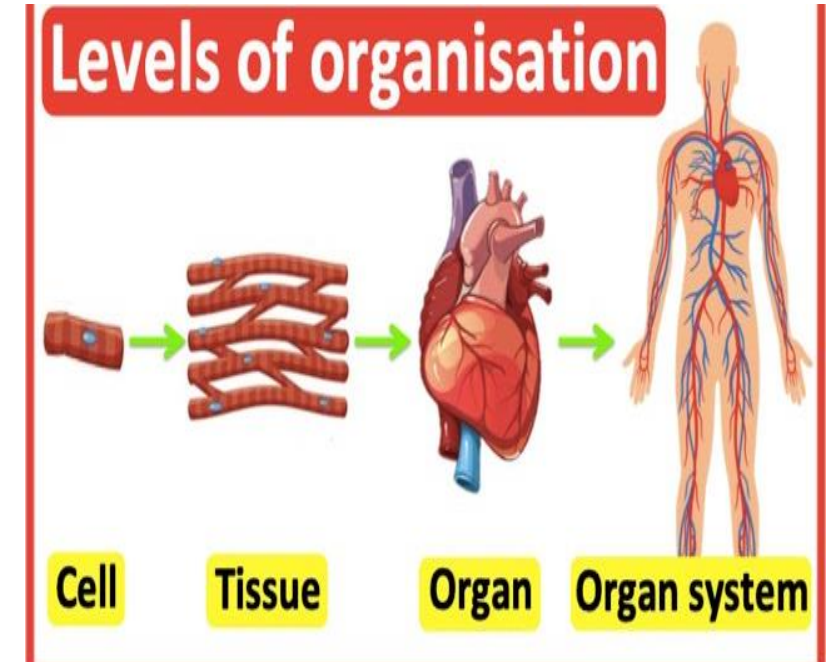


Chondroblasts

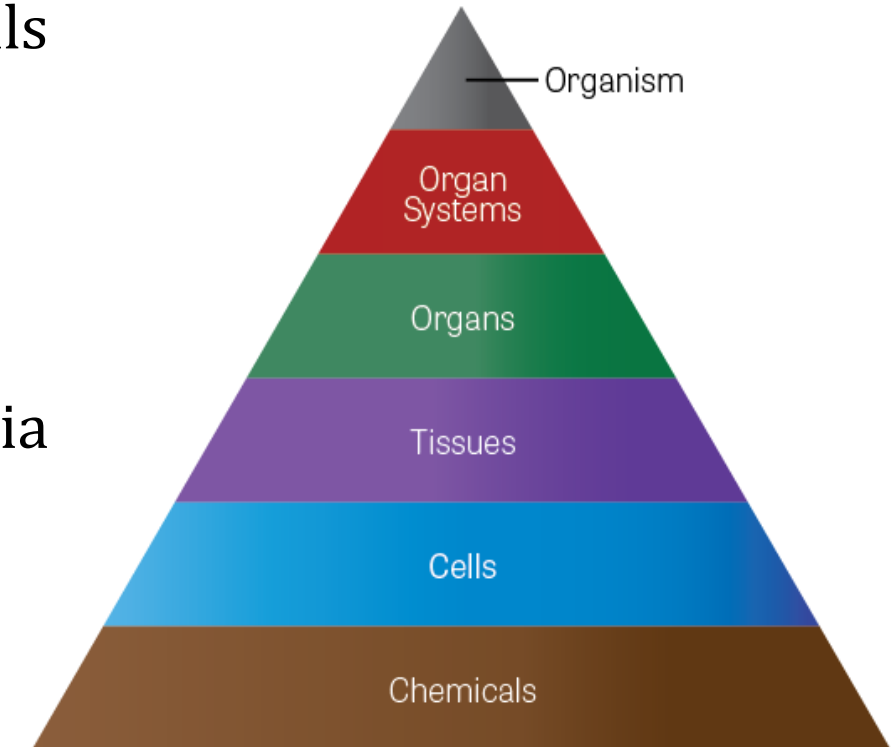


Cell Arrangements in Tissues and Organs

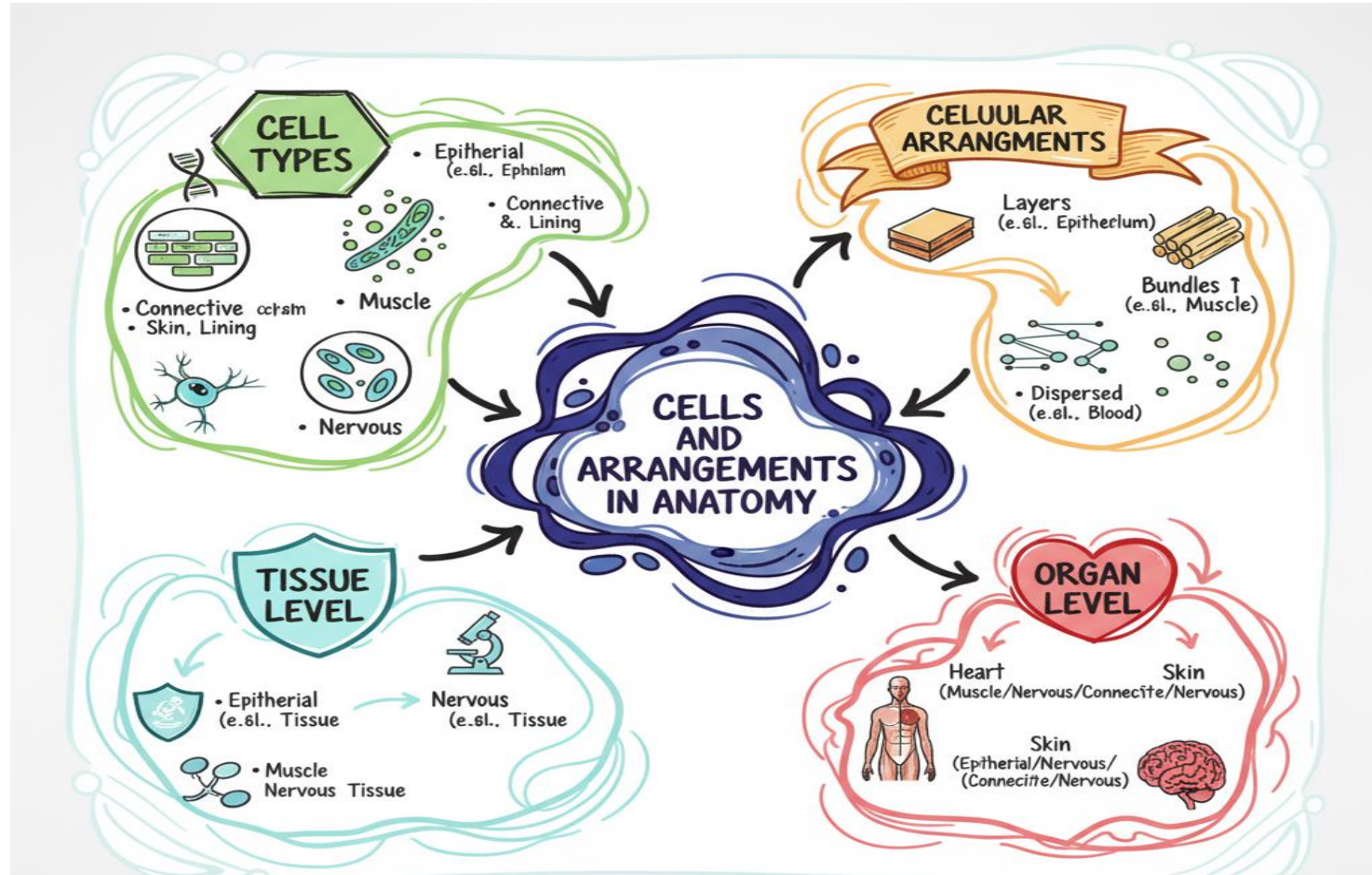
- **Epithelial Tissue:** Sheets of tightly packed epithelial cells covering surfaces and lining cavities.
- **Connective Tissue:** Cells scattered in extracellular matrix, providing support and transport (e.g., bone, cartilage, blood).



- **Muscle Tissue:** Bundles or sheets of muscle cells specialized for contraction and movement.
- **Nervous Tissue:** Networks of neurons and glia facilitating communication and control.



SUMMARY



References

- Essentials of Anatomy & Physiology For Allied Health Sciences - PR Ashalatha
- <https://www.kenhub.com/en/library/anatomy/types-of-cells-in-the-human-body>
- <https://www.khanacademy.org/test-prep/mcat/cells/eukaryotic-cells/a/organelles-article>
- <https://www.medicalnewstoday.com/articles/320878>