



**2026 -27**

# TISSUES

**PART-2**

**D. PHARMA 1<sup>ST</sup> YEAR**

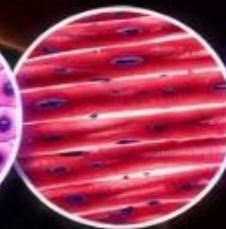
**HUMAN ANATOMY  
& PHYSIOLOGY**



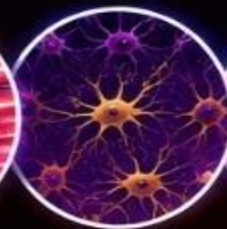
**COMPLETE CONCEPT**



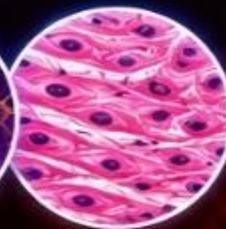
EPITHELIAL



MUSCULAR



NERVOUS



CONNECTIVE

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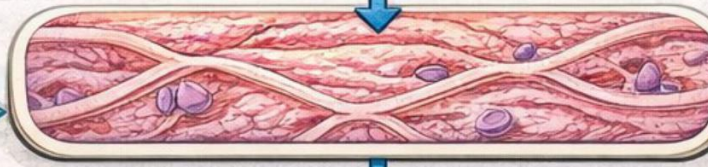
# **Chapter – 3**

## **Human Anatomy & Physiology**

### **Tissues**



# Classification of Connective Tissues



## Types of Connective Tissues

Loose

Specialized

### Loose Connective Tissues

### Dense Connective Tissues

### Specialized Connective Tissues

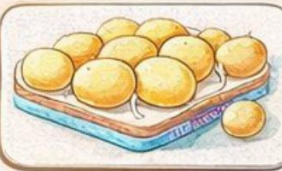
### Fluid Connective Tissues

- **Areolar**
  - Loose, holds organs in place
- **Adipose**
  - Stores fat for energy & insulation



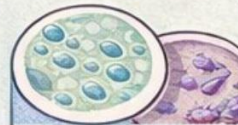
- **Areolar**
  - Loose, holds organs in place

- **Dense Regular**
  - Strong, parallel fibers
- **Dense Irregular**
  - Fibers in different directions



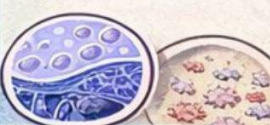
- **Adipose**
  - Stores fat for energy & insulation
- **Reticular**
  - Network of fibers that support organs

- **Cartilage**
  - Hyaline
  - Elastic
  - Elastic
  - Fibrocart,



Hyaline Elastic

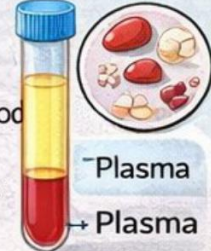
- **Bone**
  - Compact



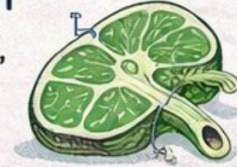
Fibrocartilage

- **Bone**
  - Red & white blood cells, platelets, plasma

- **Blood**
  - Red & white blood cells, platelets
  - Plasma



- **Lymph**
  - Lymph, lymph nodes



- **Lymph**
  - Lymph lymph nodes



| Type of Connective Tissue (संयोजी ऊतक का प्रकार)           | Location (स्थान)                                                                                                            |
|------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|
| Areolar tissue (एरियोलर ऊतक)                               | Beneath the skin, around blood vessels, nerves, and muscles (त्वचा के नीचे, रक्त वाहिकाओं, नसों और मांसपेशियों के चारों ओर) |
| Adipose tissue (वसामय ऊतक)                                 | Below the skin, around kidneys, heart, eyeballs (त्वचा के नीचे, गुर्दे, हृदय और नेत्रगोलक के चारों ओर)                      |
| Dense regular connective tissue (घना नियमित संयोजी ऊतक)    | Tendons and ligaments (स्नायु और अस्थिबंधन)                                                                                 |
| Dense irregular connective tissue (घना अनियमित संयोजी ऊतक) | Dermis of skin, capsules of organs (त्वचा का डर्मिस, अंगों के आवरण)                                                         |
| Elastic connective tissue (लचीला संयोजी ऊतक)               | Walls of large arteries, lungs, trachea (बड़ी धमनियों की दीवारें, फेफड़े, श्वासनली)                                         |

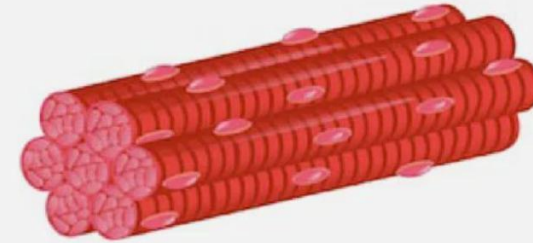
|                                                  |                                                                                          |
|--------------------------------------------------|------------------------------------------------------------------------------------------|
| Reticular connective tissue<br>(जालक संयोजी ऊतक) | Lymph nodes, spleen, bone marrow (लसीका ग्रंथियां, प्लीहा, अस्थि मज्जा)                  |
| Cartilage (उपास्थि)                              | Tip of nose, ear pinna, joints, trachea (नाक की नोक, कान की पिन्ना, संधियां, श्वासनली)   |
| Bone (अस्थि)                                     | Skeleton of body, long bones, flat bones (शरीर का कंकाल, लम्बी अस्थियां, चपटी अस्थियां)  |
| Blood (रक्त)                                     | Circulates throughout the body in blood vessels (रक्त वाहिकाओं में पूरे शरीर में संचरित) |
| Lymph (लसिका)                                    | Lymphatic vessels and lymph nodes (लसिका वाहिकाओं और लसिका ग्रंथियों में)                |

# Cardiac vs. Skeletal Muscles



**Cardiac Muscle**

1. **Location:** Found exclusively in the heart
2. **Control:** Involuntary, regulated by SA node
3. **Structure:** Branched cells, intercalated discs
4. **Energy:** Primarily aerobic metabolism
5. **Regeneration:** Limited, replaced by scar tissue



**Skeletal Muscle**

1. **Location:** Attached to bones
2. **Control:** Voluntary, conscious movement
3. **Structure:** Long fibers, multiple nuclei
4. **Energy:** Anaerobic and aerobic metabolism
5. **Regeneration:** Good, involves satellite cells

| Feature (विशेषता)              | Skeletal Muscle<br>(कंकाल मांसपेशी)                        | Cardiac Muscle<br>(हृदय मांसपेशी)                   | Smooth Muscle (मृदु<br>मांसपेशी)                                                                                                              |
|--------------------------------|------------------------------------------------------------|-----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Location (स्थान)               | Attached to bones<br>(अस्थियों से जुड़ी<br>हुई)            | Heart wall (हृदय की<br>दीवार में)                   | Walls of internal<br>organs like stomach,<br>intestines, blood<br>vessels (आंतरिक<br>अंगों की दीवारों में<br>जैसे पेट, आँत, रक्त<br>वाहिकाएँ) |
| Control (नियंत्रण)             | Voluntary<br>(इच्छानुसार)                                  | Involuntary<br>(अइच्छिक)                            | Involuntary<br>(अइच्छिक)                                                                                                                      |
| Cell shape (कोशिका<br>का आकार) | Long, cylindrical<br>(लम्बी, बेलनाकार)                     | Short, branched<br>(छोटी, शाखित)                    | Spindle-shaped (धुरी<br>आकार की)                                                                                                              |
| Nucleus (केंद्रक)              | Multinucleated,<br>peripheral (अनेक<br>केंद्रक, किनारे पर) | Single nucleus,<br>central (एक केंद्रक,<br>बीच में) | Single nucleus,<br>central (एक केंद्रक,<br>बीच में)                                                                                           |

|                                         |                                                                |                                     |                                                                                       |
|-----------------------------------------|----------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------------------------|
| Striations (धारियाँ)                    | Present (मौजूद)                                                | Present (मौजूद)                     | Absent<br>(अनुपस्थित)                                                                 |
| Speed of contraction<br>(संकुचन की गति) | Fast (तेज़)                                                    | Moderate (मध्यम)                    | Slow (धीमा)                                                                           |
| Fatigue (थकान)                          | Fatigues easily<br>(जल्दी थकती है)                             | Never fatigues<br>(कभी नहीं थकती)   | Slow fatigue (धीरे<br>थकती है)                                                        |
| Function (कार्य)                        | Movement of bones, locomotion<br>(हड्डियों की गति, चलना-फिरना) | Pumping of blood<br>(रक्त पंप करना) | Movement of food, urine, blood flow<br>(भोजन, मूत्र और रक्त प्रवाह को नियंत्रित करना) |

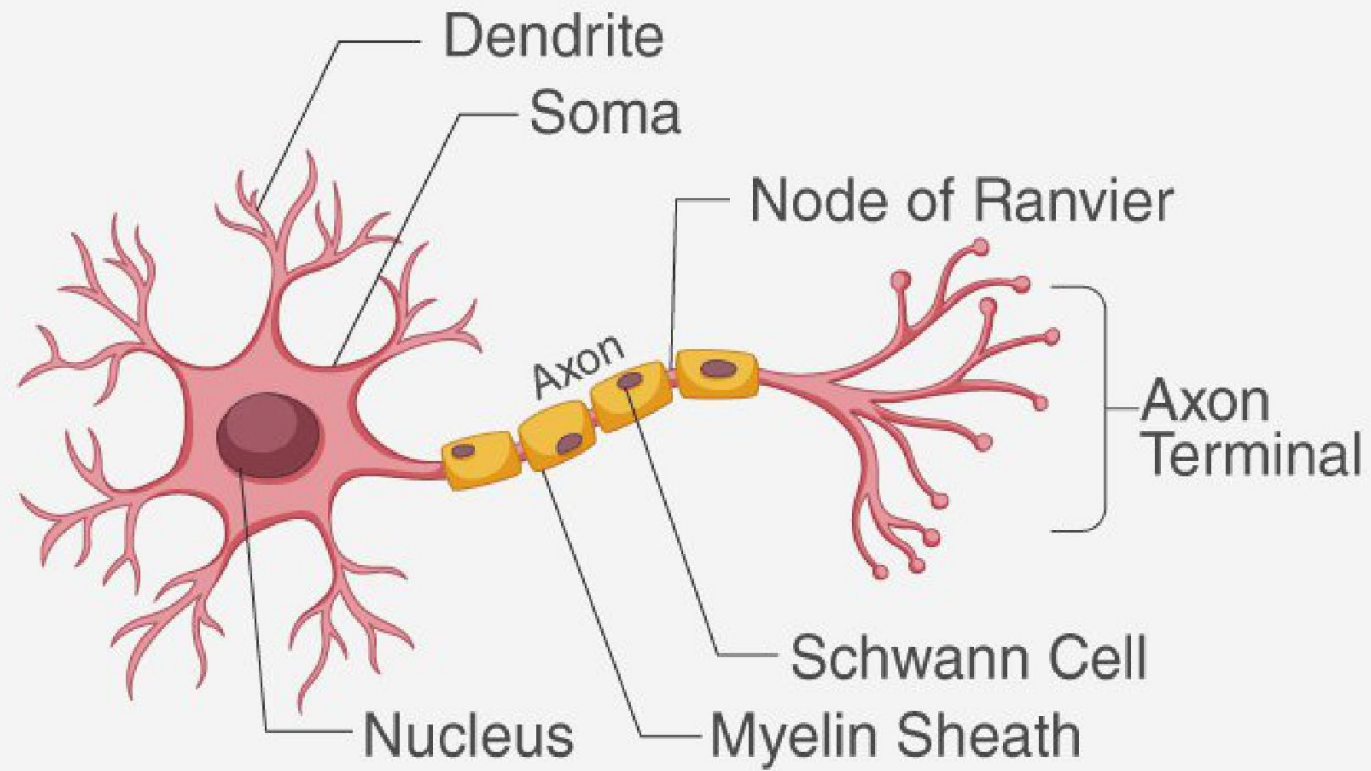
# Nervous Tissue

- Nervous or the nerve tissue is the main tissue of our nervous system.
- Brain, Spinal Cord, and nerves are composed of nervous tissue, they are specialized for being stimulated to transmit stimulus from one to another part of the body rapidly.

मस्तिष्क, रीढ़ की हड्डी और तंत्रिकाएं तंत्रिका ऊतक से बनी होती हैं, वे उत्तेजना को शरीर के एक हिस्से से दूसरे हिस्से तक तेजी से पहुंचाने के लिए उत्तेजित होने के लिए विशिष्ट होती हैं।

- It monitors and regulates the functions of the body.
- Nervous tissue consists of two cells: nerve cells or neurons and glial cells, which helps transmit nerve impulses and also provides nutrients to neurons.

तंत्रिका ऊतक में दो कोशिकाएँ होती हैं: तंत्रिका कोशिकाएँ या न्यूरॉन्स और ग्लियाल कोशिकाएँ, जो तंत्रिका आवेगों को संचारित करने में मदद करती हैं और न्यूरॉन्स को पोषक तत्व भी प्रदान करती हैं।



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