



2026 -27

TISSUES

PART-1

D. PHARMA 1ST YEAR

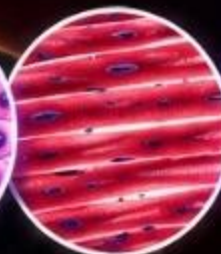
**HUMAN ANATOMY
& PHYSIOLOGY**



COMPLETE CONCEPT



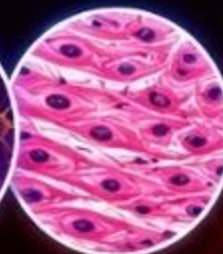
EPITHELIAL



MUSCULAR



NERVOUS



CONNECTIVE

Chapter – 3

Human Anatomy & Physiology

Tissues

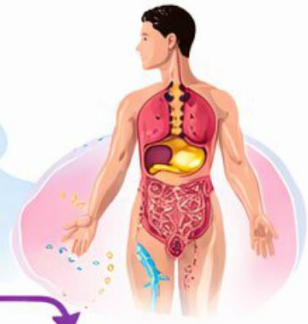
Tissues & Its Types

- **Tissue Definition:** A group of similar cells working together to perform a specific function.
- **ऊतक की परिभाषा:** एक विशिष्ट कार्य को करने के लिए एक साथ काम करने वाली समान कोशिकाओं का समूह।



Types of Tissue

The Building Blocks of the Human Body

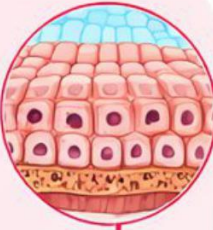


EPITHELIAL TISSUE

Covers & Protects

Location:

- Skin
- Lining of mouth
- Stomach
- Intestines
- Glands



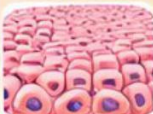
Functions:

- Protects body
- Forms glands
- Absorbs nutrients
- Filters waste

Simple



Stratified



Glandular

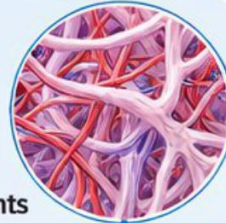


CONNECTIVE TISSUE

Supports & Binds

Location:

- Between organs
- Bones & blood
- Fat under skin
- Tendons & ligaments



Functions:

- Supports body parts
- Protects organs
- Stores energy
- Transports materials

Bone



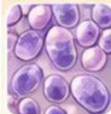
Blood



Fat



Cartilage



MUSCULAR TISSUE

Helps in Movement

Location:

- Muscles of body
- Heart
- Digestive tract



Functions:

- Contracts & relaxes
- Moves body parts
- Pumps blood
- Helps breathing



Striated



Smooth



Cardiac

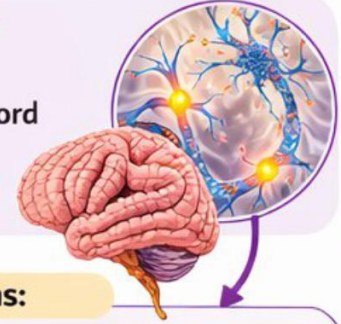


NERVOUS TISSUE

Controls & Connects

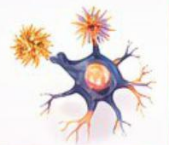
Location:

- Brain
- Spinal cord
- Nerves



Functions:

- Receives signals
- Sends messages
- Controls body
- Responds to stimuli



Brain



Neurons



Spinal Cord



Importance of Tissues

Help in Growth



Repair Body



Give Strength



Enable Movement



Protect Organs



Control Body Functions

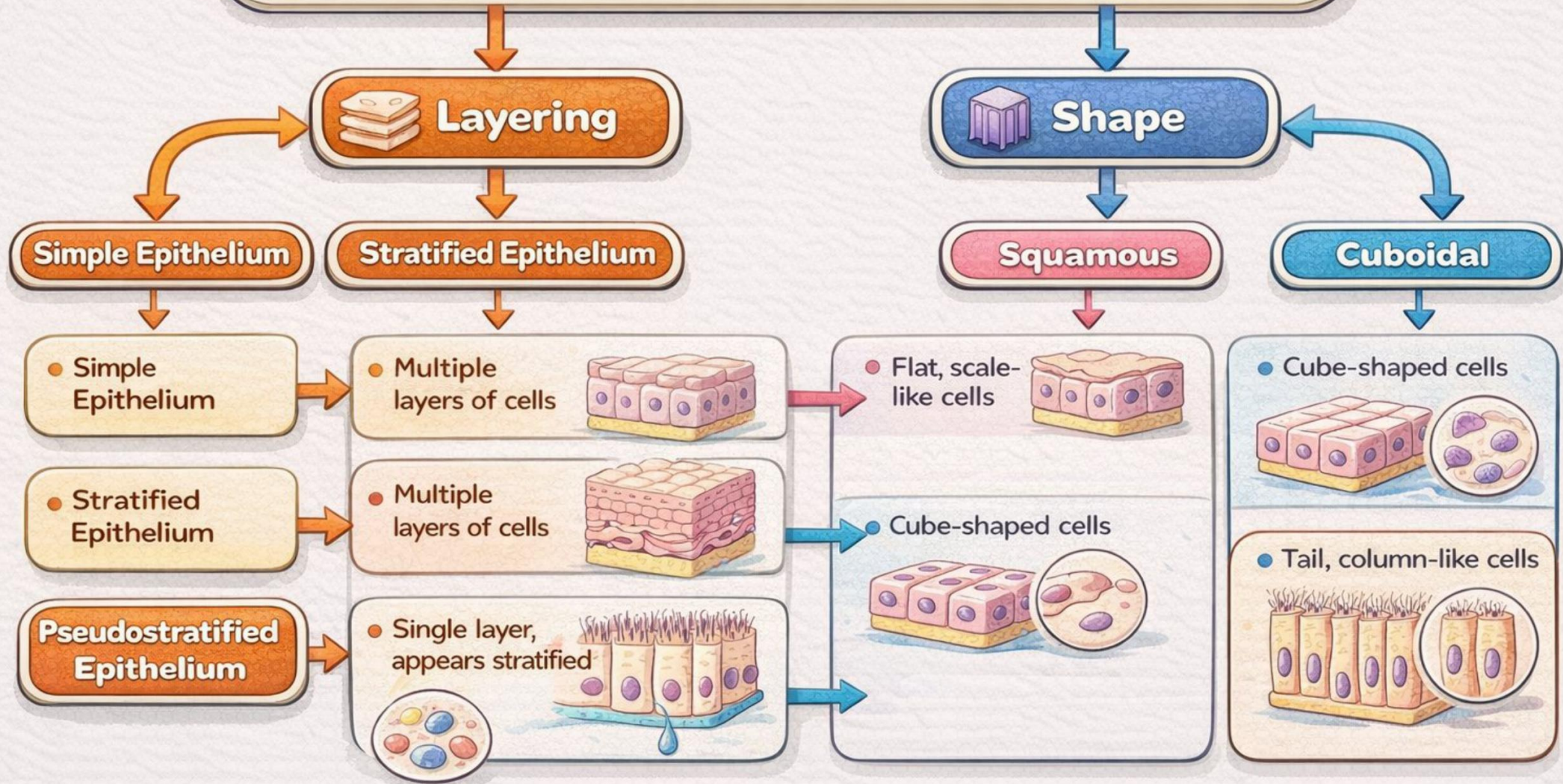


Types

- **Epithelial Tissue:** Covers body surfaces, lines hollow organs, and forms glands.
- **उपकला ऊतक:** शरीर की सतहों को ढकता है, खोखले अंगों की परत बनाता है और ग्रंथियों का निर्माण करता है।
- **Connective Tissue:** Protects, supports, and binds organs together.
- **संयोजी ऊतक:** अंगों की रक्षा करता है, उन्हें सहारा देता है और आपस में बांधता है।

- **Muscular Tissue:** Generates the physical force needed to make body structures move.
- **मांसपेशीय ऊतक:** शरीर की संरचनाओं को गतिमान करने के लिए आवश्यक शारीरिक बल उत्पन्न करता है।
- **Nervous Tissue:** Detects changes in conditions and responds by generating nerve impulses.
- **तंत्रिका ऊतक:** यह परिस्थितियों में होने वाले परिवर्तनों का पता लगाता है और तंत्रिका आवेग उत्पन्न करके प्रतिक्रिया करता है।

Classification of Epithelia



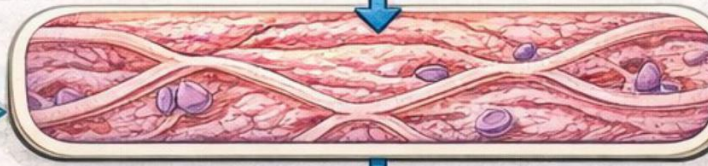
Type of Epithelial Tissue (ऊतक का प्रकार)	Location (स्थान)	Features (विशेषताएँ)
Simple Squamous Epithelium (सरल सपाट उपकला)	Lining of alveoli (lungs), blood vessels (endothelium), Bowman's capsule of kidney (फेफड़ों के एल्वियोली, रक्त वाहिकाएँ, वृक्क का बोमैन कैप्सूल)	Single thin flat cells, allow diffusion and filtration (पतली सपाट कोशिकाएँ, प्रसार और निस्पंदन को संभव बनाती हैं)
Simple Cuboidal Epithelium (सरल घनाभ उपकला)	Kidney tubules, thyroid gland, salivary gland ducts (वृक्क नलिकाएँ, थायरॉइड ग्रंथि, लार ग्रंथि की नलिकाएँ)	Cube-shaped cells, secretion and absorption (घनाभ आकार की कोशिकाएँ, स्रवण और अवशोषण में सहायक)
Simple Columnar Epithelium (सरल स्तंभाकार उपकला)	Lining of stomach, intestine, gall bladder (पेट, आंत, पित्ताशय की आंतरिक परत)	Tall column-like cells, secretion of mucus and absorption (लंबी स्तंभाकार कोशिकाएँ, श्लेष्मा का स्रवण और अवशोषण)

Ciliated Columnar Epithelium (सिलिया युक्त स्तंभाकार उपकला)	Respiratory tract, fallopian tubes (श्वासन पथ, फैलोपियन नलिकाएँ)	Columnar cells with cilia, help in movement of particles or ovum (सिलिया युक्त कोशिकाएँ, कणों या अंडाणु की गति में सहायक)
Pseudostratified Columnar Epithelium (कृत्रिम बहिस्तरीय स्तंभाकार उपकला)	Trachea, bronchi (श्वासनली, श्वसनी)	Appears multilayered but is single layer, cilia + goblet cells present (बहिस्तरीय जैसा दिखता है पर एक परत, सिलिया और गॉब्लेट कोशिकाएँ होती हैं)

Stratified Squamous Epithelium (बहिस्तरीय सपाट उपकला)	Skin, mouth, esophagus (त्वचा, मुख, ग्रसनी)	Many layers, protective function against wear and tear (कई परतें, घिसाव और चोट से सुरक्षा)
Keratinized Stratified Squamous Epithelium (कैराटिन युक्त बहिस्तरीय सपाट उपकला)	Epidermis of skin (त्वचा की एपिडर्मिस)	Upper layers contain keratin, waterproof and tough (ऊपरी परतें कैराटिन युक्त, जलरोधी और कठोर)
Non-keratinized Stratified Squamous Epithelium (अकैराटिन युक्त बहिस्तरीय सपाट उपकला)	Mouth, pharynx, vagina (मुख, ग्रसनी, योनि)	Soft, moist surface, no keratin (नरम और नम सतह, कैराटिन नहीं)
Transitional Epithelium (संक्रमण उपकला)	Urinary bladder, ureter (मूत्राशय, मूत्रवाहिनी)	Cells can change shape (stretch & recoil), allows expansion (कोशिकाएँ आकार बदल सकती हैं, खिंचाव और सिकुड़न संभव बनाती हैं)



Classification of Connective Tissues



Types of Connective Tissues

Loose

Specialized

Loose Connective Tissues

Dense Connective Tissues

Specialized Connective Tissues

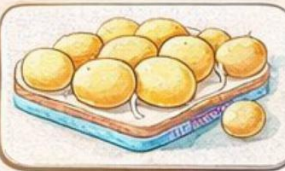
Fluid Connective Tissues

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



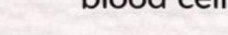
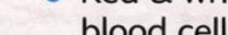
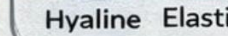
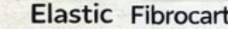
- **Areolar**
 - Loose, holds organs in place

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

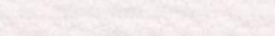
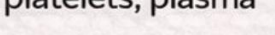
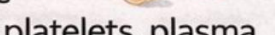
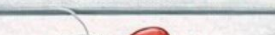
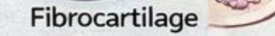
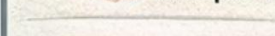


- **Adipose**
 - Stores fat for energy & insulation
- **Reticular**
 - Network of fibers that support organs

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

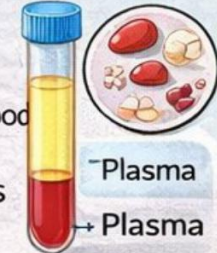


- **Bone**
 - Compact

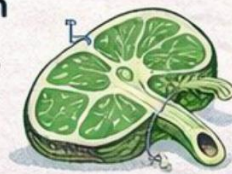


- **Bone**
 - Red & white blood cells, platelets, plasma

- **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 (वसाभय 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)

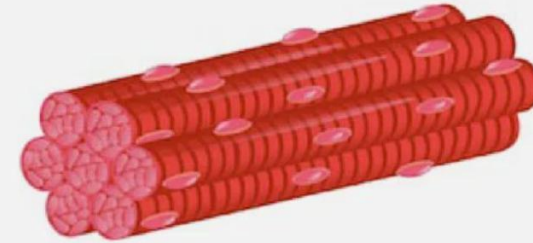
Reticular connective tissue (जालक संयोजी ऊतक)	Lymph nodes, spleen, bone marrow (लसीका ग्रंथियां, प्लीहा, अस्थि मज्जा)
Cartilage (उपास्थि)	Tip of nose, ear pinna, joints, trachea (नाक की नोक, कान की पिन्ना, संधियां, श्वासनली)
Bone (अस्थि)	Skeleton of body, long bones, flat bones (शरीर का कंकाल, लम्बी 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 (कंकाल मांसपेशी)	Cardiac Muscle (हृदय मांसपेशी)	Smooth Muscle (मृदु मांसपेशी)
Location (स्थान)	Attached to bones (अस्थियों से जुड़ी हुई)	Heart wall (हृदय की दीवार में)	Walls of internal organs like stomach, intestines, blood vessels (आंतरिक अंगों की दीवारों में जैसे पेट, आँत, रक्त वाहिकाएँ)
Control (नियंत्रण)	Voluntary (इच्छानुसार)	Involuntary (अइच्छिक)	Involuntary (अइच्छिक)
Cell shape (कोशिका का आकार)	Long, cylindrical (लम्बी, बेलनाकार)	Short, branched (छोटी, शाखित)	Spindle-shaped (धुरी आकार की)
Nucleus (केंद्रक)	Multinucleated, peripheral (अनेक केंद्रक, किनारे पर)	Single nucleus, central (एक केंद्रक, बीच में)	Single nucleus, central (एक केंद्रक, बीच में)

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

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