Warm-Up

1. Effector
2. Control Center
3. Receptor
4. Feedback
5. Lack of Change

Which of the above is (are) involved in maintaining homeostasis?

a. 1, 3, 4, 5
b. 1, 2, 3, 4
c. 1, 2, 3, 5
d. 1, 3, 4, 5

ANATOMY SEPT 28

SAP 1e: STUDENTS WILL DESCRIBE HOW STRUCTURE AND FUNCTION ARE RELATED IN TERMS OF CELL AND TISSUE TYPES.

- **WARM UP:**
  1. What is the relationship between cells, tissues, organs and organ systems?
- **CLASSWORK: Tissue notes**
- **CLOSING: STUDENT LED "POPCORN" QUESTIONS FROM NOTES**

Body Tissues

Tissues: groups of cells that are similar in structure and function.

Four Primary Types:

1. Epithelium - covering
2. Connective Tissue - support
3. Nervous Tissue - control
4. Muscle - movement

Epithelial Tissue (EPITHELIUM)

- The lining, covering, and glandular (forms various glands of the body) tissue of the body.
- Covers all free body surfaces and contains versatile cells

Functions of the Epithelium

Protection

Filtration

Secretion

Special Characteristics of Epithelium

- Fit closely together bound together by specialized cell junctions to form continuous sheets(except glandular)
- Have one free surface or edge (also called apical surface) smooth or modified with cilia of microvilli

Special Characteristics of Epithelium continued

- Lower surface rests on a basement membrane
- Have no blood supply of their own – depend on diffusion from the capillaries in the underlying connective tissue for food and oxygen
- If WELL NOURISHED, able to regenerate themselves easily

Classification of Epithelium

Terms to know:

- Simple: one layer of cells
- Stratified: more than one cell layer
- Squamous: flattened like fish scales
- Cuboidal: cube-shaped
- Columnar: shaped like columns

Classification of Epithelium

- Classified by cell arrangement
- Each epithelium is given TWO names

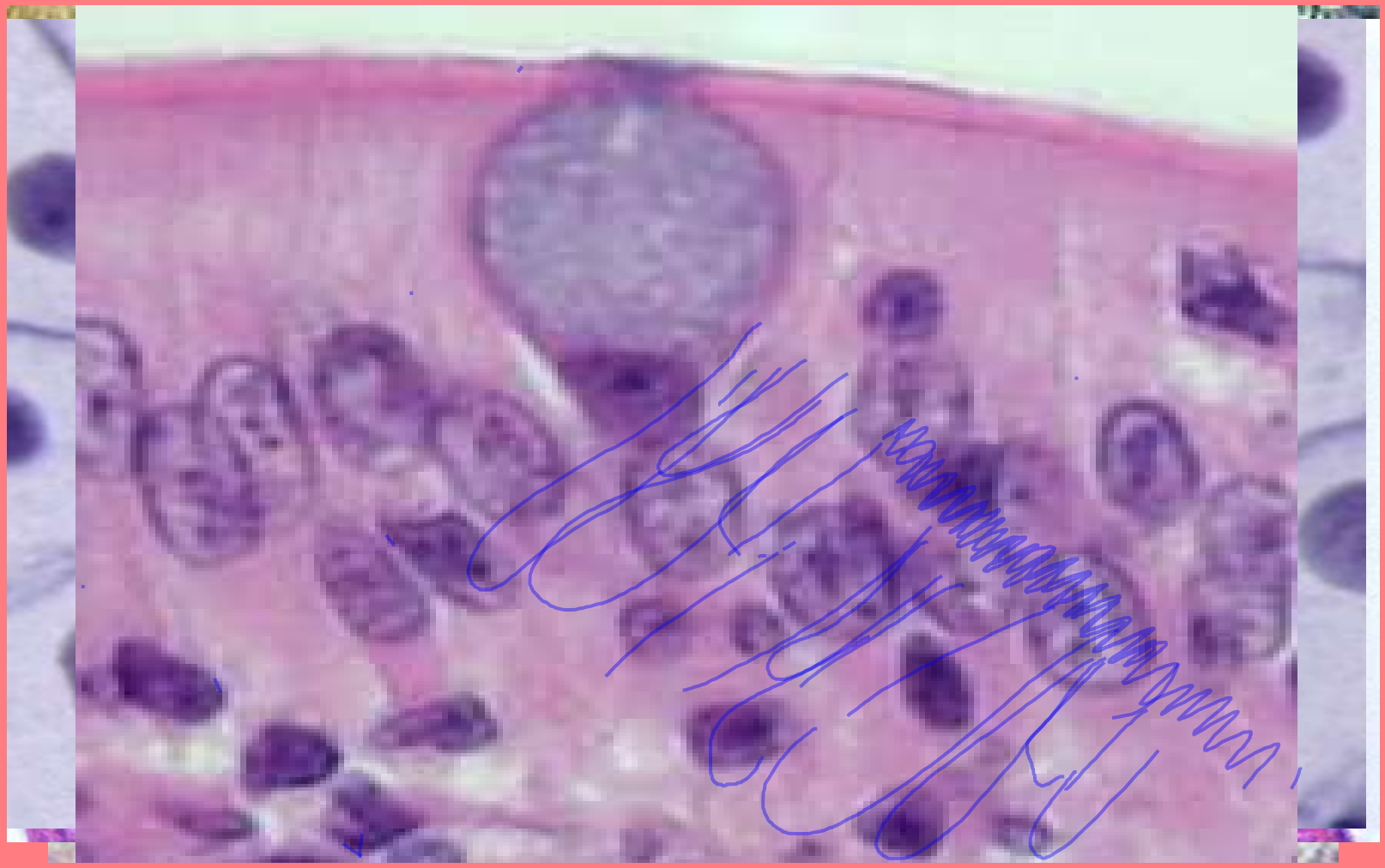
First: number of layers

Second: describes the shape of cells

Simple Columnar Epithelium

Types of Simple Epithelia

Simple Squamous Epithelium



Cilia

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Microvilli

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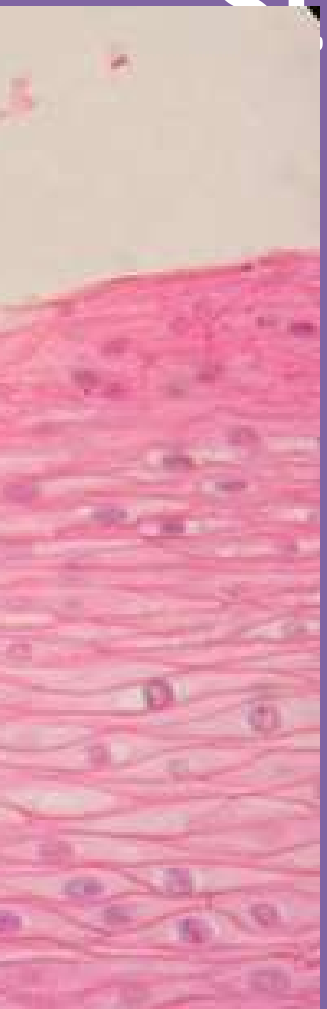
Stratified Epithelia

Stratified Squamous Epithelia

Stratified Columnar Epithelia



Warm up

Match the following tissues to their description:

A. Stratified Squamous

B. Transitional

C. Simple Columnar

D. Simple Cuboidal

1. lines the digestive tract
2. in areas of great abuse and friction
3. in the urinary system
4. common in glands

ANATOMY SEPT 29

SAP 1e: STUDENTS WILL DESCRIBE HOW STRUCTURE AND FUNCTION ARE RELATED IN TERMS OF CELL AND TISSUE TYPES.

- **WARM UP:**
  1. **What are the characteristics of epithelial tissue?**
- **CLASSWORK: Tissue notes, cont.; tissue color sheet**
- **CLOSING: STUDENT LED "POPCORN" QUESTIONS FROM NOTES**

Glandular Epithelium

- Gland: consists of one or more cells that make and secrete a particular product (secretion)
- Secretion: typically contains protein molecules in an aqueous (water-based) fluid
  - Indicates an active process in which glandular cells obtain needed materials from the blood and use them to make their secretion

Endocrine	Exocrine
○ lose their connection to the surface (duct) ○ often called ductless glands ○ their secretions (all hormones) diffuse directly into the blood vessels that leave through the glands ○ Examples: Thyroid, Adrenals, and Pituitary	▪ retain their ducts ▪ Their secretions empty through the ducts to the epithelial surface ▪ Examples: sweat and oil glands, liver, and pancreas

POPCORN

- What is the name for a single layer flattened shape tissue?

- Simple Squamous

POPCORN

- What is the name for a single layer cube shaped tissue?

- Simple Cuboidal

POPCORN

- What is the name for a single layer column shaped tissue?

- Simple Columnar

POPCORN

- What is the name for a multi layer flattened shaped tissue?

- Stratified Squamous

POPCORN

- Where is simple squamous found in the body? Why?

- Air sacs of lungs, capillaries
- thin, allows for gases to easily pass through

POPCORN

- Where is simple cuboidal found in the body? Why?

- Salivary glands and pancreas; walls of kidney tubules; surface of ovaries
- Secretions

POPCORN

- Where is pseudostratified columnar epithelial found in the body? Why?

- Respiratory tract
- Cilia propel dust and debris upward away from lungs

POPCORN

- Where is transitiona epithelial found in the body? Why?

- Urinary bladder, urethra
- Stretches and then returns to normal

POPCORN

- What is the difference between endocrine and exocrine glands?

- Endocrine glands secrete directly into blood stream while exocrine glands use ducts to carry their secretions somewhere else.

POPCORN

- Give examples of endocrine glands

- Thyroid, adrenal gland, pituitary gland

POPCORN

- Give examples of exocrine glands

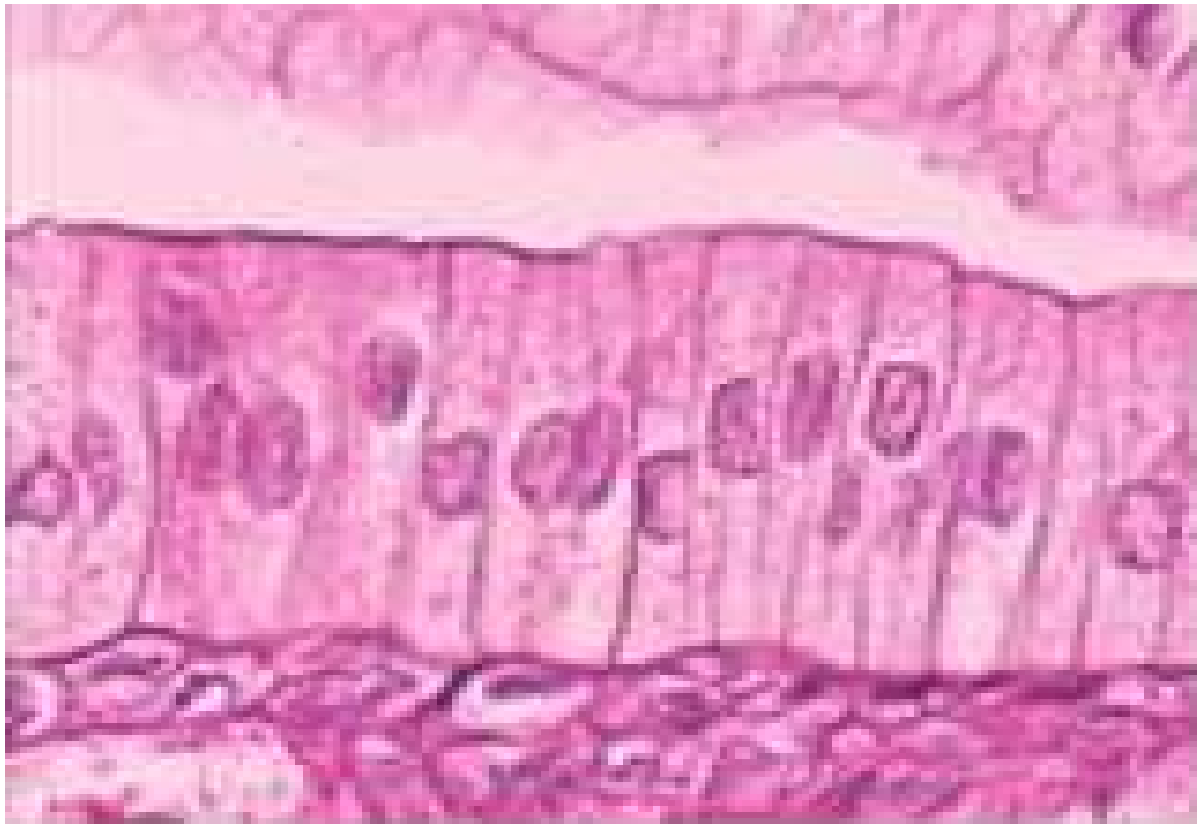
- Sweat and oil glands(sebaceous); liver, pancreas

ANATOMY SEPT 30

SAP 1e: STUDENTS WILL DESCRIBE HOW STRUCTURE AND FUNCTION ARE RELATED IN TERMS OF CELL AND TISSUE TYPES.

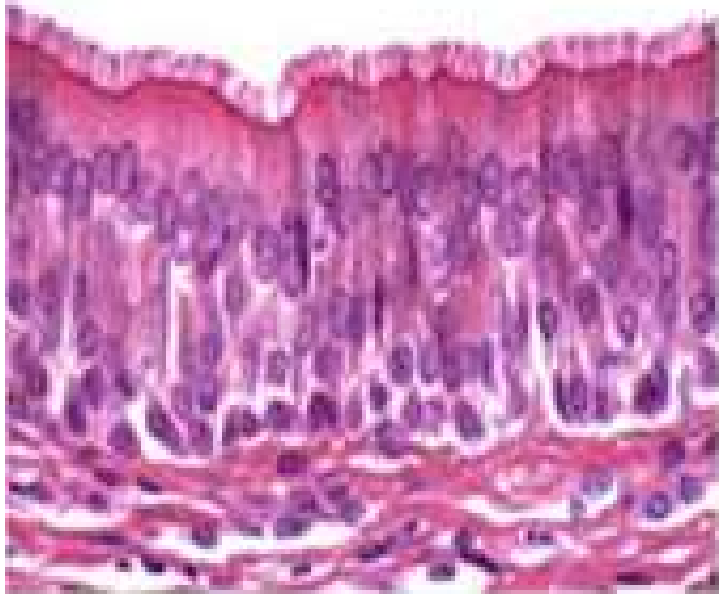
- **WARM UP:**
  1. Explain the difference between endocrine and exocrine glands
  2. Differentiate between simple squamous and stratified squamous
- **CLASSWORK: Tissue Classification Lab-Individual papers**
- **CLOSING: Tissue Identification pictures**

Simple Columnar



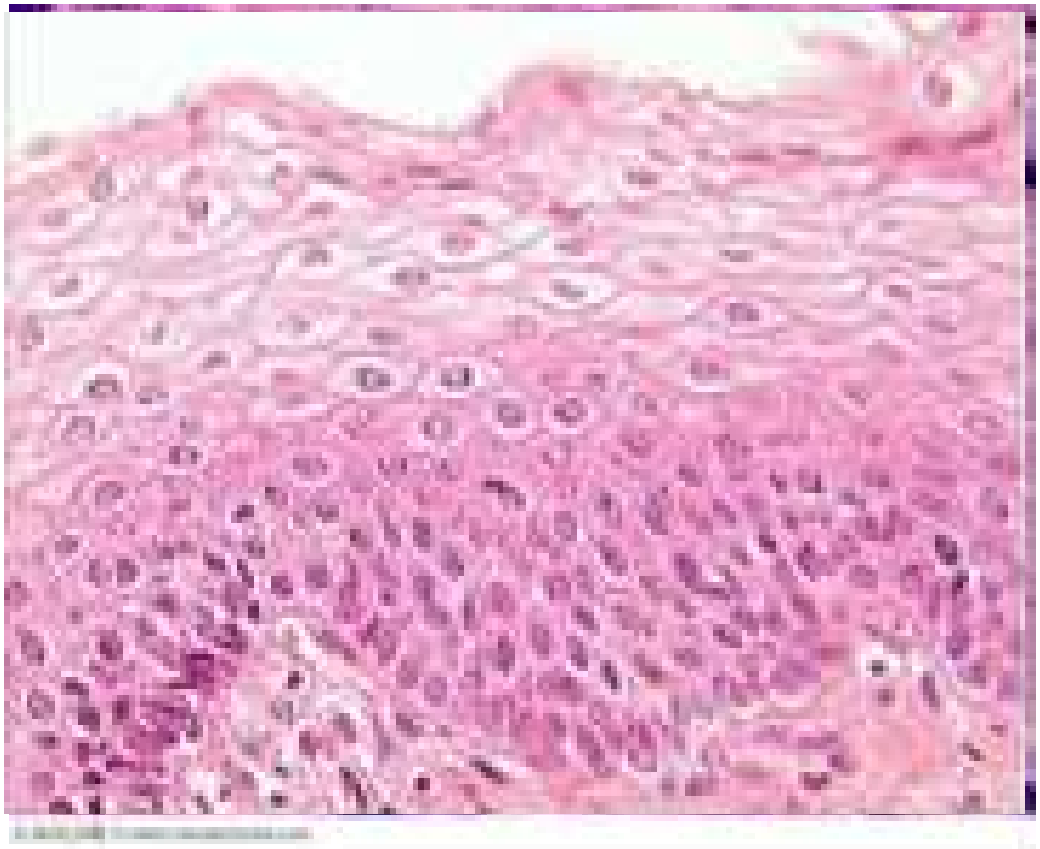
Simple Cuboidal

Pseudostratified ciliated columnar

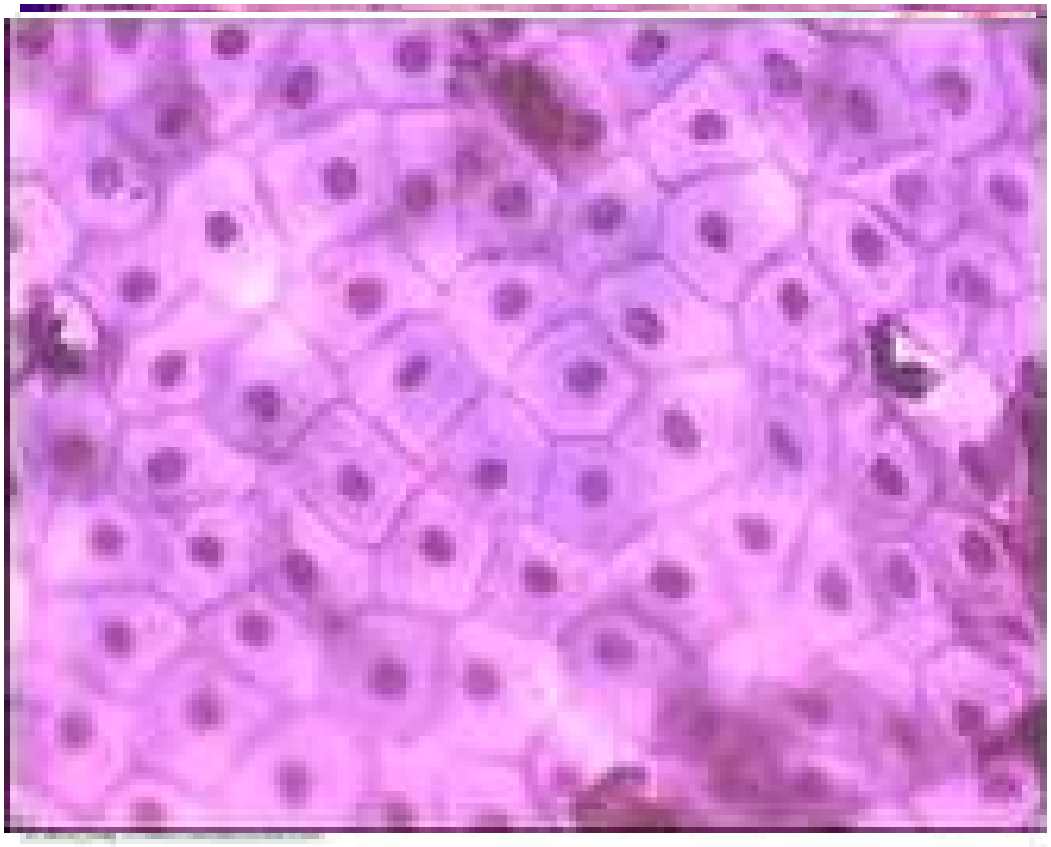


Transitional

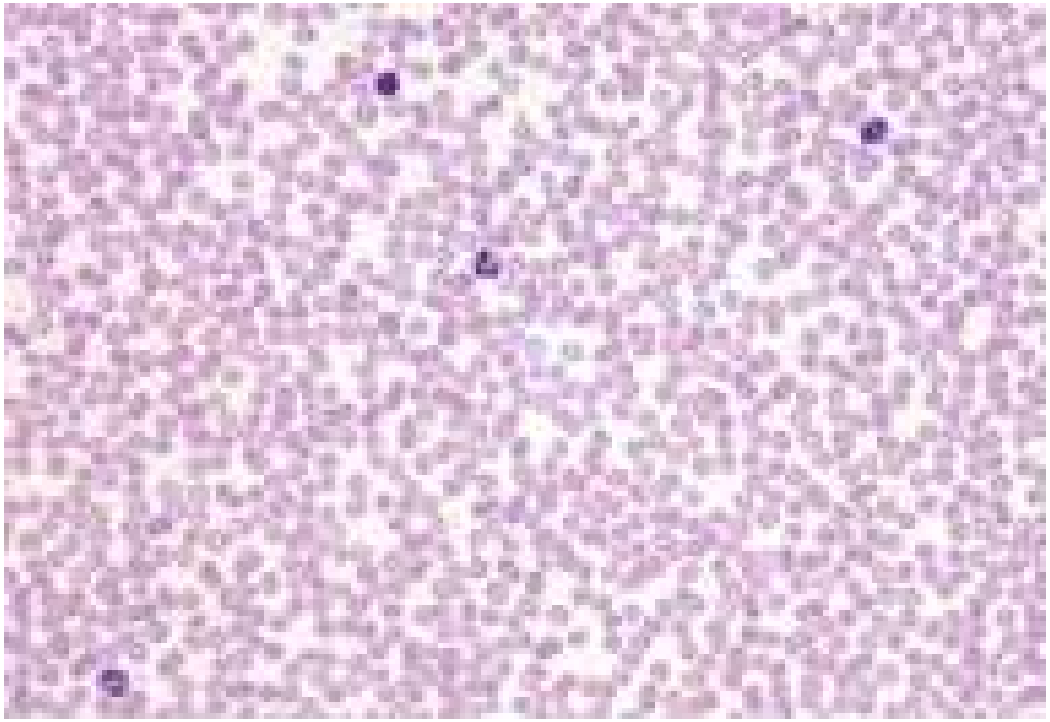
Stratisfied Squamous



Simple Squamous

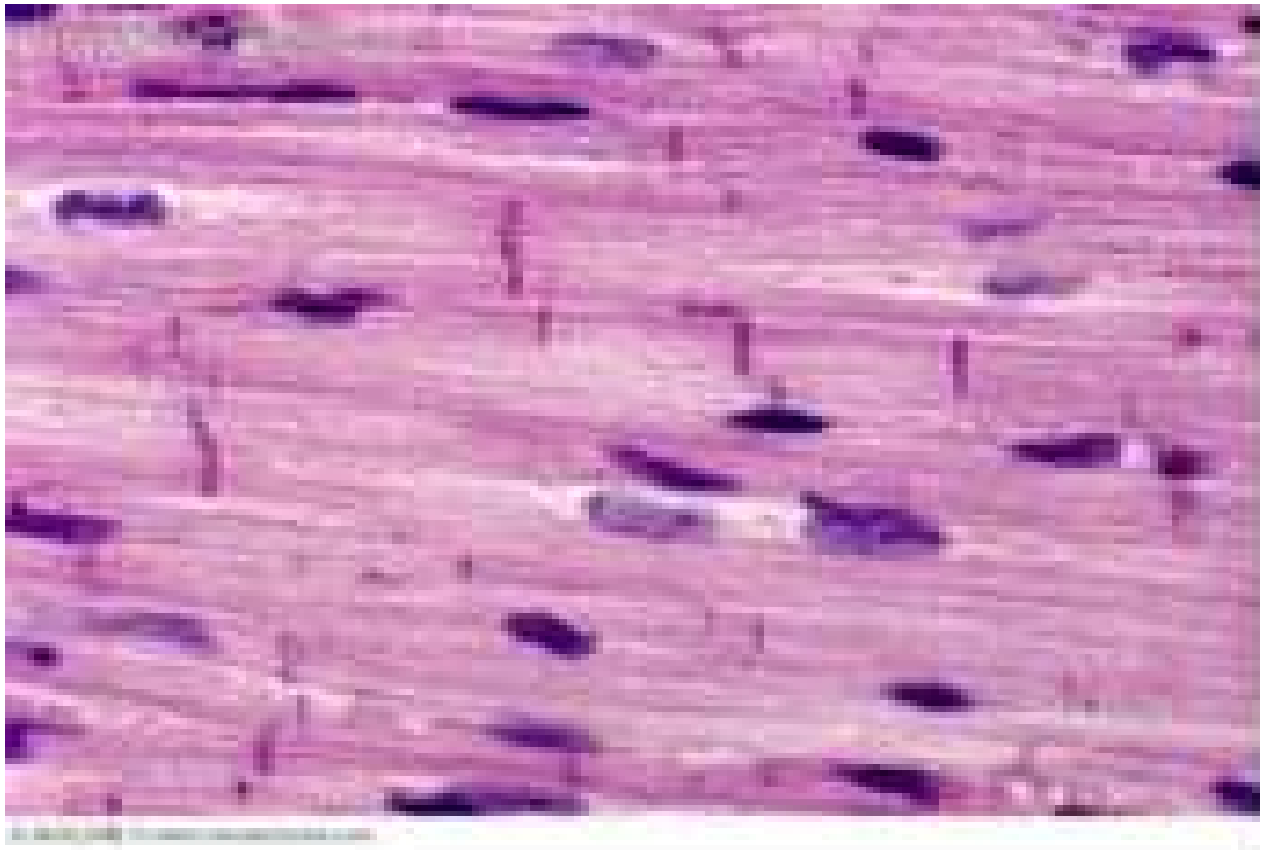


Blood

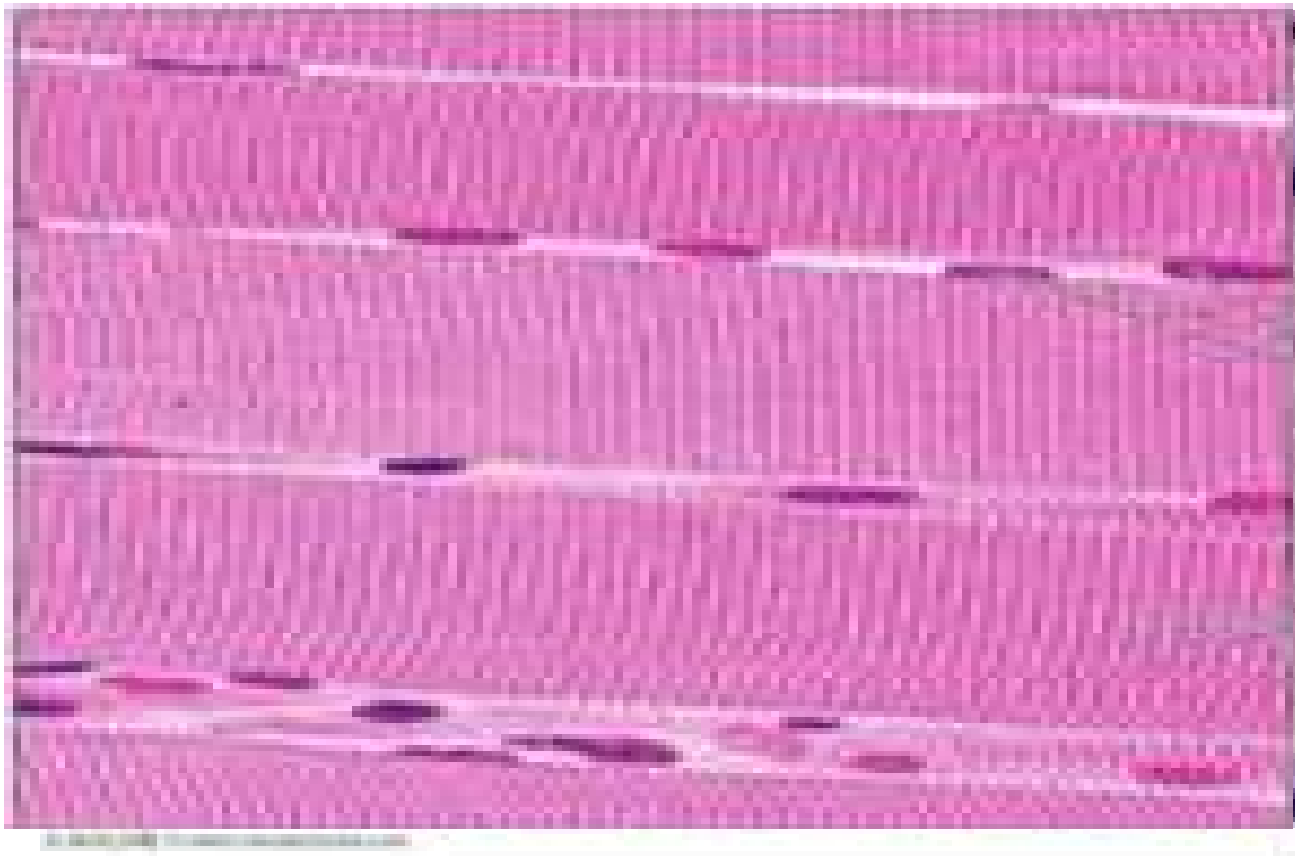


Bone

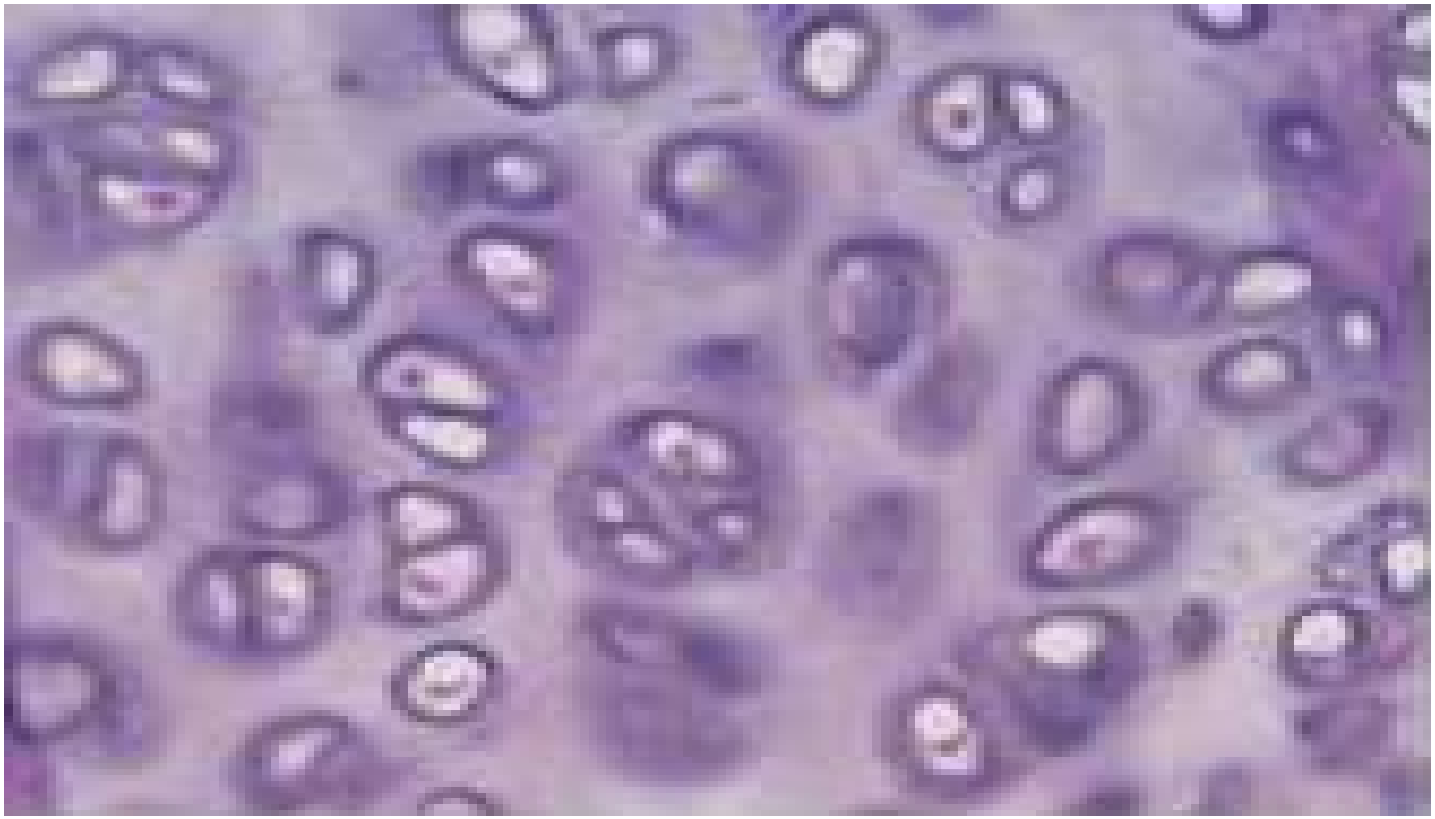
Cardiac Muscle



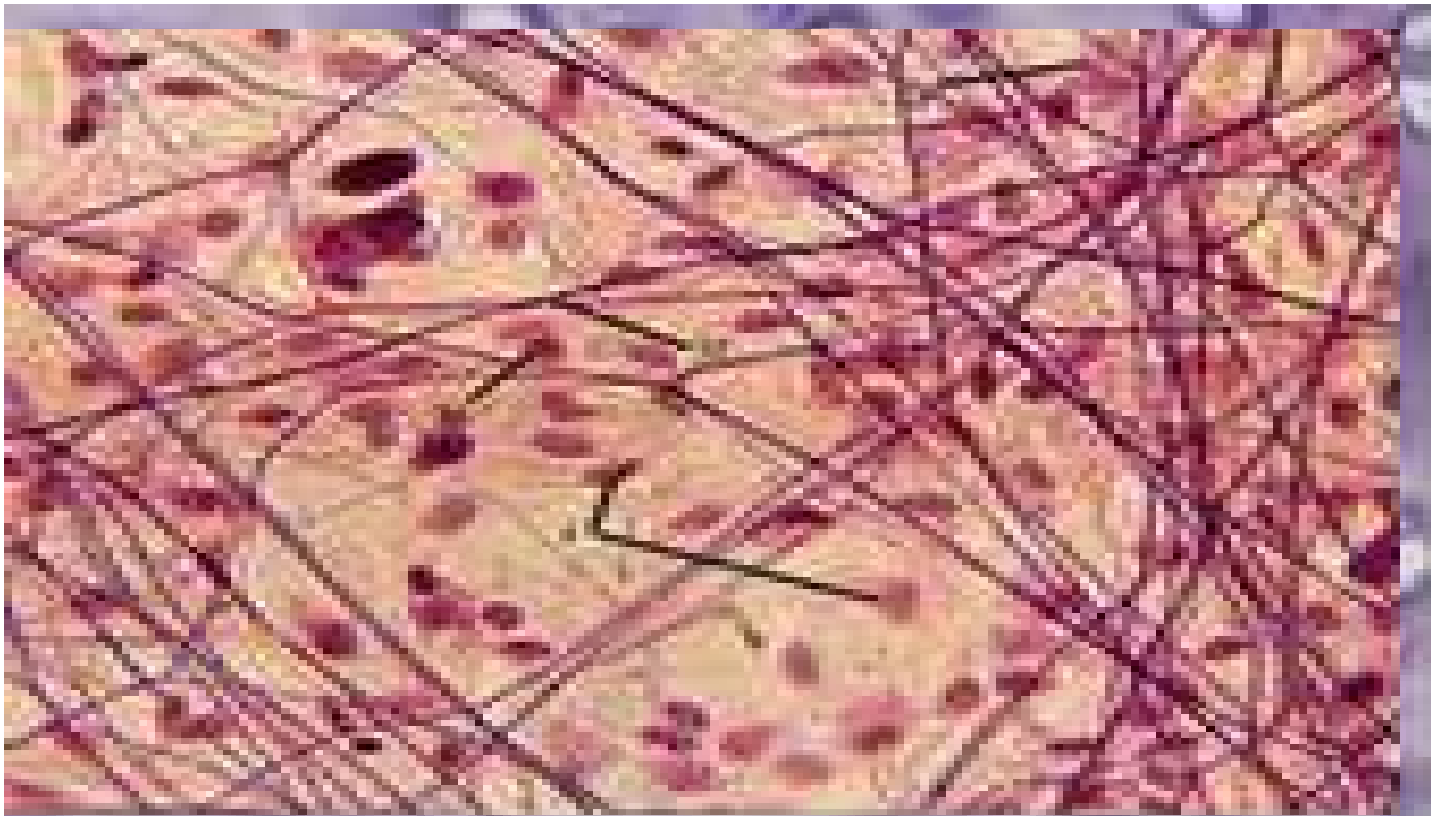
Skeletal Muscle



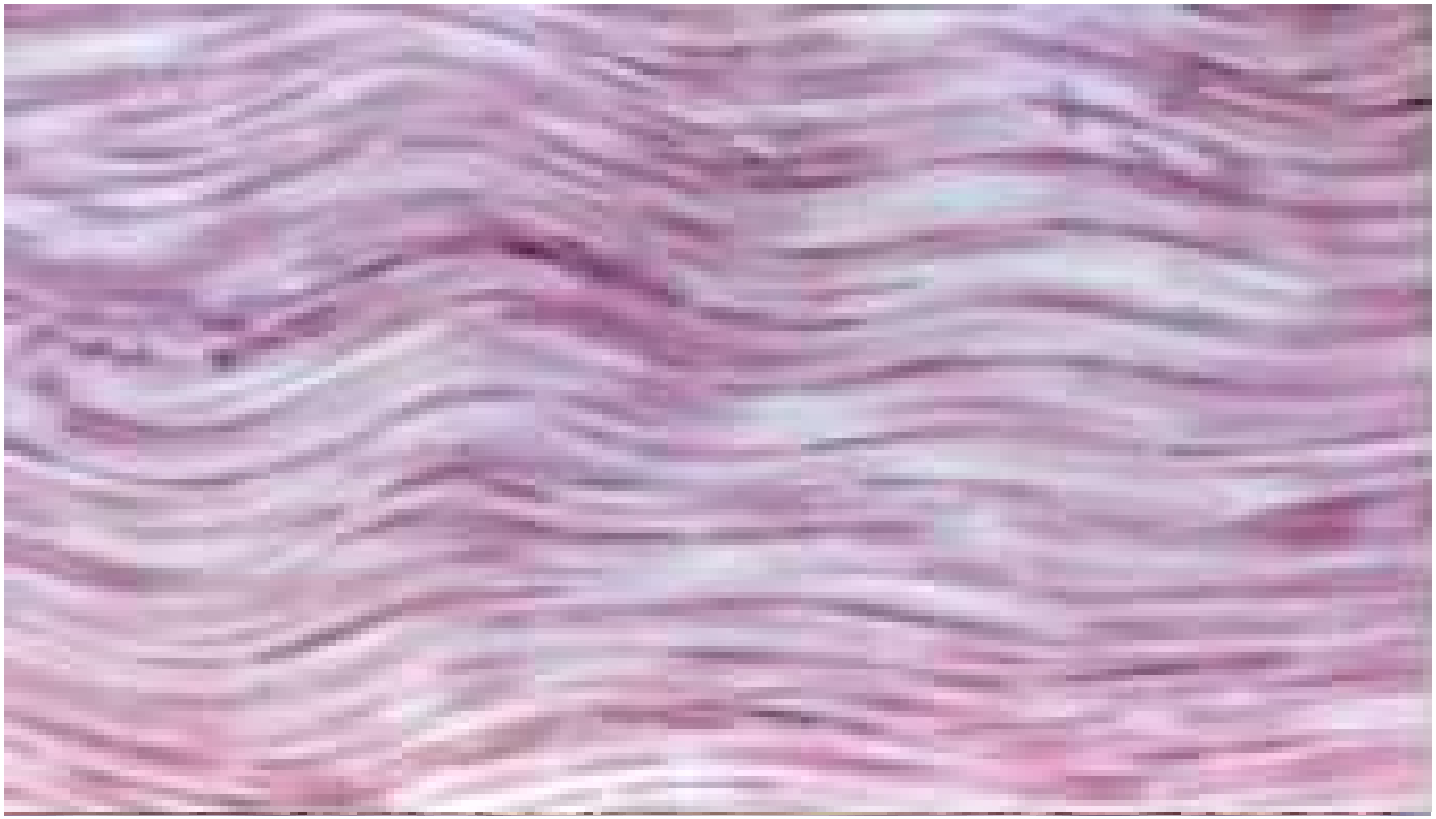
Hyaline Cartilage



Areolar



Dense connective



CONNECTIVE TISSUE

Overview of Connective Tissue

- It CONNECTS body parts
- Found everywhere in the body
- Most abundant and widely distributed of the tissue types

Functions include:

Protecting, supporting, and binding together other tissues

Characteristics of Connective Tissue

1. **Variations in Blood Supply:**
   - **Most are well vascularized (good blood supply).**
   - **Exception: Tendons and ligaments have poor blood supply, cartilages are avascular.**
   - **Consequently, they have a slow healing process**
2. **Extracellular Matrix: non-living substance found outside the cells**

Extracellular Matrix

-Produced by connective tissue cells and then secrete to the exterior

Two main elements:

1. Ground substance- composed largely of water plus some adhesion proteins and large, charge polysaccharide molecules; water reservoir of the body

Extracellular Matrix

Types of Connective Tissue-Bone

- Sometimes called osseous tissue
- Composed of bone cells sitting in cavities called lacunae and surrounded by layers of a very hard matrix that contains calcium salts in addition to large numbers of collagen fibers

Types of Connective Tissue-Cartilage

Less hard and more flexible than bone

Three types:

Hyaline Cartilage

Fibrocartilage

Elastic Cartilage

Types of Connective Tissue

Dense Connective Tissue

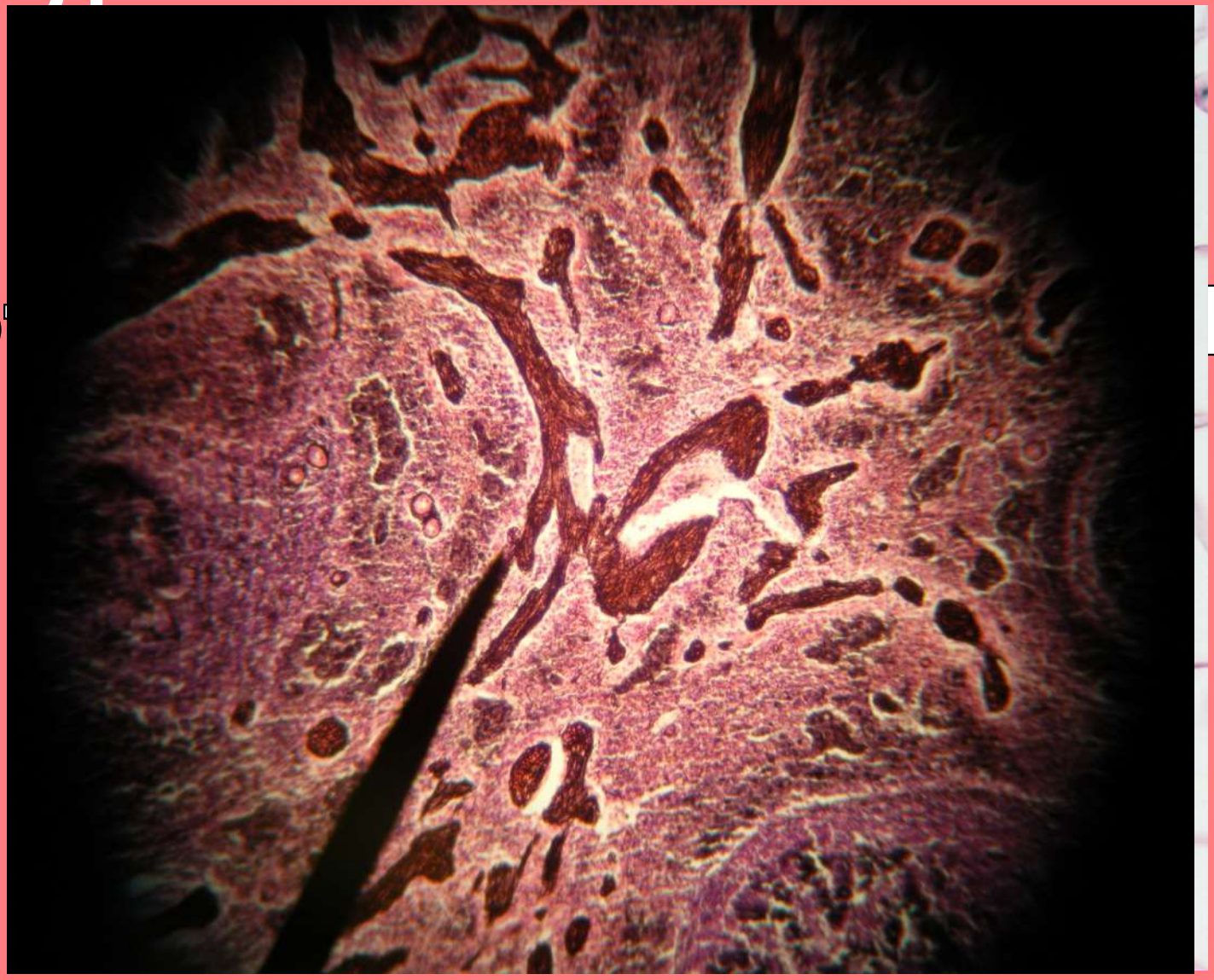
Crowded between the collagen fibers are rows of fibroblasts that manufacture building blocks of the fibers.

Forms strong, ropelike structures

Also makes up the lower layers of the skin

Types of Connective Tissue

- so



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Types of Connective Tissue

Blood

"vascular tissue"

- considered connective tissue because the cells are surrounded by non-living matter (blood plasma)

Warm-up

Connective tissue is characterized by

a. Having simple or stratified layers
b. Goblet cells
c. Cells in a non-living matrix
d. Tissue that functions as a control

MUSCLE TISSUE

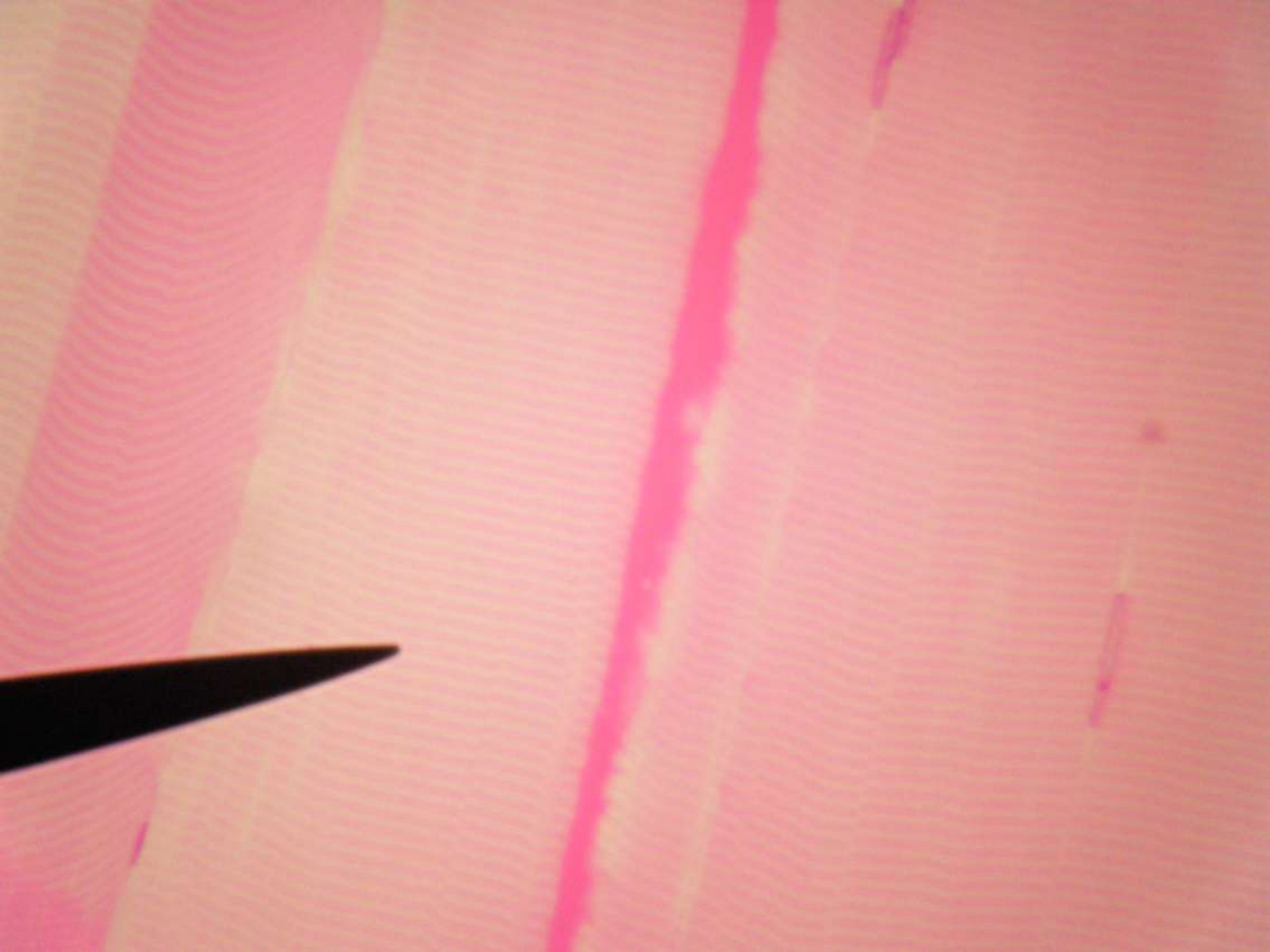
HIGHLY SPECIALIZED TO CONTRACT (SHORTEN), TO PRODUCE MOVEMENT

TYPES OF MUSCLE TISSUE

SKELETAL

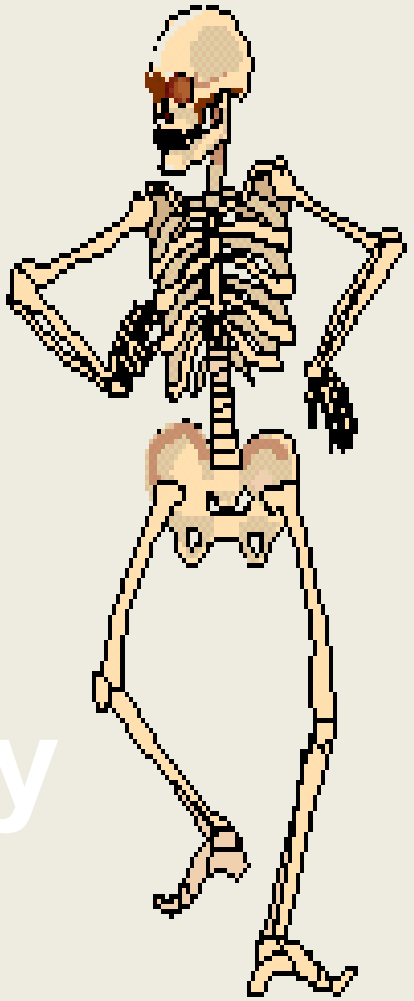
CARDIAC

SMOOTH

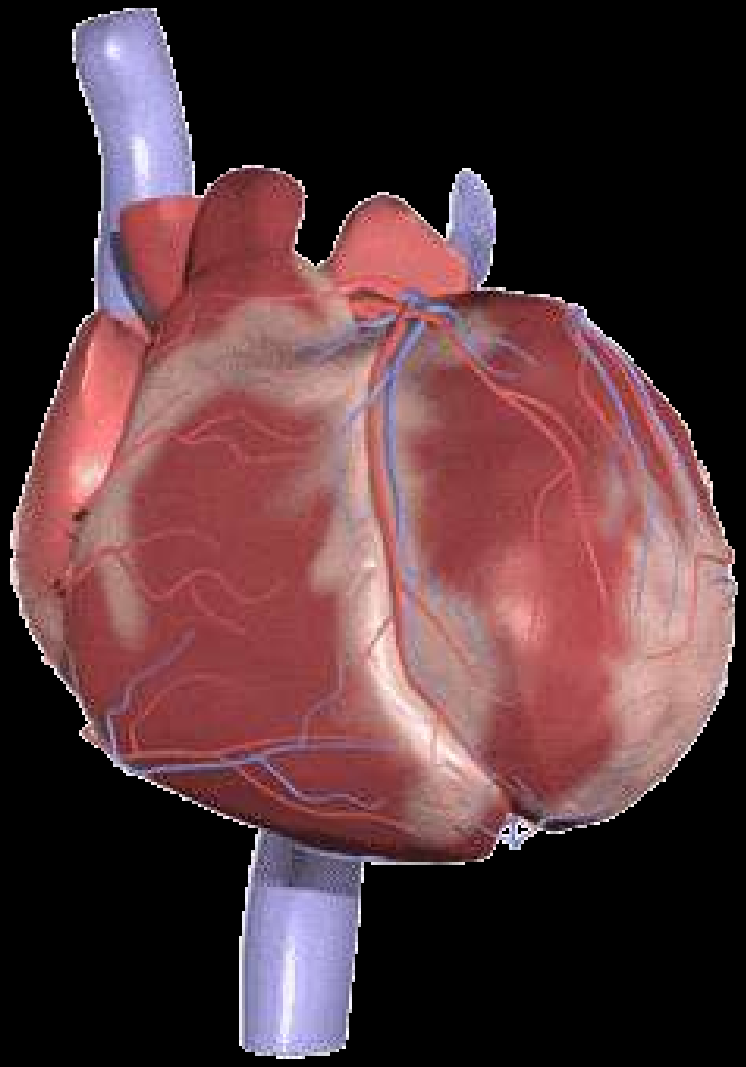


Skeletal Muscle

- Voluntarily controlled (consciously)
- Form the flesh of the body
- When the skeletal muscles contract, they pull on bones or skin



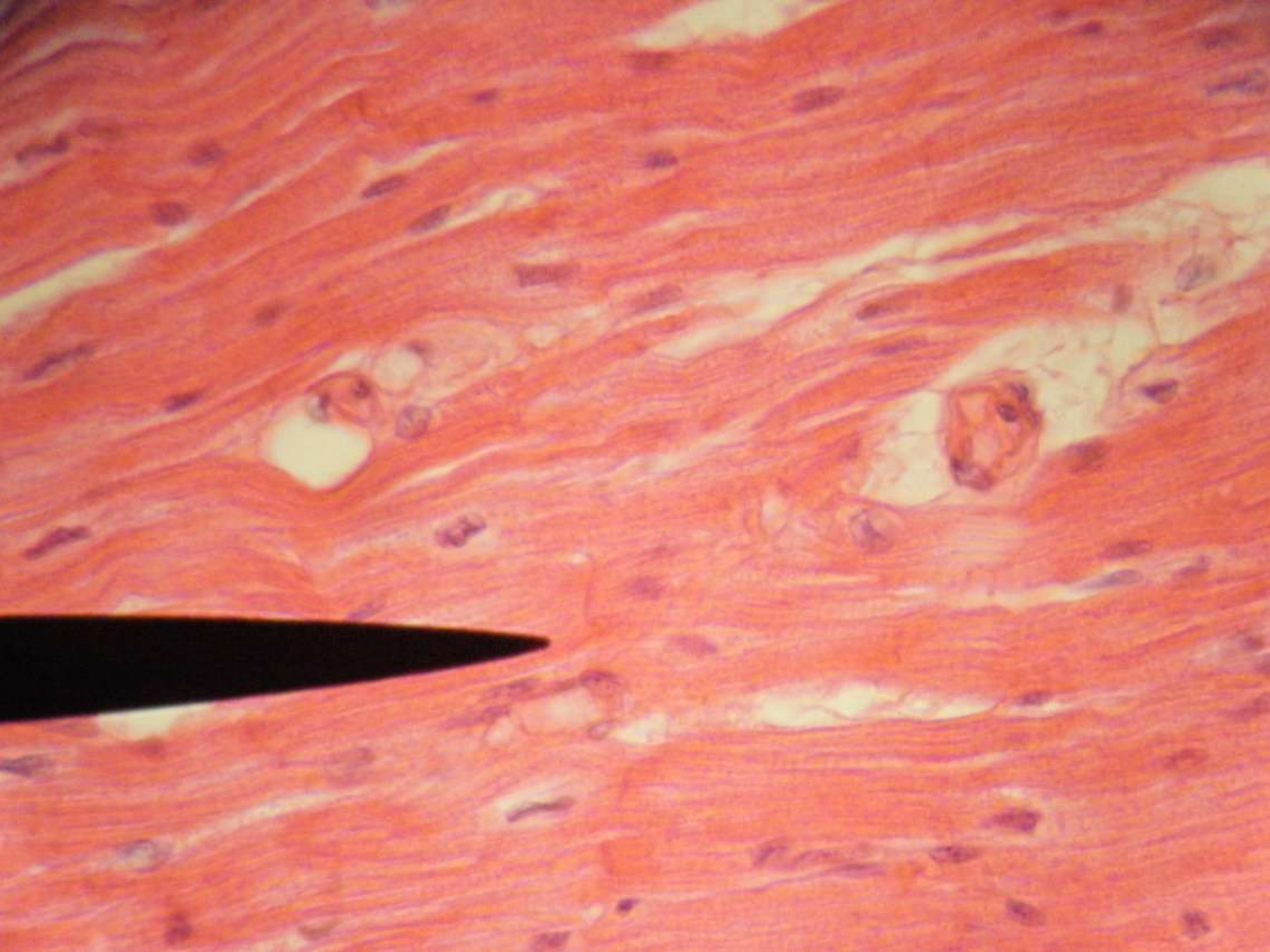
Cardiac Muscle

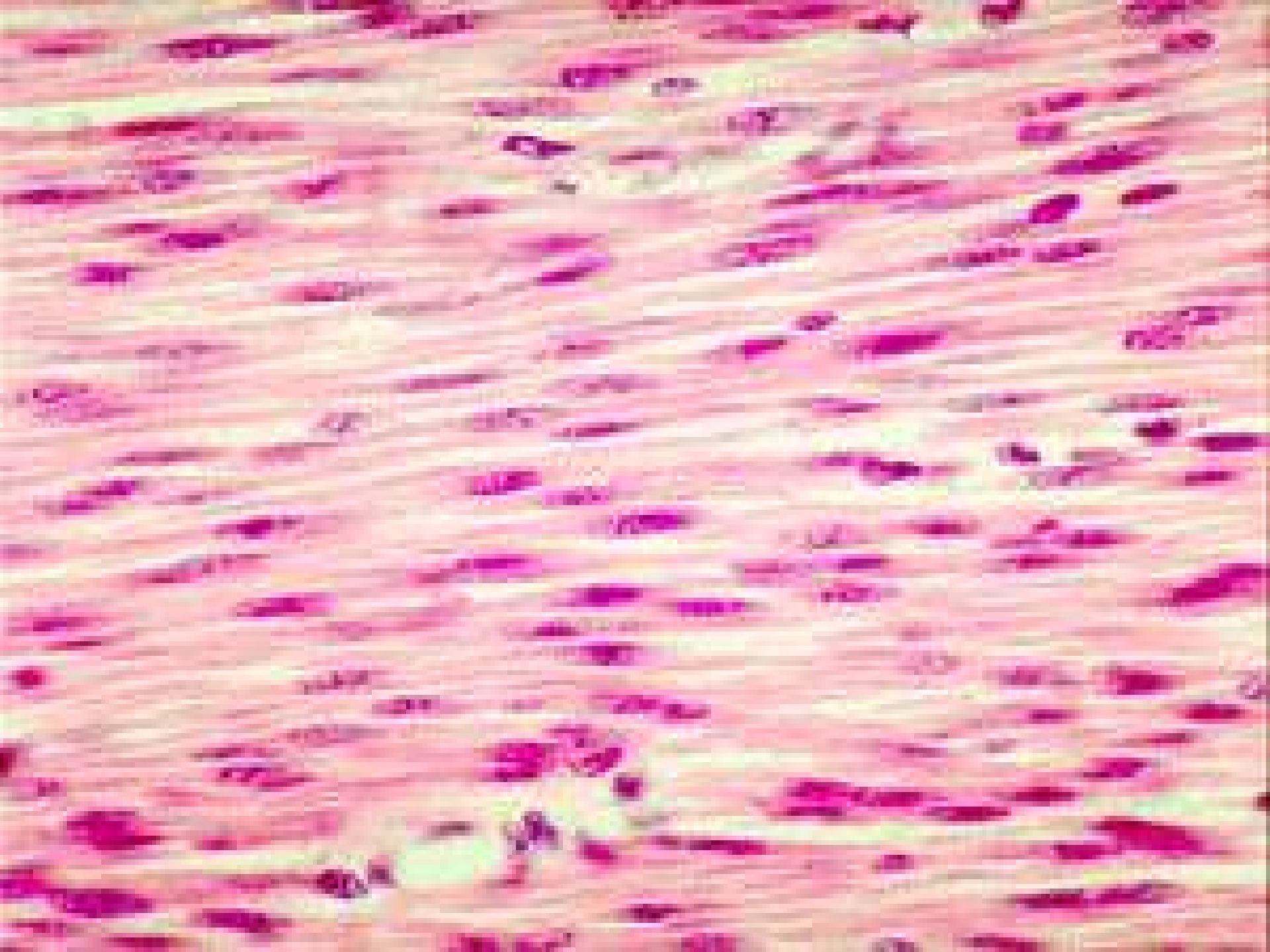


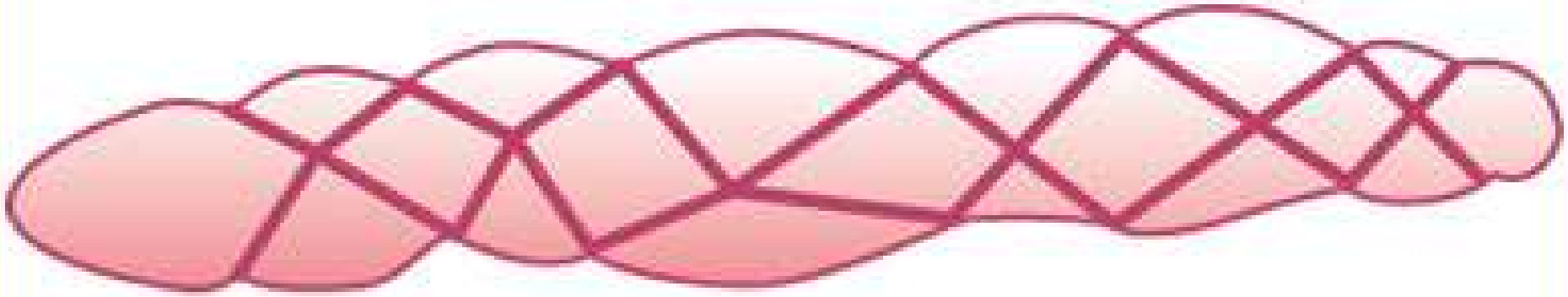
- Found only in the heart.
- As it contracts, the heart acts as a pump and propels blood through the blood vessels
- Under involuntary control

Cardiac Muscle

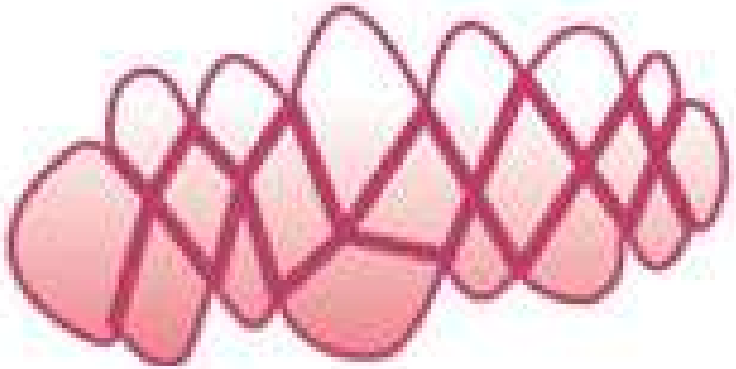
Cardiac muscle has striations, but are uninucleate, relatively short, branching cells that fit tightly together at intercalated junctions.



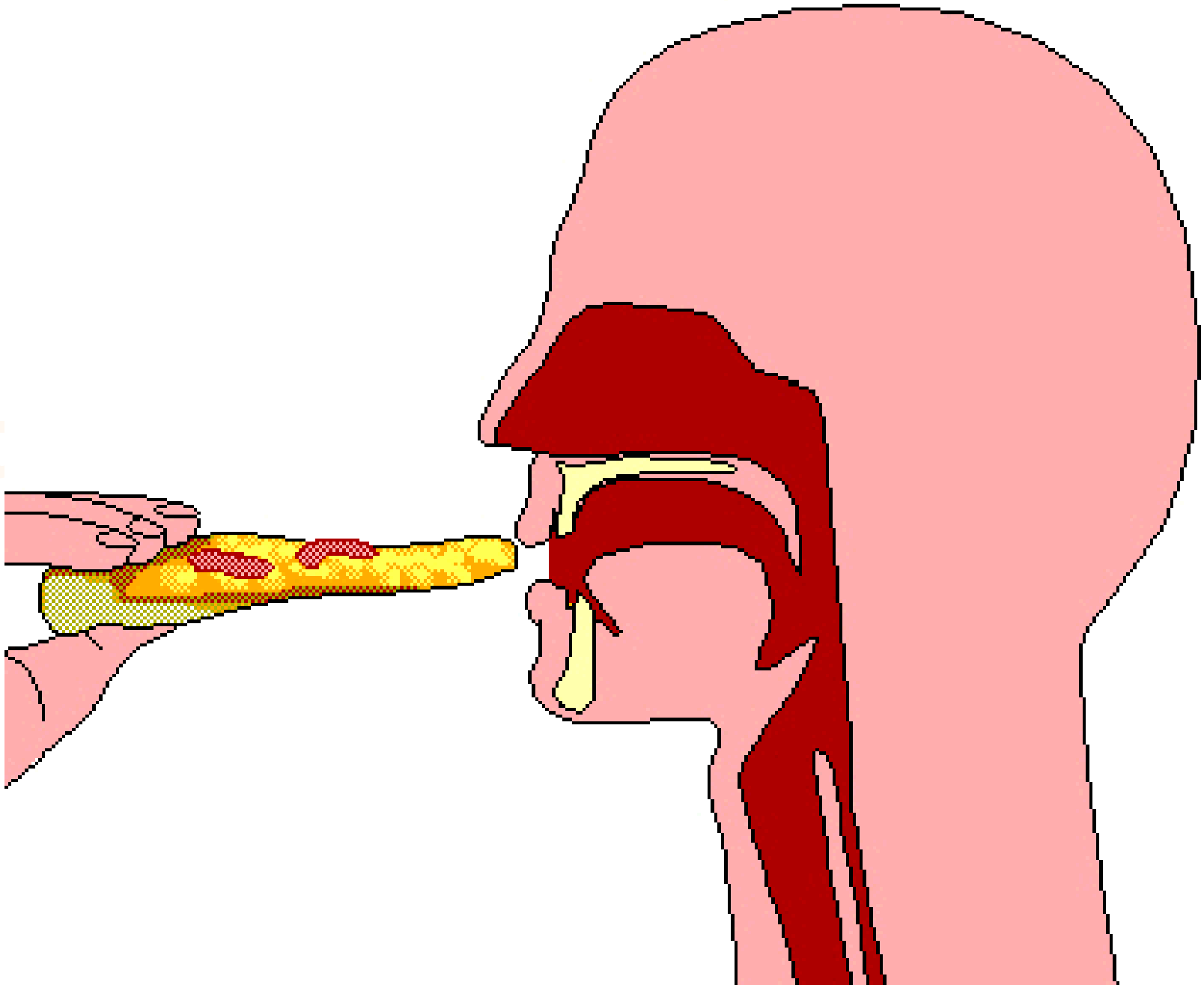




Relaxed smooth muscle cell



Contracted smooth muscle cell



Warm-up

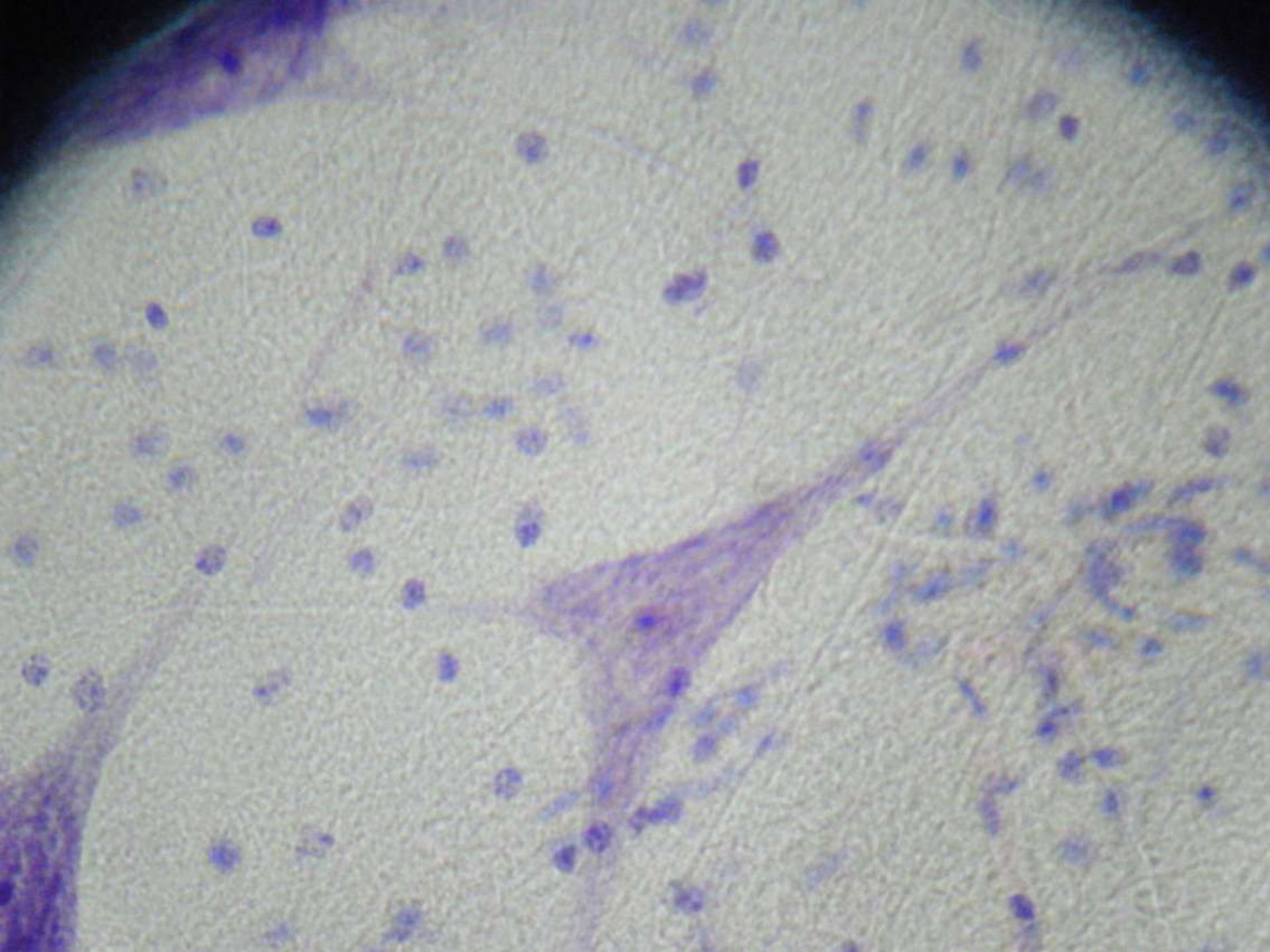
The intercalated disks of the cardiac muscle do which of the following:

a. Pull on bones or skin when contracting
b. Perform a wave-like movement to move food throughout the body
c. Changes the shape of the organ making it smaller or bigger
d. Perform a rapid conduction of electrical pulse across the heart

Nervous Tissue
and
Types of Membranes

Nervous Tissue

Consists of cells called neurons and supporting cells.



CLASSIFICATION OF BODY MEMBRANES

What tissue types would have membranes?

Epithelial Membranes

- Cutaneous
- Mucous
- Serous

Connective Tissue Membranes

Epithelial Membranes	Connective Tissue Membranes

• Also called COVERING and LINING membranes
• Name is inaccurate
  • Although they do contain a sheet of epithelial tissue, it is always combined with an underlying layer of connective tissue. These membranes are actually SIMPLE ORGANS.
	• synovial membranes
	• composed of soft areolar connective tissue and contain NO epithelial cells.
	• Line fibrous capsules surrounding joints, where they provide a smooth surface and secrete a lubricating fluid.
	• Also line small sacs of connective tissue called bursae and tube like tendon sheaths.
	  • Both cushions organs moving against each other during muscle activity

Epithelial Membranes - Cutaneous

- YOUR SKIN
- Its superficial epidermis is composed of stratified squamous epithelium.
- Exposed to air and is a dry membrane

Epithelial Membranes - Mucous

- Composed of various epithelium resting on a loose connective tissue membrane called a lamina propria
- Lines all body cavities that open to the exterior (hollow organs – respiratory, digestive, urinary, and reproductive tracts

Epithelial Membranes - Mucous

Adapted for absorption or seretion

They are “wet” or moist, membranes that are almost continuously bathed in secretions or in urinary mucosae – urine.

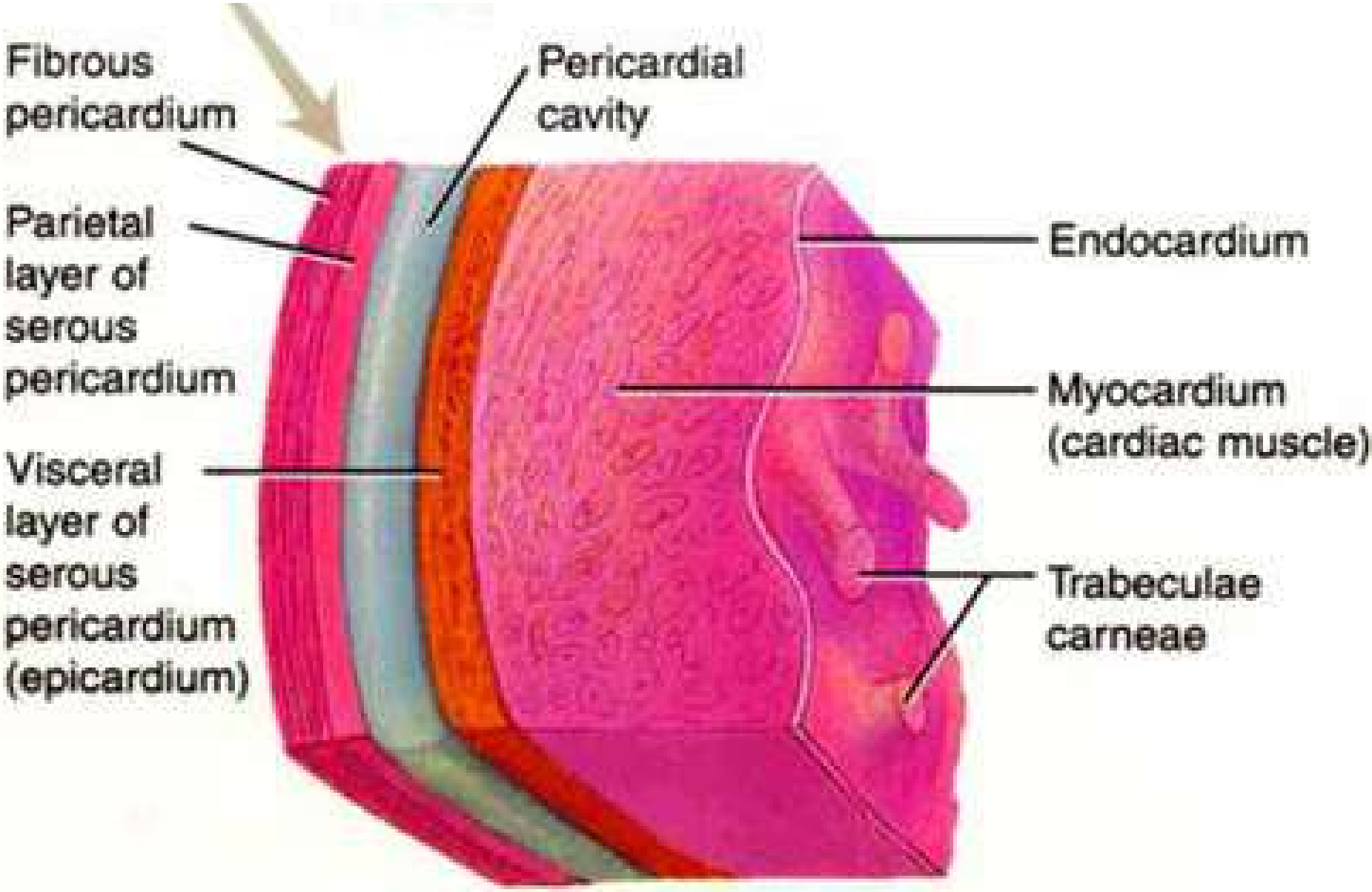
So not all secrete mucus

Epithelial Membranes - Serous

Composed of a layer of simple squamous epithelium

Line body cavities that are closed to the exterior.

Epithelial Membranes - Serous



Epithelial Membranes - Serous

The serous layers are separated by a scanty amount of thin, clear fluid (serous fluid) Serous fluid allows the organs to slide easily across the cavity walls and one another without friction as they carry out their routine functions.

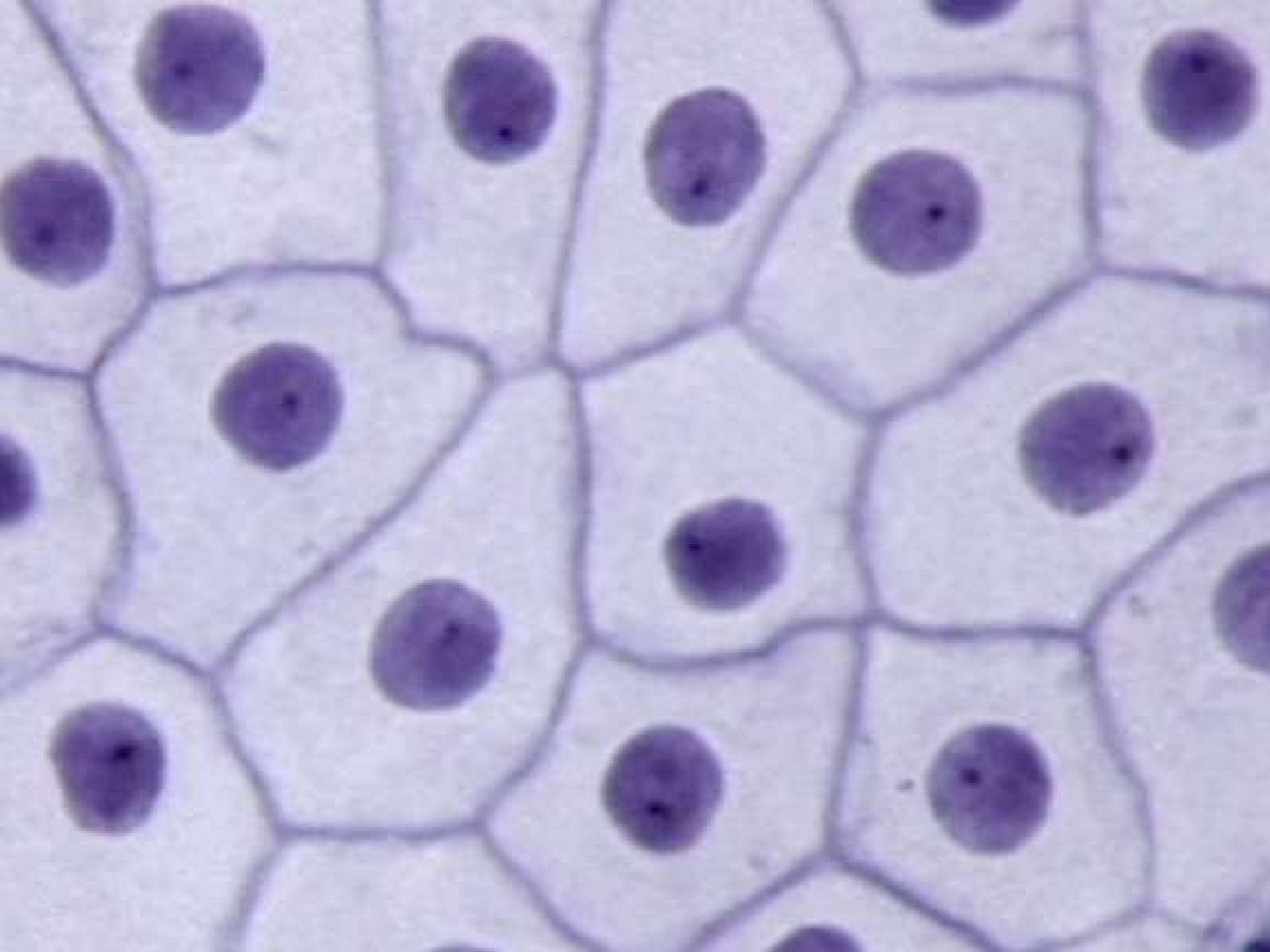
Specific Names of Serous Membranes

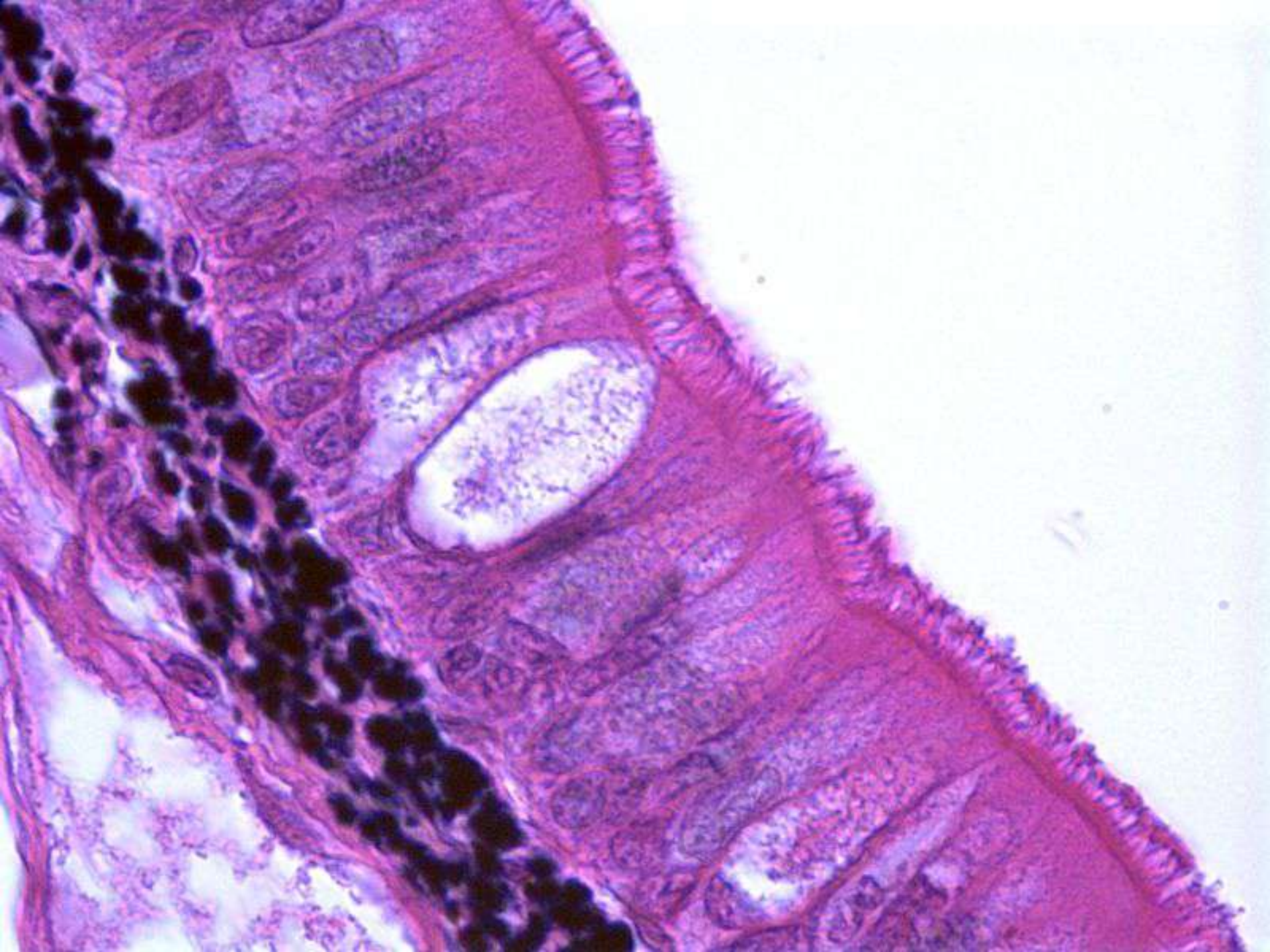
Names depend on their locations.

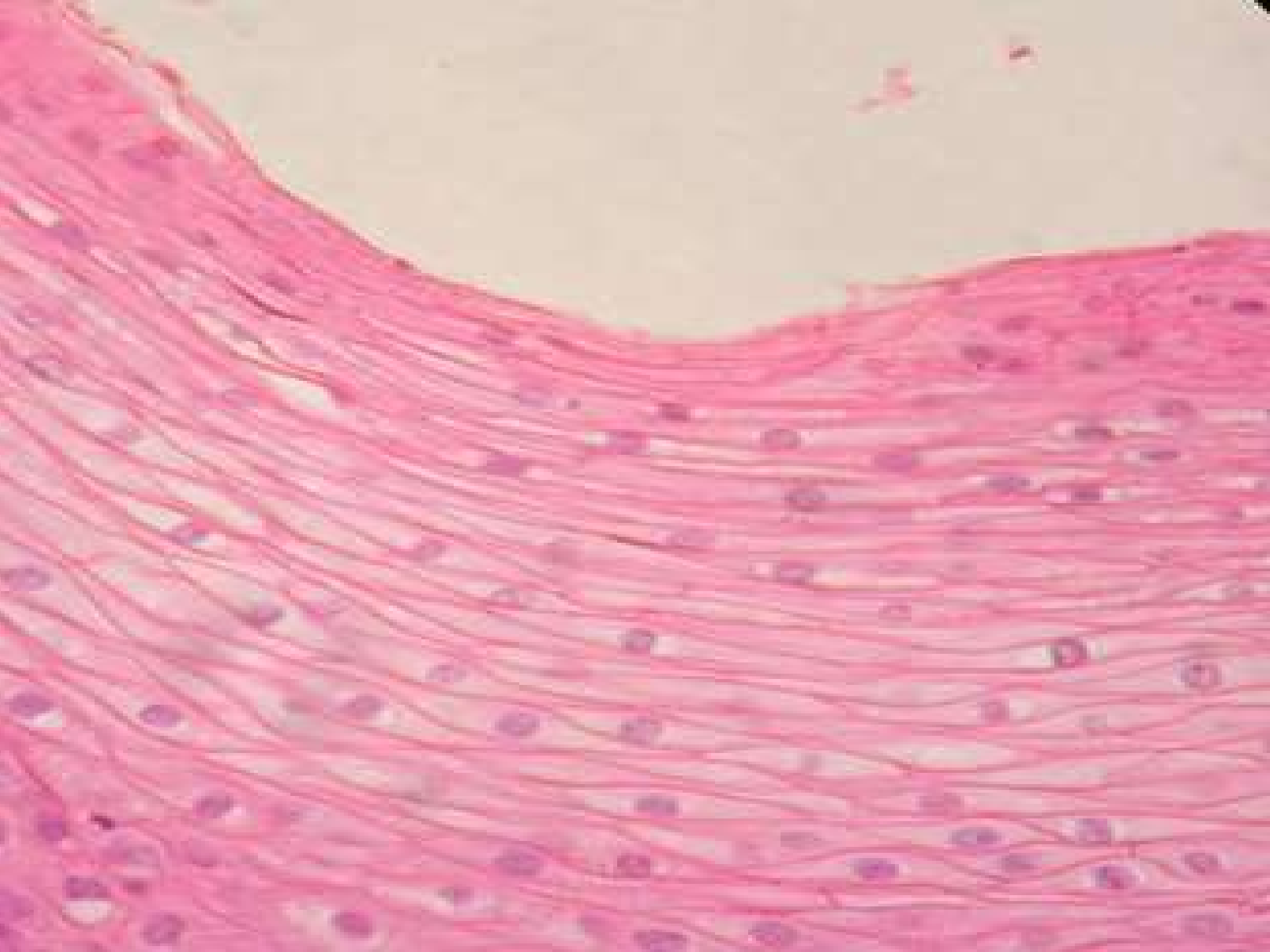
- Peritoneum – serosa lining the abdominal cavity and covering its organs
- Pleura – in the thorax surrounding the lungs
- Pericardium – surrounding the heart

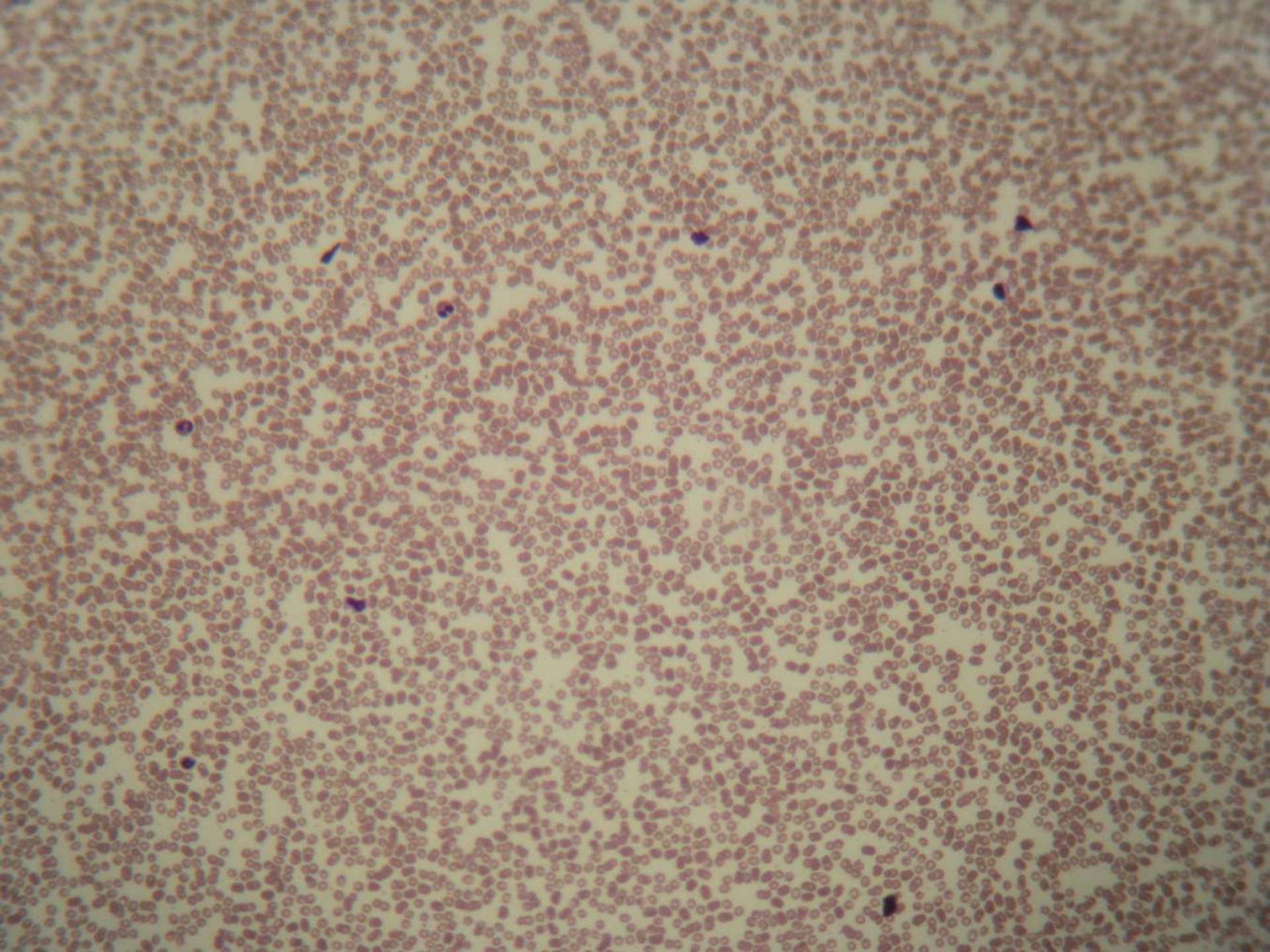
Practice Classifying Tissues

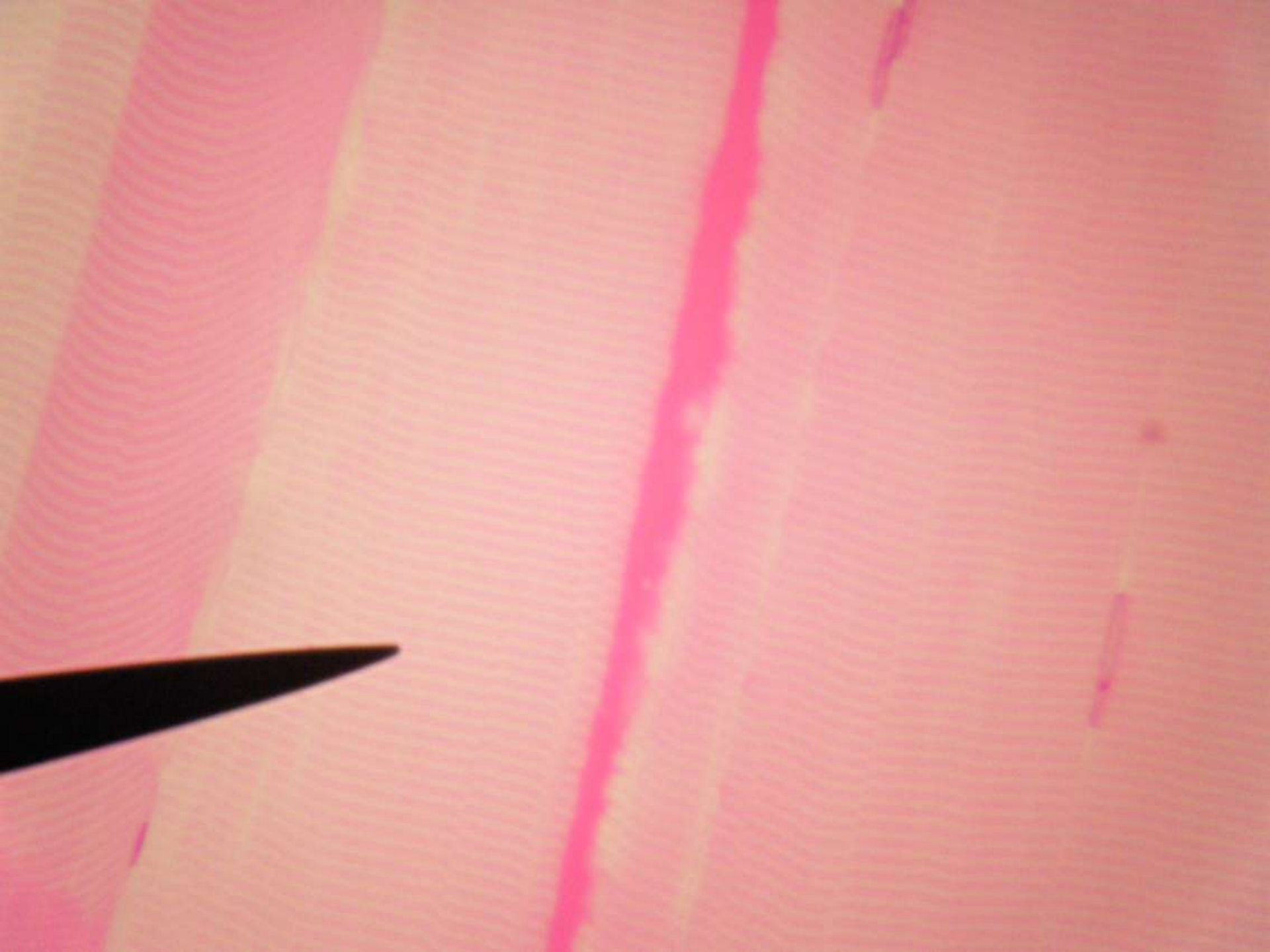
On the following slides, use your knowledge of the types of tissues to classify the type of tissue shown

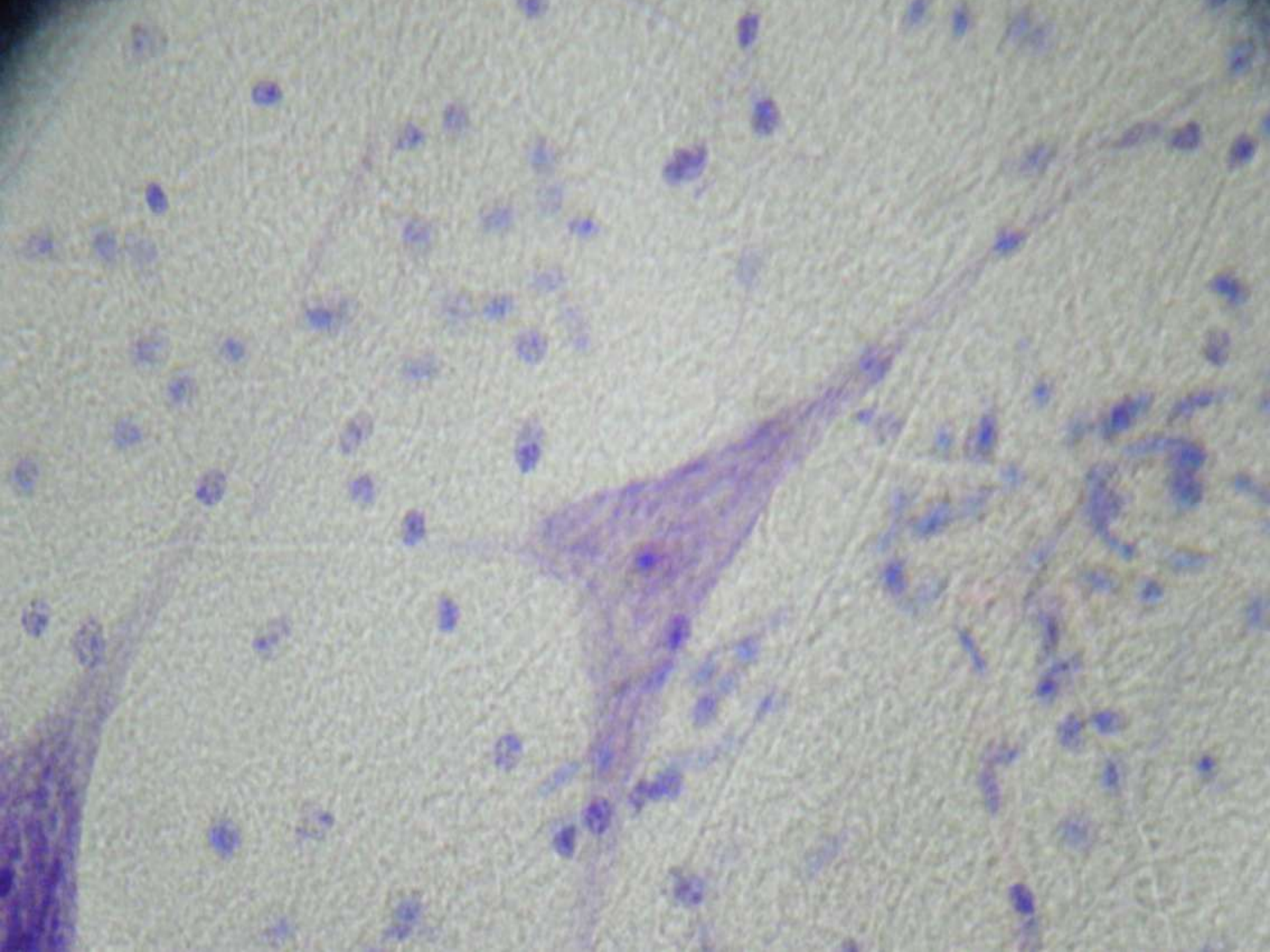












Match the following descriptions to the correct membrane

1. Wet or moist membranes
2. Covering or lining membranes
3. Your skin

a. Cutaneous
b. Mucous
c. Epithelial

Tissue Regeneration

Tissue Repair

The body has techniques for protecting itself against uninvited guests or injury.

Body's physical barriers: skin, mucous membranes, cilia, strong acid produced by stomach glands


Types of Responses
Inflammation – generalized body (nonspecific) body response that attempts to prevent further injury
Immune – extremely specific and mounts vigorous attack against recognized invaders (bacteria, viruses, toxins)

Tissue Repair

Also known as wound healing.

Occurs in two major ways:

1. Regeneration – replacement of destroyed tissue by that same kind of cells
2. Fibrosis – repair of dense connective tissue by formation of scar tissue

When will regeneration and fibrosis occur?

Which occurs depends on:

1. The type of tissue damage
2. The severity of the injury

Tissue injury sets the following events into motion

1. The capillaries become permeable
2. Granulation tissue forms
3. Surface epithelium regenerates

Warm-Up

1. Blood seeps to injured area.
2. Granulation Tissue forms
3. Clot forms.
4. Scar

Which of the following is the correct order of tissue regeneration?

a. 1,2,3,4 b. 4,3,2,1

c. 2,4,1,3 d. 1,3,2,4

Cell and Tissue Development

Read and Respond

Read the “Developmental Aspects of Cells and Tissues” (pg 101 & 104)

Answer the corresponding questions on your worksheet.

Define bold terms on page 102.