

كلية
المستقبل الجامعة

قسم الصيدلة



Human biology

Supportive Connective Tissue

Lab 4

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Supportive Connective Tissue:

1- CARTILAGE: Jelly-like matrix (chondroitin sulfate) containing collagen and elastic fibers and chondrocytes surrounded by a membrane called the **perichondrium**.

Unlike other CT, cartilage has **NO** blood vessels or nerves except in the perichondrium.

The strength of cartilage is due to collagen fibers and the resilience is due to the presence of chondroitin sulfate.

Chondrocytes occur within spaces in the matrix called **lacunae**.

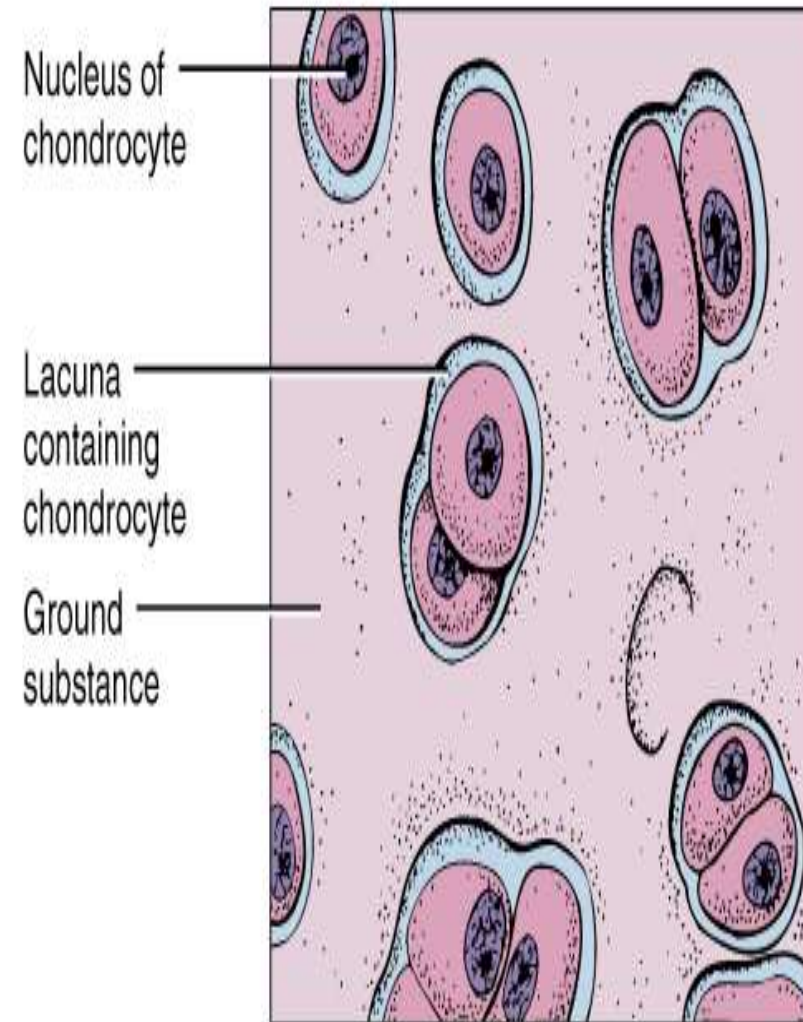
Types of cartilage:

1- Hyaline cartilage 2- Fibrocartilage 3- Elastic cartilage

Supportive Connective Tissue:

1. Hyaline Cartilage (most abundant type)

- ❑ Collagen fibers embedded in matrix with chondrocytes inside lacunae.
- ❑ Found in embryonic skeleton, at the ends of long bones, in the nose and in respiratory structures.
- ❑ Function: flexible, provides support, allows movement at joints.



Hyaline cartilage

Supportive Connective Tissue:

2. Fibrocartilage

- ❑ Contains bundles of collagen in the matrix that are usually more visible under microscopy.
- ❑ Found in the intervertebral discs
- ❑ Function = support and absorbs shocks.

Histology Lab Part 9: Slide 39

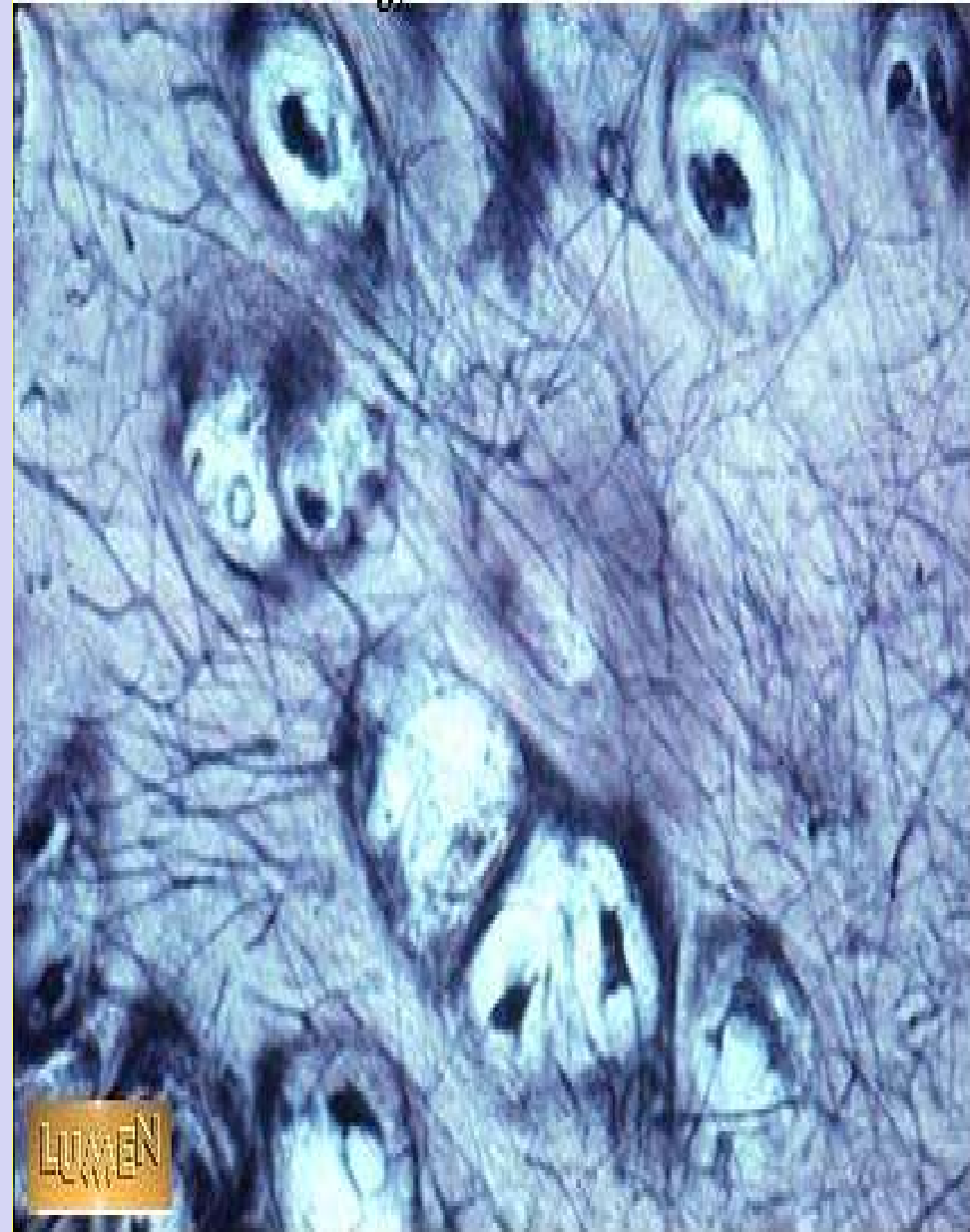


Supportive Connective Tissue:

3. Elastic Cartilage

- ❑ Threadlike network of elastic fibers within the matrix.
- ❑ Found in external ear, and epiglottis.
- ❑ Function = gives support, maintains shape, allows flexibility

Histology Lab Part 9: Slide 36



LOWEN

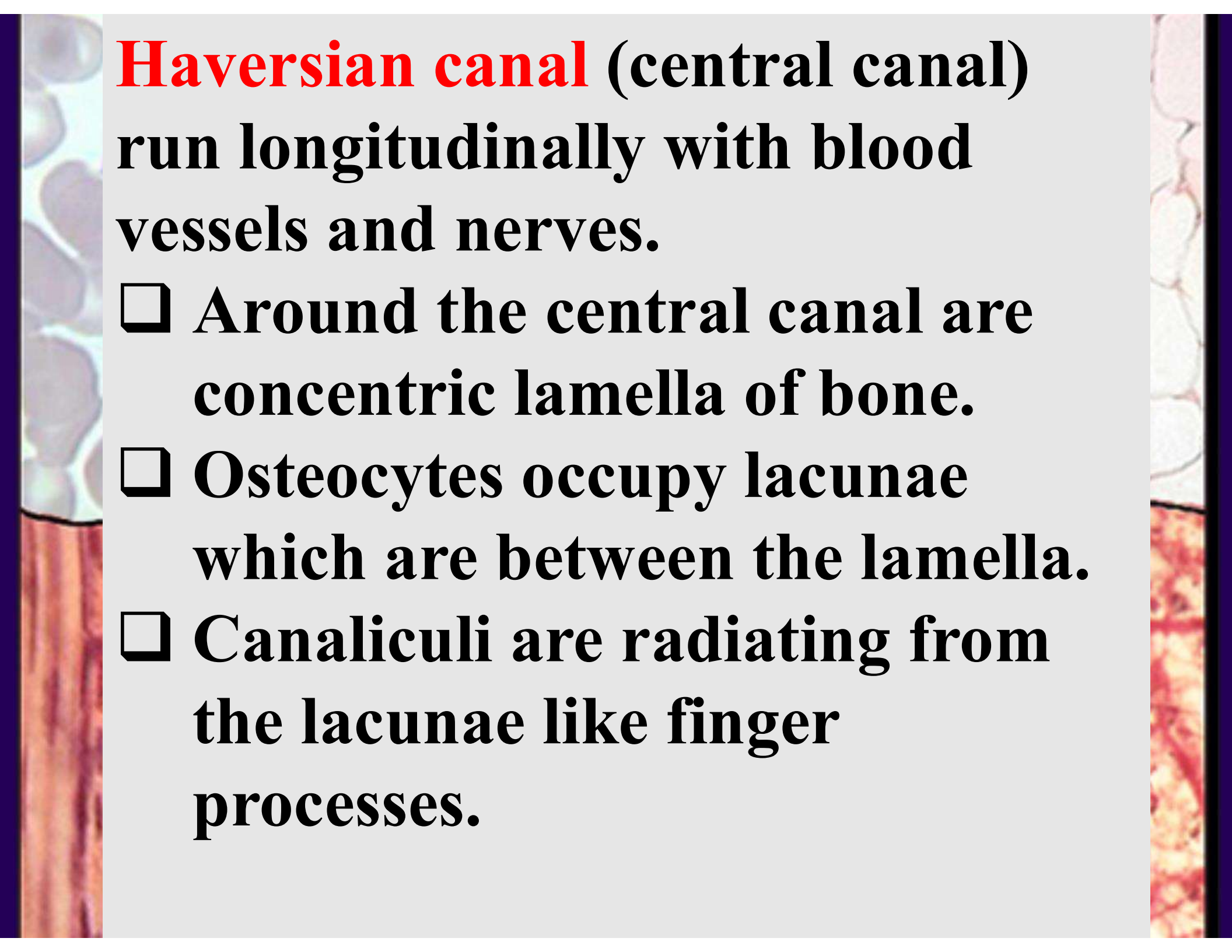
BONE

1-Spongy bone:

- It is made of spongy porous, not like compact bone.
- Found in ends of long bones.
- Function: for producing blood cells.

2-Compact bone:

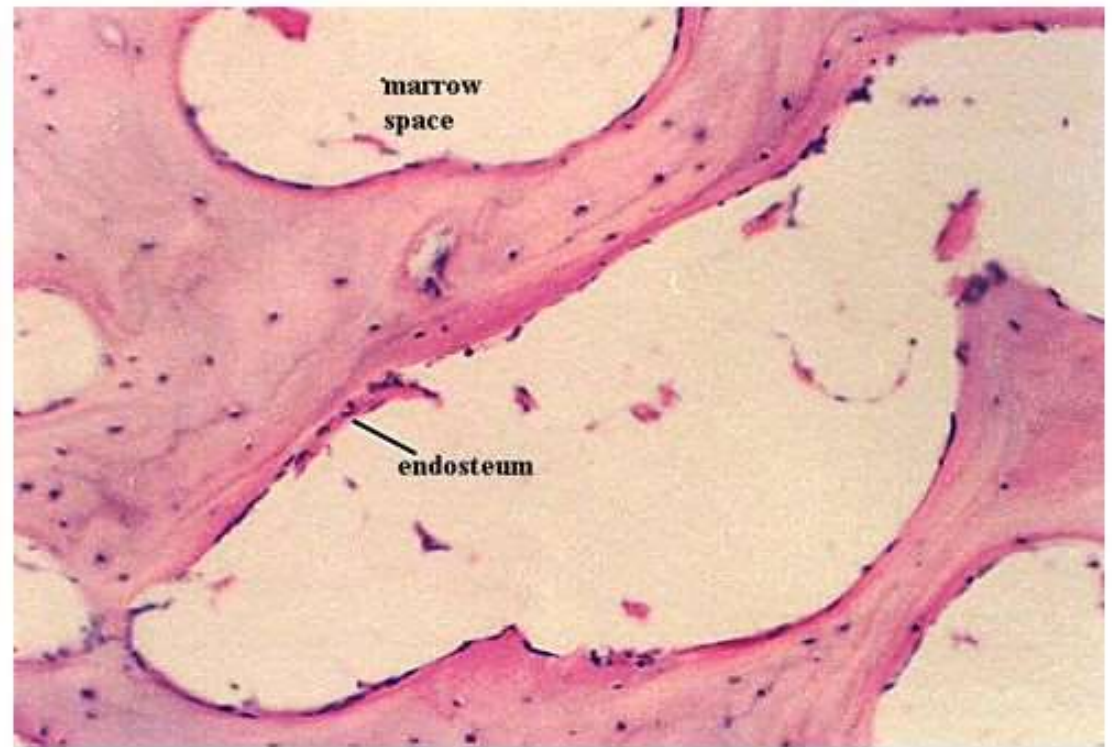
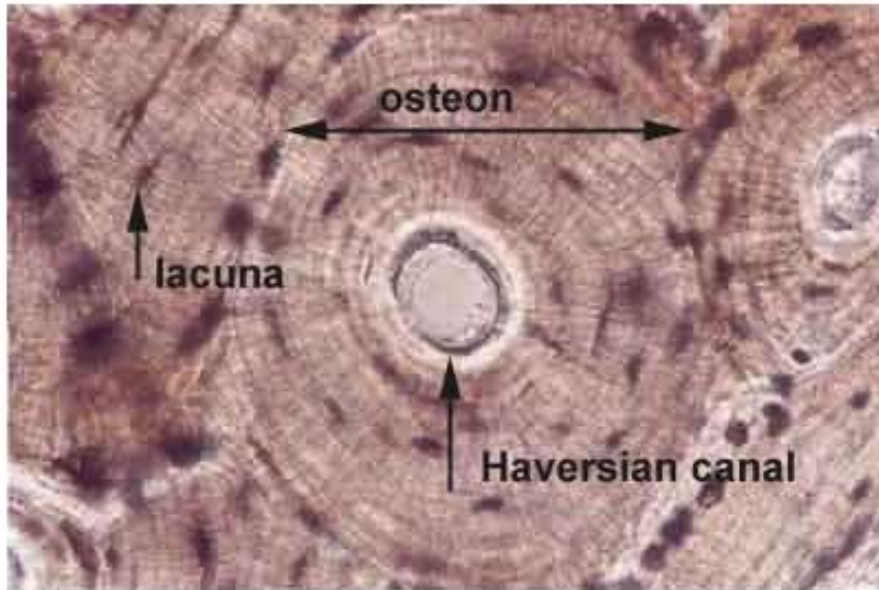
- Found in most long tissue.
- Blood vessels and nerves penetrate periosteum through horizontal opening called Volkmann's canals.

The slide features three vertical panels of microscopic images. The left panel shows a cross-section of bone with a central canal. The middle panel shows a longitudinal section of bone with concentric lamellae. The right panel shows a cross-section of bone with a central canal. The text is overlaid on the middle panel.

Haversian canal (central canal) run longitudinally with blood vessels and nerves.

- Around the central canal are concentric lamella of bone.
- Osteocytes occupy lacunae which are between the lamella.
- Canaliculi are radiating from the lacunae like finger processes.

Compact Bone (Ground bone) vs. Spongy Bone (Cancellous bone)



Note the absence of osteons in spongy bone

Blood System FUNCTION

1- Blood transports oxygen and nutrients to body cells

2- Blood removes carbon dioxide and other waste products from body cells for elimination

Composition of Blood

A-Plasma: 90 percent water = liquid portion of blood

□ Transports cellular elements of blood throughout circulatory system

– Remaining portion is salts and plasma proteins: albumins, globulins, and fibrinogen

Blood Cells

blood cells are two types:

- **1-Erythrocytes**

- Known as **red blood cells (RBC)**

- Tiny biconcave-shaped disks

- Thinner in center than around edges

- No nucleus in mature red blood cell

- Average life span = approximately 120 days

- Main component = hemoglobin

- Primary function = transport oxygen to cells of body

- **2- Leukocytes**

- **Known as white blood cells (WBC)**

- **Larger than erythrocytes, but fewer in number**

- **Mature WBC has a nucleus; does not have hemoglobin**

- **Two categories = granulocytes + agranulocytes**

- **Granulocytes have granules in their cytoplasm**

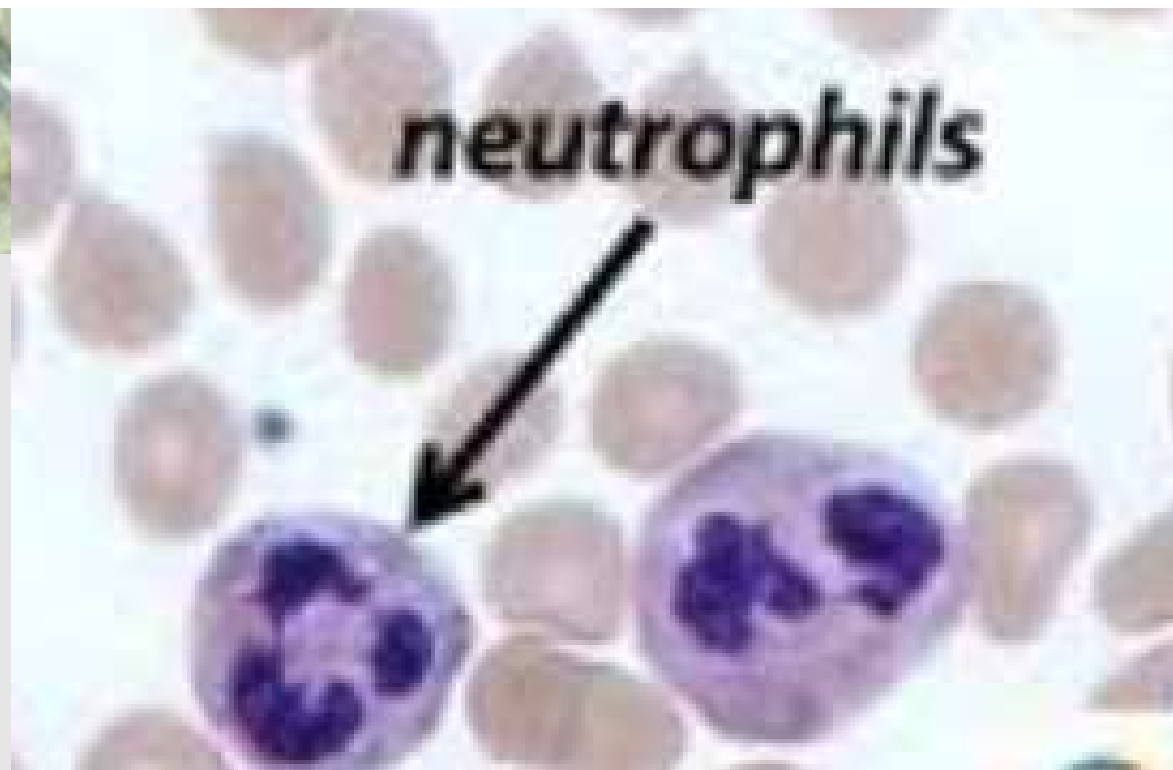
- **Agranulocytes have no granules in their cytoplasm**

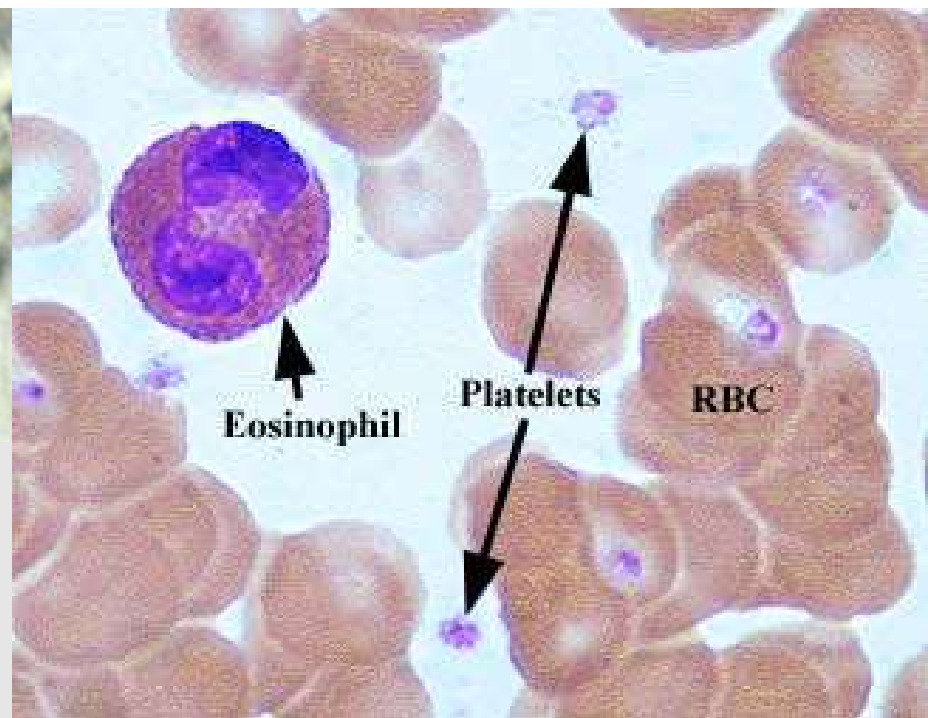
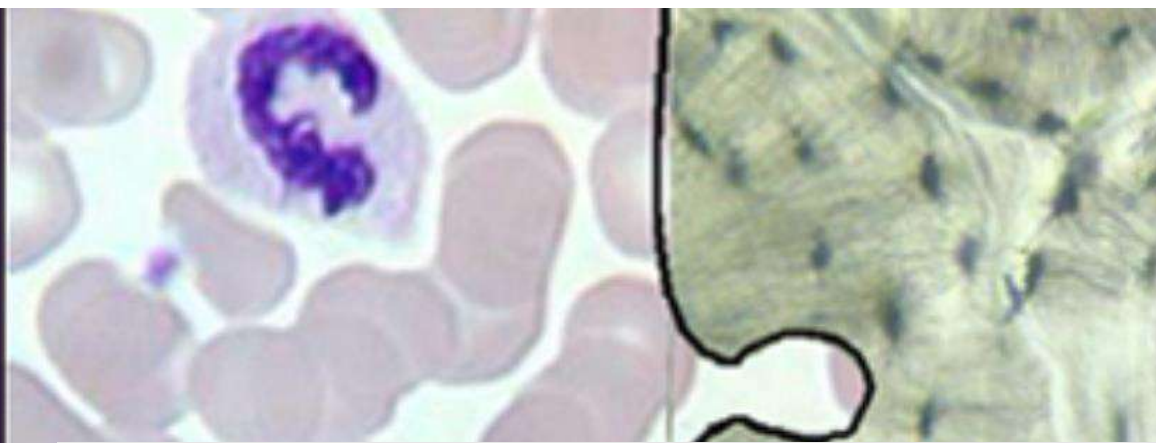
- **Five different types of leukocytes within the categories**

- **Granulocytes**

- **Neutrophils**

- **Constitute approximately 60-70 percent of all WBCs**
- **Have multi-lobed nuclei**
- **Phagocytic in nature**
- **Do not absorb acid or base dye well**
 - **Remain fairly neutral color**





- **granulocytes**

- **Eosinophils**

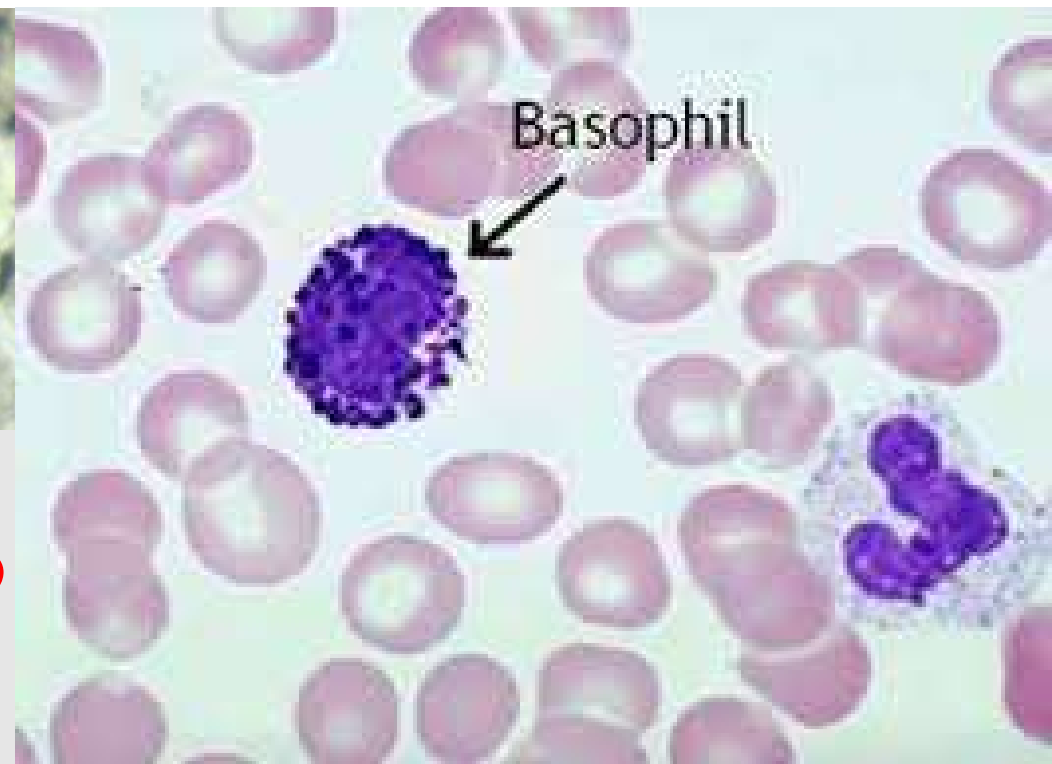
- **Constitute approximately 2-4 percent of all WBCs**
- **Have a nucleus with two lobes**
- **Increase in number in response to allergic reactions**
- **Stain a red, rosy color with an acid dye**

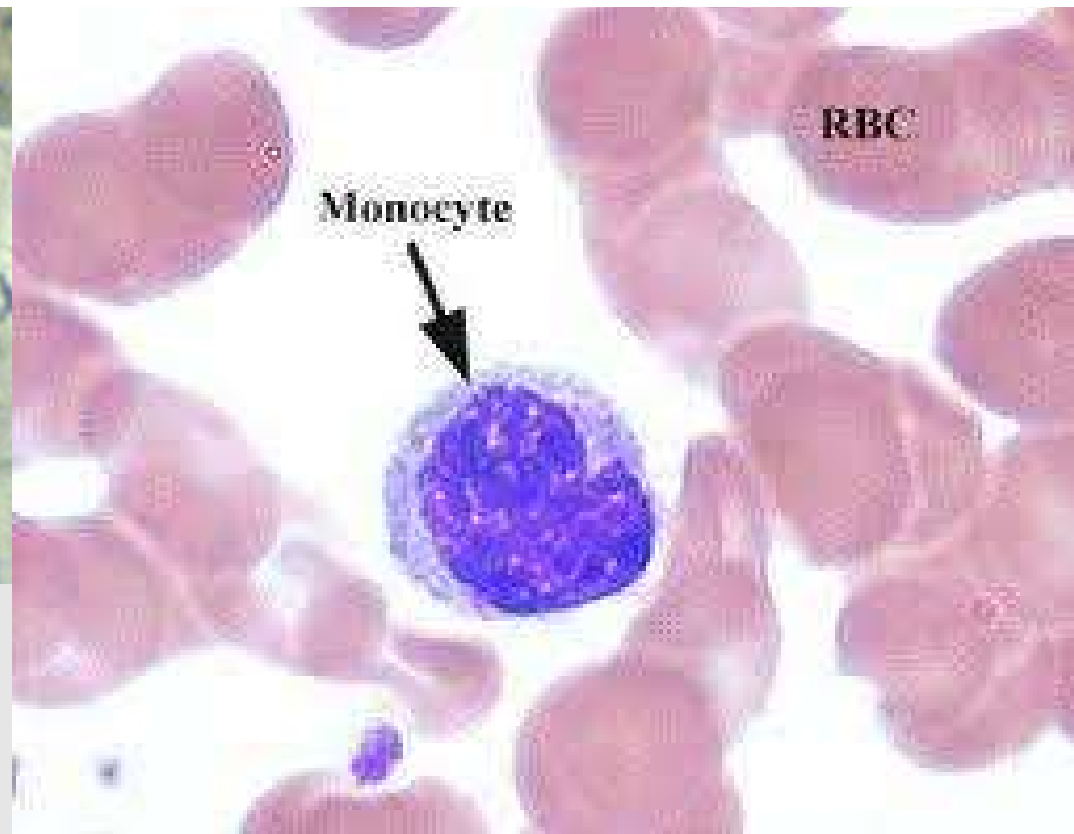
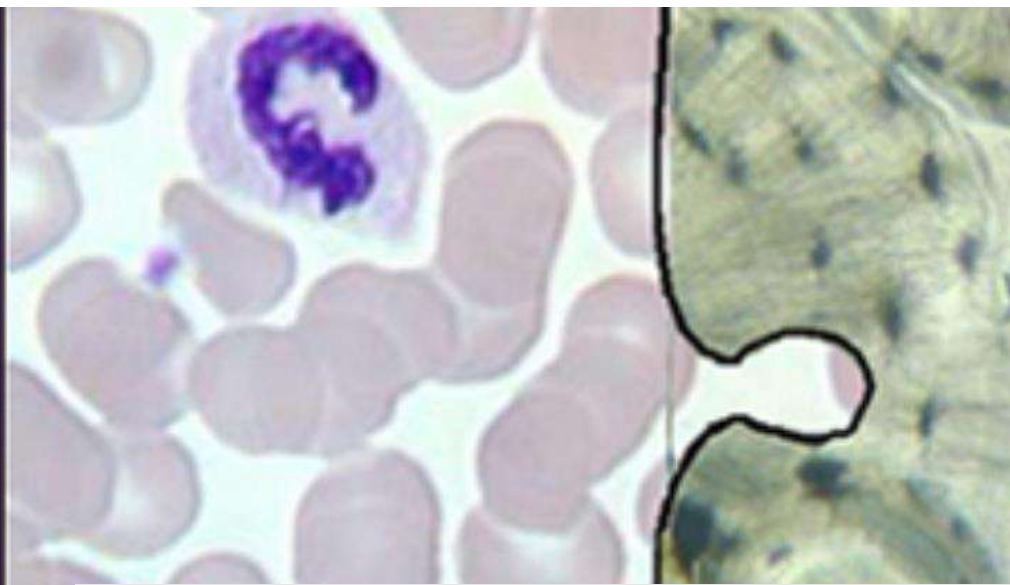


- **granulocytes**

- **Basophils**

- **Constitute less than 1 percent of all WBCs**
- **Have a nucleus with two lobes**
- **Secrete histamine during allergic reactions**
- **Secrete heparin – a natural anticoagulant**
- **Stain a dark blue with a base dye**



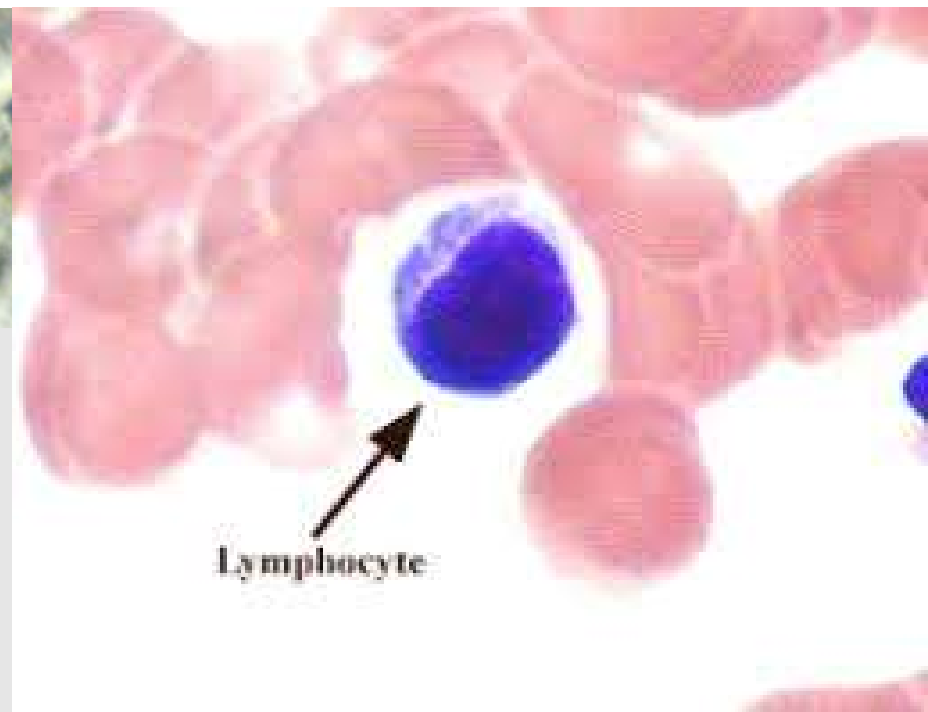


- **A granulocytes**
- **Monocytes**
 - **Constitute approximately 3-8 percent of all WBCs**
 - **Largest of all white blood cells**
 - **Have a kidney bean-shaped nucleus**
 - **Phagocytic in nature**

A granulocytes

Lymphocytes

- Constitute approximately 20-25 percent of all WBCs
- Have a large spherical-shaped nucleus
- Play important role in immune process
- Some lymphocytes are phagocytic
- Other lymphocytes produce antibodies





Cell Fragments

- **Thrombocytes**

- **Also known as platelets**
- **Contain no hemoglobin**
- **Essential for normal clotting of blood**