

## Tissues (Histology)



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## Tissues

- Groups of cells with a common function
- Four primary tissues
  - Epithelia
  - Connective tissues
  - Muscle
  - Nervous

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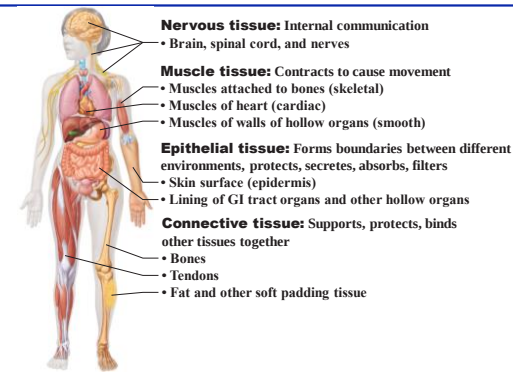
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## Various Tissue Locations - Informational



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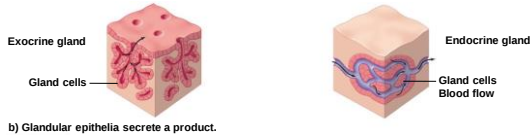
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## Epithelial Tissues

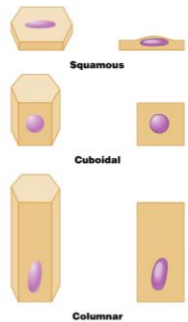
- Line body cavities and cover surfaces
- Glandular epithelia
  - Epithelial cells adapted to make up glands
  - Exocrine glands
    - Secrete into ducts to exterior of body
  - Endocrine glands
    - Secrete into the blood



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## Epithelial Tissues: Classification

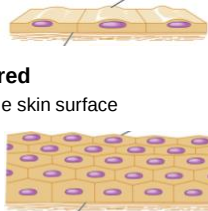
- Shape
  - **Squamous**
    - Flattened cells (scale like)
  - **Cuboidal**
    - Cube shaped (box-like)
  - **Columnar**
    - Column shaped



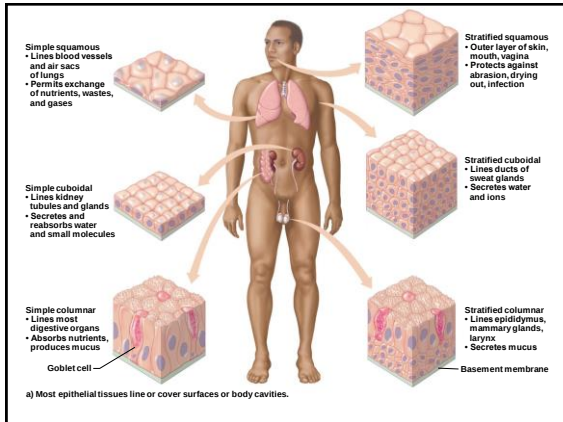
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## Epithelial Tissues: Classification

- Number of layers
  - **Simple/single-layered**
    - Adapted for diffusion across cell barriers
  - **Stratified/multiple-layered**
    - Provide protection, as in the skin surface



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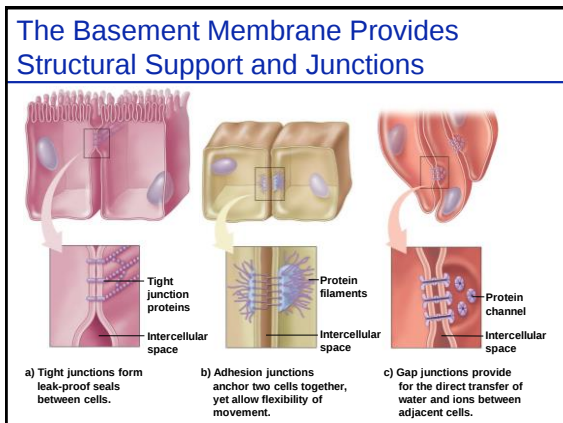
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### Connective Tissue

- General functions
  - Supports softer organs of body
  - Connects parts of body
  - Stores fat
  - Produces blood cells
- Contains fibers and cells embedded in nonliving extracellular matrix
- Matrix provides the strength
- Two general types
  - Fibrous and special

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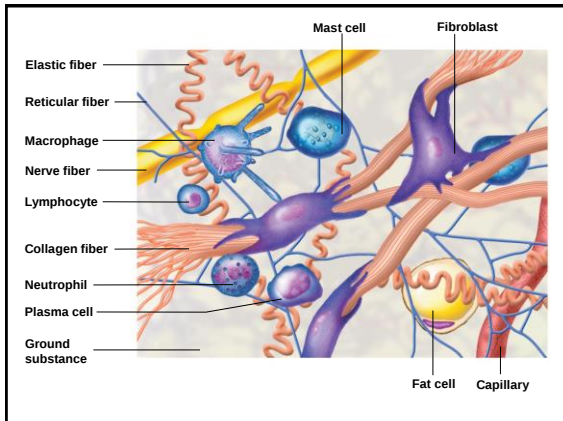
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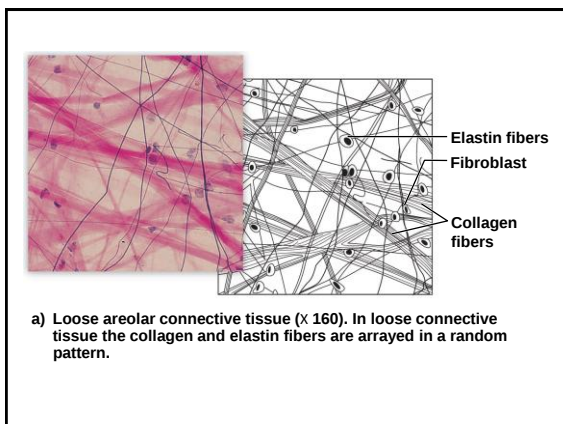
## Fibrous Connective Tissue

- Function
  - provides strength and elasticity
- Cells
  - Fibroblasts
  - Macrophages
  - Lymphocytes
  - Neutrophils
- Fibers
  - Collagen
  - Elastic
  - Reticular

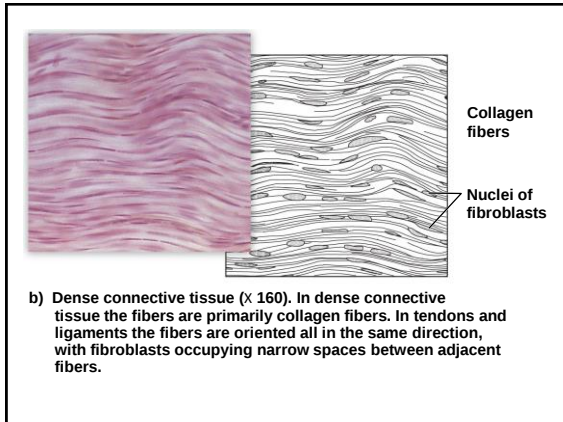
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## Specialized Connective Tissues

- **Cartilage**
  - produced by chondroblasts found in lacunae
  - no blood vessels
  - high collagen content

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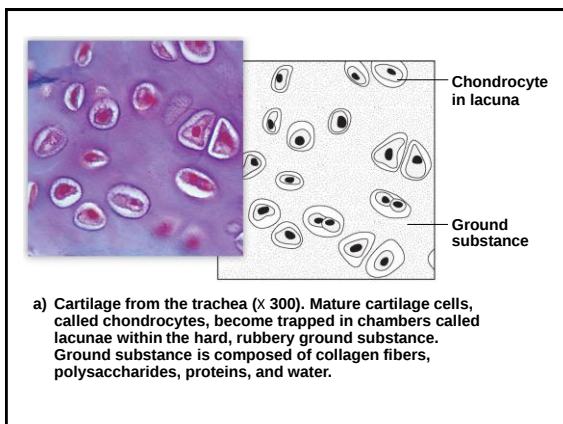
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## Specialized Connective Tissues

- **Bone**
  - inorganic matrix with calcium salts for hardness

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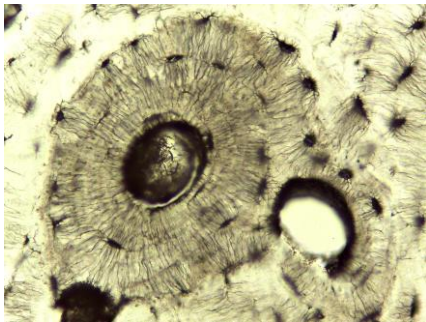
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## Bone Connective Tissue



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## Specialized Connective Tissues

- **Blood**
  - fluid matrix of plasma
  - red blood cells
  - white blood cells
  - platelets

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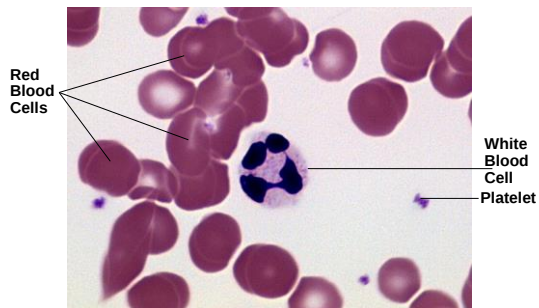
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## Blood Connective Tissue



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## Specialized Connective Tissues

- **Adipose tissue**
  - fat cells
  - function in insulation, protection, and energy storage

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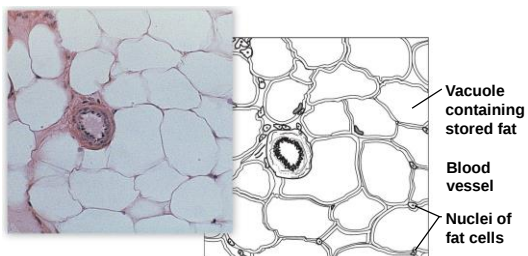
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b) Adipose tissue from the subcutaneous layer under the skin (X 140). Adipose tissue consists almost entirely of fat cells. The fat deposit within a fat cell can become so large that the nucleus is pushed to the side.

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## Muscle Tissue Contracts to Produce Movement

- **Skeletal** muscle
  - Moves body parts
  - Voluntary, multinucleated
- **Cardiac** muscle
  - Functions in the heart
  - Involuntary, single nucleus
- **Smooth** muscle
  - Surrounds hollow structures
  - Involuntary, single nucleus

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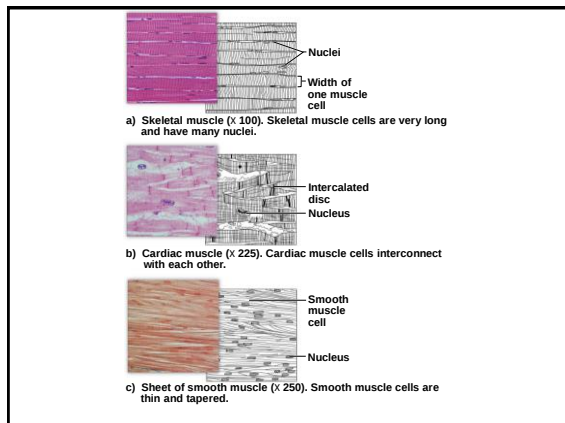
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## Nervous Tissues Transmit Impulses

- **Neuron**
  - specialized nervous system cell
    - Function: generate and transmit electrical impulses
    - Structural components: cell body, dendrites, axon
- **Glial cells** support neurons

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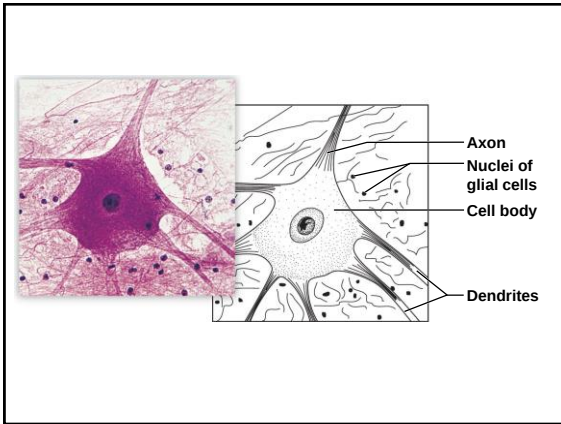
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## Multicellular Organisms Must Maintain Homeostasis

- Maintenance of relative constancy of the conditions of the internal environment
- **Negative feedback control system**
  - deviations from normal are detected and counteracted
- Components of a negative feedback control system
  - Controlled variable
  - Sensor
  - Control center
  - Effector

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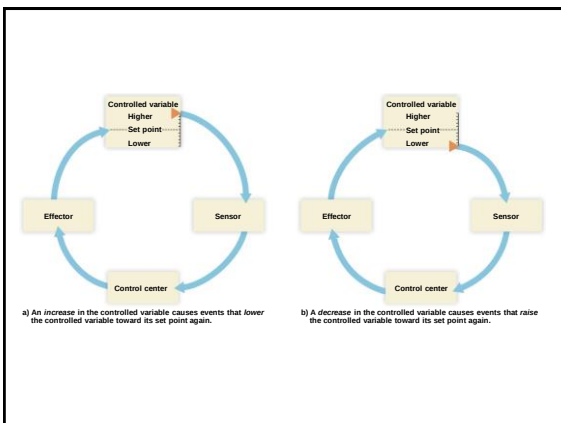
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## Negative Feedback Helps Maintain Core Body Temperature

- **Controlled variable:** body temperature
- **Sensors:** temperature sensors in skin and internal organs
- **Control center:** hypothalamus
- **Effectors**
  - Blood vessels
  - Sweat glands
  - Skeletal muscles

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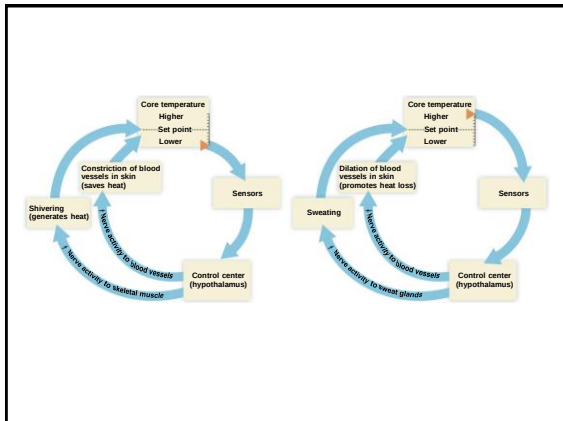
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