

*Chapter 1*  
**The Human Body:  
An Orientation**

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**The Human Body**

- Anatomy –
- Physiology –

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**Principle of Complementarity of  
Structure & Function**

- Inseparable sciences because  
structure always related to function

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## Levels of Structural Organization

- Atoms – basic unit of matter (CHNOPS)
- Molecules (phosphate, glucose)
- Macromolecules – (protein, deoxyribose nucleic acid)
- Organelles – little organs w/specific function
- Cells – basic unit of life
- Tissues – group of cells working together
- Organs – group of tissues working together
- Systems – group of organs working together (11)
- Organisms – group of systems working together

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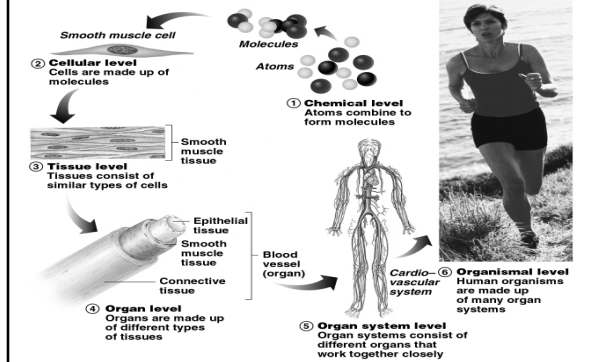
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## Levels of Structural Organization




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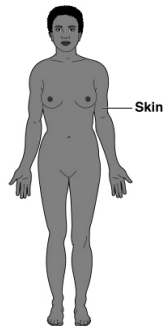
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## Organ System Overview

- Integumentary (skin)
  - External body covering
  - Protects deeper tissue from injury
  - Synthesizes vitamin D
  - Location of nerve receptors




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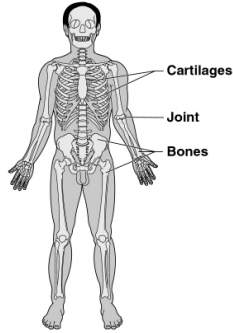
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## Organ System Overview

- Skeletal
  - Protects & supports body organs
  - Provides muscle attachment for movement
  - Site of blood cell formation
  - Stores minerals



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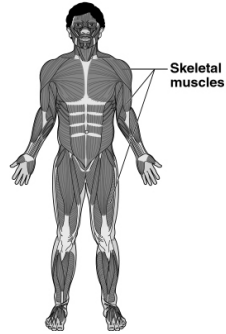
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## Organ System Overview

- Muscular
  - Allows motion
  - Maintains posture
  - Produces heat



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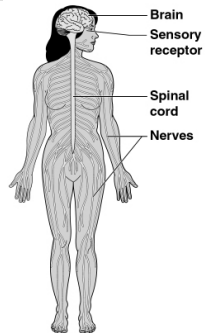
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## Organ System Overview

- Nervous
  - Control system - Activates muscles & glands
  - Responds to internal & external changes



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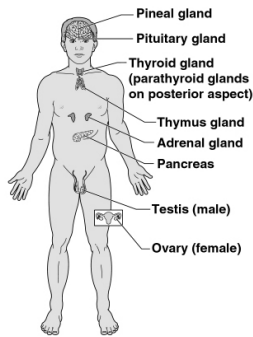
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## Organ System Overview

### Endocrine

- Secretes regulatory hormones
  - Growth
  - Reproduction
  - Metabolism



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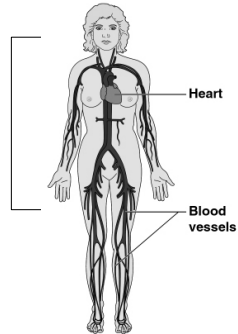
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## Organ System Overview

### Cardiovascular (♥)

- Transports materials via blood pumped by ♥
  - O<sub>2</sub>
  - CO<sub>2</sub>
  - Nutrients
  - Wastes



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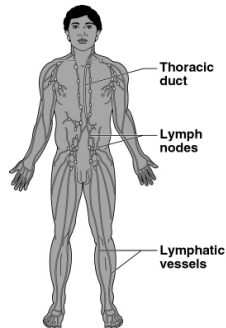
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## Organ System Overview

### Lymphatic (lymph nodes & spleen)

- Returns fluids to blood
- Disposes of debris
- Involved in immunity



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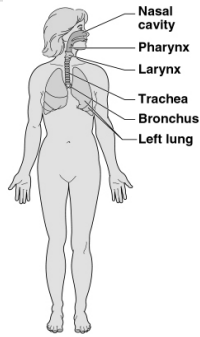
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## Organ System Overview

### Respiratory (lungs)

- Supplies blood with O<sub>2</sub>
- Removes CO<sub>2</sub>



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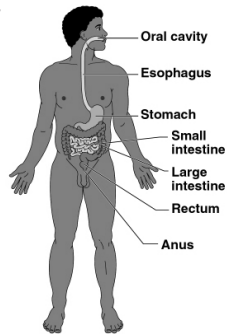
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## Organ System Overview

### Digestive

- Breaks down food
- Allows nutrient absorption into blood
- Eliminates indigestible material



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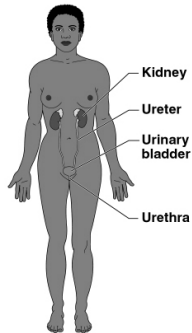
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## Organ System Overview

### Urinary (bladder & kidney)

- Eliminates nitrogenous wastes
- Maintains acid – base balance
- Regulates materials
  - H<sub>2</sub>O
  - Electrolytes



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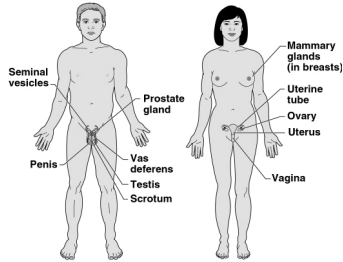
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## Organ System Overview

- Reproductive
  - Production of offspring




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## Organ Systems

- All systems are interdependent

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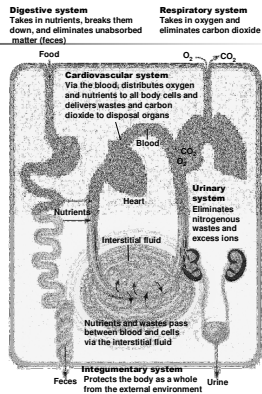
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**Necessary Life Functions**

- **Maintain Boundaries –**
  - Integumentary system maintains barrier between environment & internal structures
- **Movement –**
  - Controlled by muscular & skeletal systems
  - Also includes movement of substances
- **Responsiveness**
  - Ability to sense changes (stimuli) & react
- **Digestion**
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**Necessary Life Functions**

- **Growth**
  - -
- **Reproduction**
  - -
- **Metabolism**
  - chemical reactions within the body that involve the use & release of energy
    - Catabolism -
    - Anabolism -

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**Necessary Life Functions**

- **Excretion**
  - -
- **Assimilation**
  - -
- **Circulation**
  - -
- **Respiration**
  - Obtaining O<sub>2</sub>; removing CO<sub>2</sub>; release of energy from food

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## Survival Needs

- Nutrients
  - Chemicals for energy & cell building
  - Includes carbs, proteins, lipids, vitamins, & minerals
- Oxygen
  - Required for chemical reactions such as respiration

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## Survival Needs

- Water
  - 60–80% of body weight
  - Provides for metabolic reactions; solvent
  - Helps regulate body temp.
- Stable body temperature
  - ~98
  - Many enzymes only function w/in certain temp. range

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## Survival Needs

- Appropriate atmospheric pressure
  - Affects breathing
  - At higher altitudes the atp. is lower & the body compensates by producing more red blood cells

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**Homeostasis**

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- Homeostasis must be maintained for normal body functioning & to sustain life
- Homeostatic imbalance – a disturbance in homeostasis resulting in disease
  - Diabetes
  - Gout

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**Maintaining Homeostasis**

- Body communicates through neural and hormonal systems (nervous & endocrine)
  - Control center (hypothalamus of brain)
    - Determines maintenance point
    - Analyzes information
    - Determines appropriate response

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**Maintaining Homeostasis**

- Receptor - responds to changes in the environment (stimuli)
  - Sends information to control center
  - Known as Afferent Pathway
- Effector - provides a response to the stimulus
  - Sends impulse from CNS to muscles, glands
  - Known as Efferent Pathway

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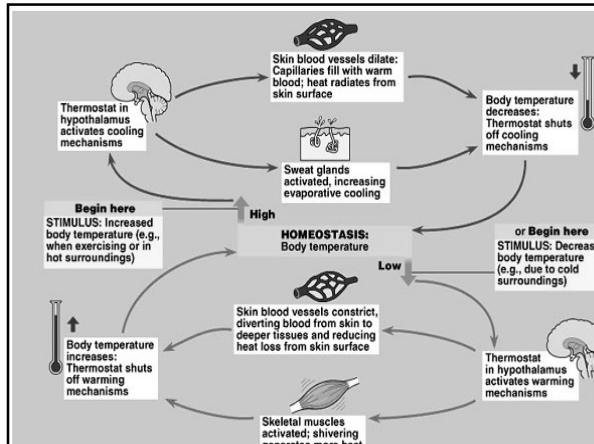
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### Feedback Mechanisms

- Negative feedback
  - Most homeostatic control mechanisms
    - EX.
    - EX.
  - Works like a thermostat
  - Causes change to occur in opposite direction. Shuts off or reduces intensity of the original stimulus

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### Feedback Mechanisms

- Positive feedback
  - Increases the original stimulus to increase the activity
  - Occurs in blood clotting & childbirth
    - Oxytocin – hormone that ↑ labor contractions

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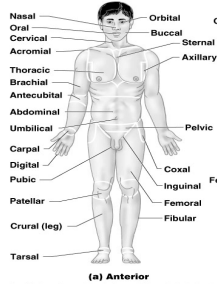
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## The Language of Anatomy

- Special terminology is used to prevent misunderstanding
- Anatomical position – standard body position
  - Body erect, arms at side, palms forward, thumbs pointed out



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## 2 Body Divisions

- Axial
  - Head, neck, & trunk
- Appendicular
  - Upper and lower limbs

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## Directional Terms (study page 12)

- Superior (cranial or cephalic)-
- Inferior (caudal)-
- Anterior –
- Posterior –
- Medial –
- Lateral –

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## Directional Terms

- Intermediate –
- Proximal –
- Distal –
- Superficial –
- Deep –

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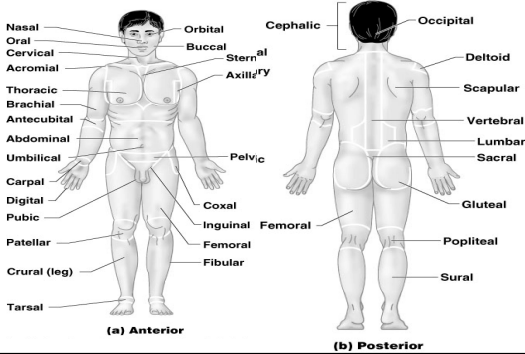
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## Directional Terms p. 14




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## Anterior Regional Terms

- Nasal – nose
- Oral – mouth
- Otic - ear
- Cervical – neck
- Acromial – shoulder
- Axillary – armpit
- Mammary – breast
- Brachial – upper arm
- Antecubital – front of elbow
- Antebrachial - forearm

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### Anterior Regional Terms

- Abdominal – stomach area
- Carpal – wrist
- Palmar – palm
- Pollex – thumb
- Digital of phalange – fingers & toes
- Pubic – genital
- Patellar – front of knee
- Crural – shin
- Tarsal – ankle

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### Anterior Regional Terms

- Cephalic – head
- Frontal – forehead
- Orbital – eye
- Buccal – cheek
- Mental – chin
- Sternal – breastbone
- Thoracic – chest (pectoral)
- Umbilical – naval

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### Anterior Regional Terms

- Inguinal – groin
- Coxal – hip
- Femoral – thigh
- Hallux – big toe

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### Posterior Regional Terms

- Occipital – base of skull
- Acromial – shoulder
- Vertebral – spinal column
- Brachial – upper arm
- Scapular – shoulder blade
- Dorsal – back
- Cubital – back of elbow
- Lumbar – loin, between ribs & hips
- Sacral – between hips

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### Posterior Regional Terms

- Gluteal – buttock
- Perineal – between the anus
- Popliteal – back of knee
- Sural – calf
- Calcaneal – heel
- Plantar – sole

See page 14

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### Body Planes

- Frontal or coronal plane – runs longitudinal; divides into anterior & posterior
- Transverse plane – runs horizontal; divides body into superior & inferior
- Median or Sagittal – runs longitudinal; divides body into Right & Left
- Oblique plane – between horizontal & longitudinal

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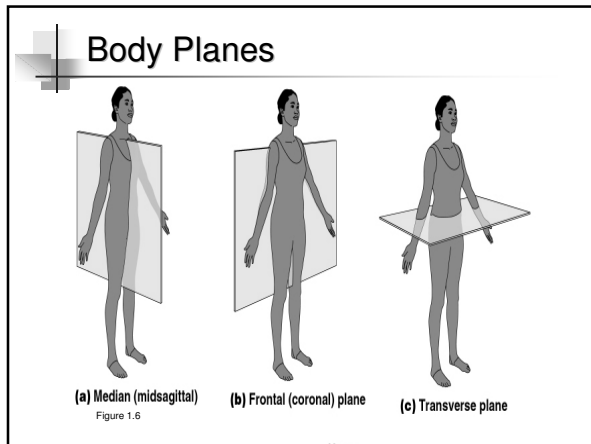
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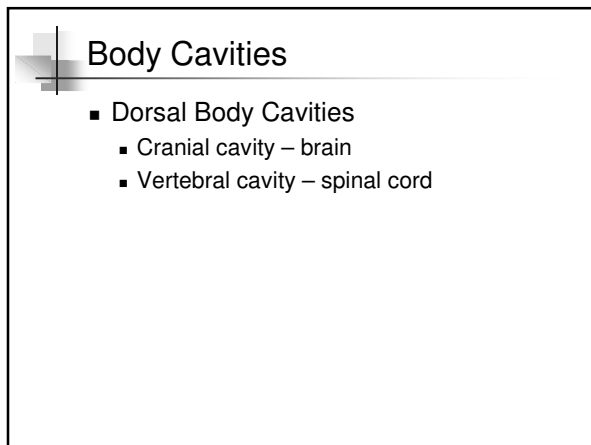
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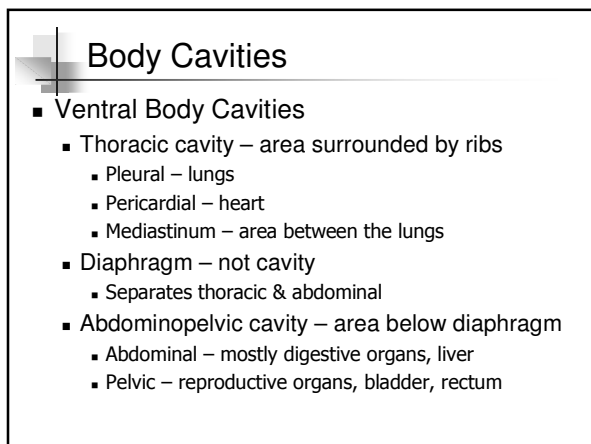
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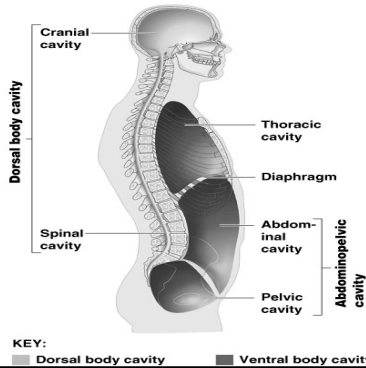
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## Body Cavities




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## Abdominopelvic Regions

- Umbilical region – center
- Epigastric region – superior to umbilical
- Hypogastric region – inferior to umbilical
- Right iliac – lateral to hypogastric
- Left iliac – lateral to hypogastric
- Right lumbar – lateral to umbilical
- Left lumbar - lateral to umbilical
- Right hypochondriac – lateral to epigastric
- Left hypochondriac – lateral to epigastric

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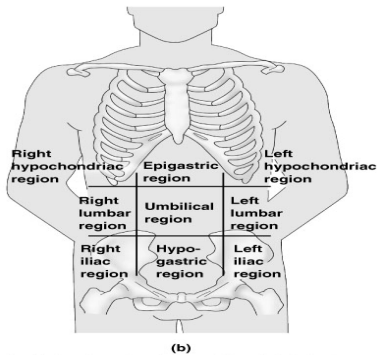
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## Abdominopelvic Regions




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