



## CHAPTER 3

# The Human Body

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## Lesson Objectives

1. Describe the primary areas of the body.
2. List the 10 body systems and explain a key function of each.
3. For each body system, describe at least 1 injury or illness that affects the functioning of that system.

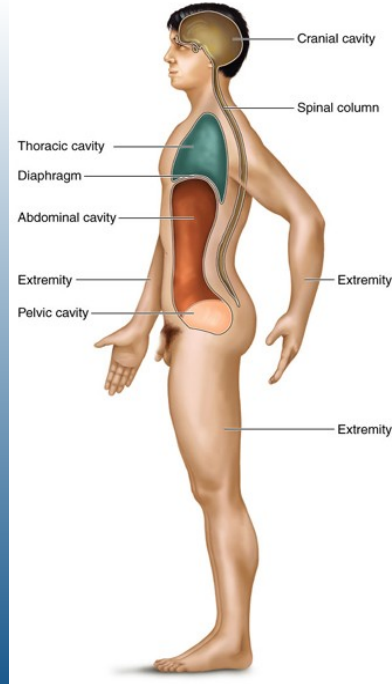


## The Human Body

- Composed of many different organs and tissues
- All parts work together:
  - To sustain life
  - Allow activity
- Injury or illness impairs functions



## Primary Areas of the Body





## Body Cavity – a hollow area containing organs (5 major)

- Cranial – located in the head. It contains the brain and is protected by the skull
- Spinal – extending from the bottom of the skull to the lower back. It contains the spinal cord and is protected by the bones of the spine
- Thoracic – located in the trunk above the diaphragm (primary muscle used in breathing). This cavity contains the heart and lungs. It is protected by the rib cage and upper spine



## Body Cavities *continued*

- **Abdominal** – located in the trunk between the diaphragm and the pelvis. It contains the liver, gall bladder, pancreas, intestines, stomach, kidneys and spleen. Because most of the abdominal cavity is not protected by bones, the organs within it are especially vulnerable to injury
- **Pelvic** – located in the lowest part of the trunk. Contains the bladder, rectum, and reproductive organs. Protected by the pelvic bones and the lower portion of the spine



## Body Systems

- Organs have one or more specific functions.
- The organs that work together for a major function are called a body system.



## Body Systems *continued*

- Respiratory system
- Cardiovascular system
- Nervous system
- Musculoskeletal system
- Integumentary system
- Gastrointestinal system
- Endocrine system
- Urinary system
- Reproductive system



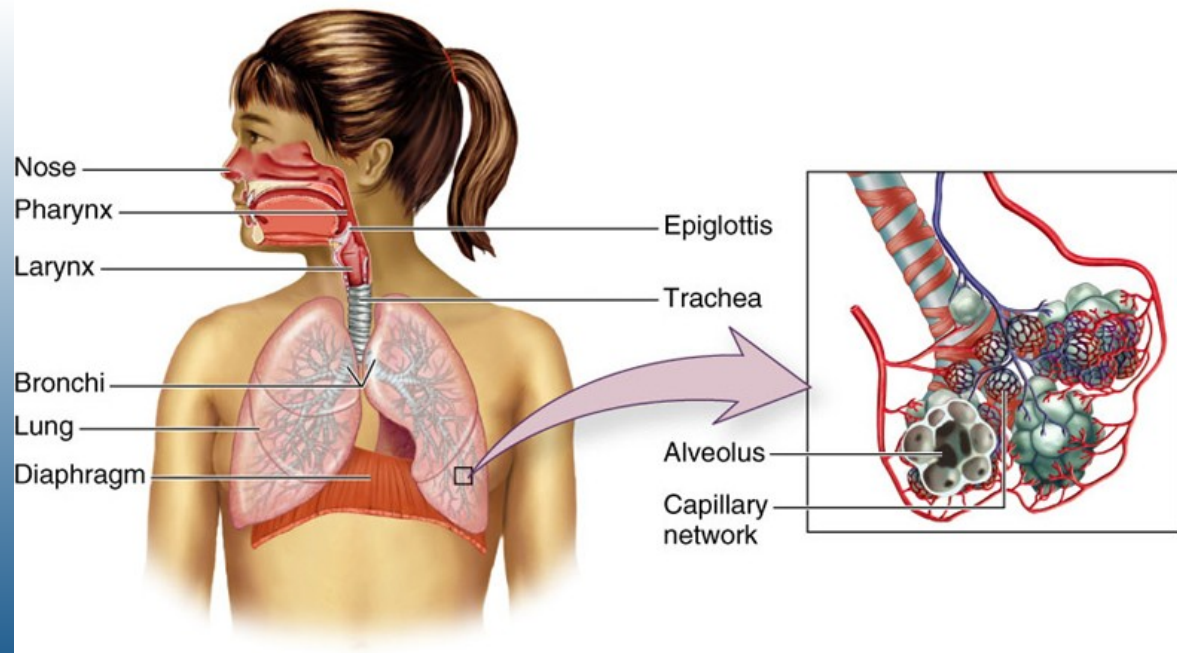


## Body Systems Are Closely Interrelated

- Work together to perform many functions.
- Injuries and illness commonly affect multiple systems.
- Life-threatening conditions affect respiratory, circulatory and nervous systems.



## Respiratory System: Primary Organs





## Respiratory System: Primary Functions

- **Move air in and out of lungs**
  - Oxygen from inhaled air moves into blood.
  - Carbon dioxide from blood moves into air and is exhaled.



## Emergencies Related to the Respiratory System

- Airway obstruction
  - Physical blockage that prevents flow of air
- Injury to head or neck
  - Upper airway swelling
- Broken rib
  - May puncture lung
- Penetrating injury to lung
  - Alters lung pressures



## Emergencies Related to the Respiratory System *continued*

- Factors affecting nervous system control of breathing
  - E.g., poisoning, drug overdose
- Electrical shock
  - Interrupts nervous system control of breathing
- Asthma
  - Airway tissues swell
- Chronic lung diseases
  - Reduce lung function



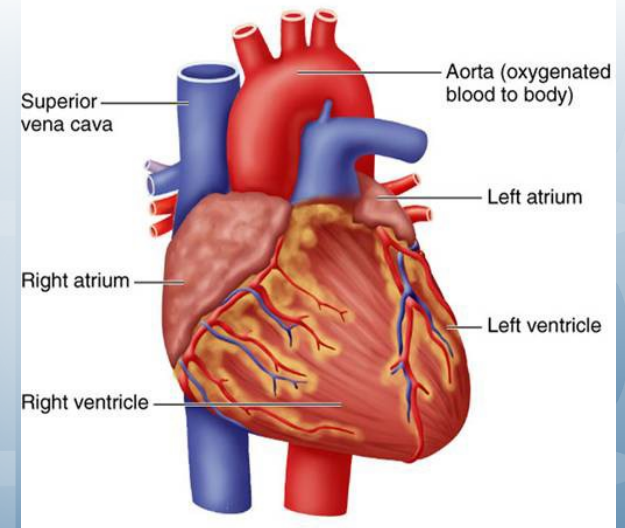
## Cardiovascular System: Primary Organs

- Heart
- Blood
- Blood vessels

Arteries carry blood away from the heart

Veins take the deoxygenated blood back to the heart

Capillaries are tiny vessels where oxygen and nutrients in the blood pass to tissue and carbon dioxide passes into the blood





## Cardiovascular System: Primary Functions

- Transports blood to lungs:
  - Delivers carbon dioxide and picks up oxygen
- Transports oxygen and nutrients to all parts of body
- Helps regulate body temperature
- Helps maintain body's fluid balance



# Emergencies Related to the Cardiovascular System

- Any condition that affects respiration:
  - Reduces ability to deliver oxygen
- Severe bleeding:
  - Shock
- Stroke:
  - Reduces blood flow to part of the brain
- Heart conditions:
  - Reduce tissue oxygenation





## Emergencies Related to the Cardiovascular System *continued*

- Heart attack
  - Can lead to cardiac arrest.
- Ventricular fibrillation
  - Heart muscle flutters rather than pumping blood.



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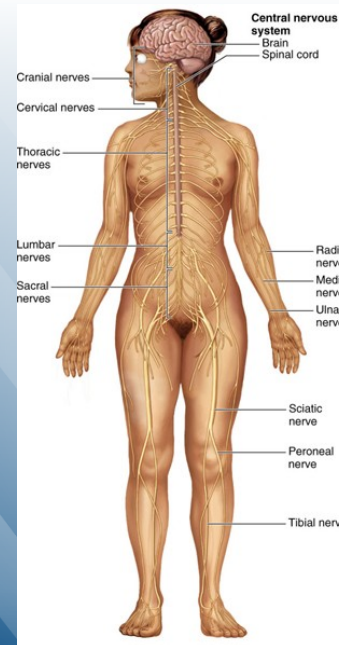
# Learning Checkpoint 1

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## Nervous System: Primary Organs

- Brain
- Spinal cord
- Sensory receptors
- Nerves – transmit electrical impulses from one area of the body to another





## Nervous System: Primary Functions

- Sensory receptors gather information about environment and send to brain.
- Brain integrates and analyzes information.
- Nerve signals from brain lead to actions throughout body to accomplish tasks or maintain homeostasis.



## Emergencies Related to the Nervous System

- Head and spinal injuries
  - Can have serious/life-threatening effects
- Injury to part of brain or stroke
  - May destroy or impair one or more functions
- Damage to spinal cord
  - May cause complete loss of function to body area or paralysis



# Emergencies Related to the Nervous System

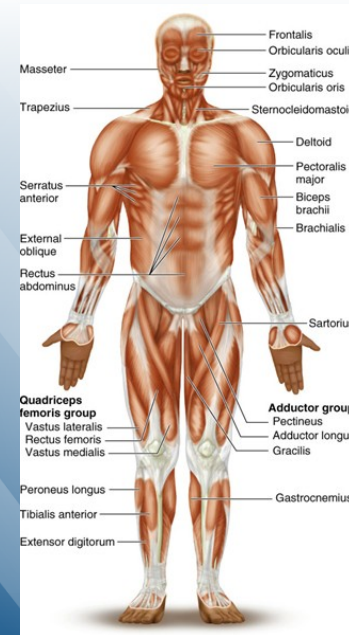
*continued*

- Altered mental status from:
  - Head injuries
  - Any injury causing decreased oxygenation
  - Sudden illness (e.g., stroke, seizure, diabetes)
  - Severe infection or fever
  - Poisoning or drug overdose



## Musculoskeletal System: Primary Organs

- Bones
- Muscles
- Ligaments – join bones together at joints
- Tendons – connect muscle to bones





## Musculoskeletal System: Primary Functions of Bones

- Provide body shape and support.
- Protect vital organs.
- Produce blood cells.
- Store calcium.
- Act as levers to allow joint movement.





## Musculoskeletal System: Primary Functions of Muscles

- Skeletal muscles attach to bones and allow movement.
- Produce body heat.
- Perform pumping action of heart and work of breathing.



## Emergencies Related to the Musculoskeletal System

- Fractures
- Dislocations
- Sprains
- Strains





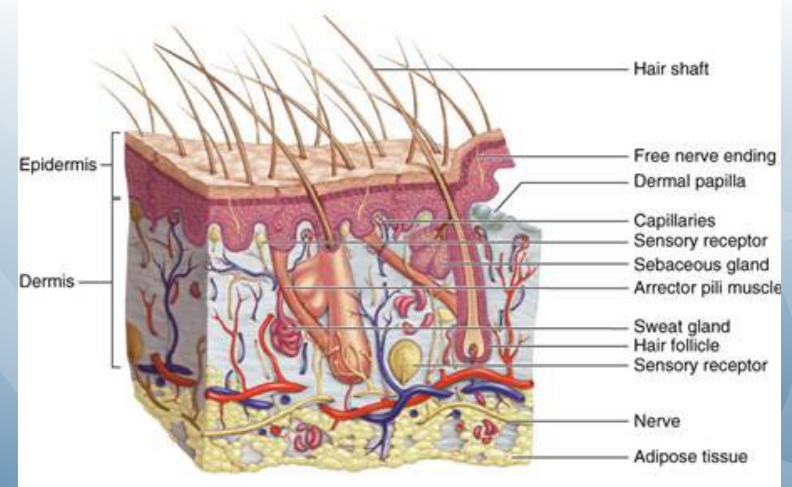
## Fractures

- Can be serious if nearby organs/blood vessels damaged:
  - Vertebral fractures may injure spinal cord.
  - Pelvic fractures may damage bladder or other pelvic organs.
  - Skull fracture may cause brain damage.



## Integumentary System: Primary Organs

- Skin
- Nails
- Hair
- Accessory structures:
  - Sweat glands
  - Oil glands





## Integumentary System: Primary Functions

- Protects body
- Helps regulate body temperature
- Helps prevent water loss
- Removes some body wastes
- Produces Vitamin D
- Provides sensation (e.g., touch, pressure, pain, temperature)



## Emergencies Related to the Integumentary System

- Cuts and scrapes
  - Common causes of bleeding
- Openings in skin
  - Allow pathogens into body
- Heat and chemical burns
  - Loss of body heat
  - Loss of body fluid



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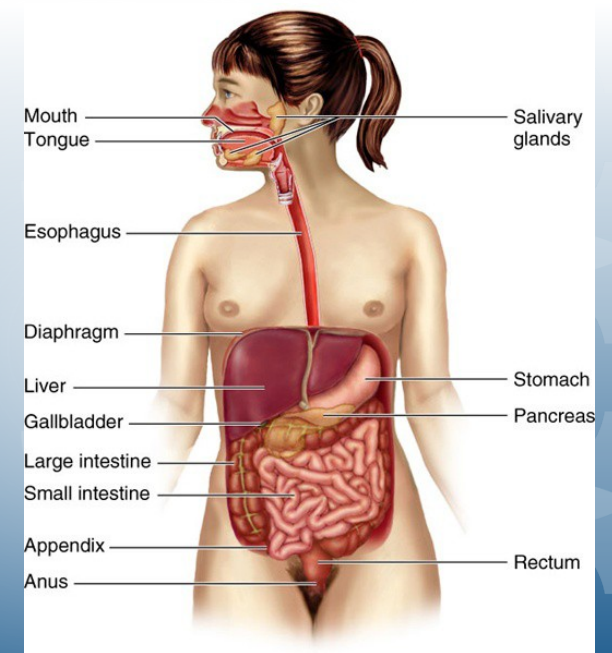
# Learning Checkpoint 2

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## Gastrointestinal System

- Digests food and extracts nutrients
- Organs easily injured by traumatic forces
- Poisons absorbed have many effects
- Vomiting or diarrhea can cause dehydration

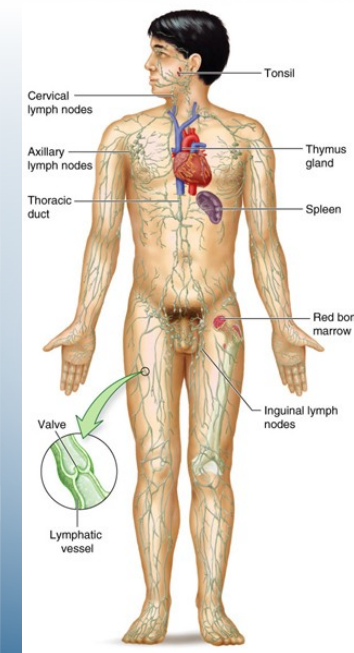






## Lymphatic and Immune Systems

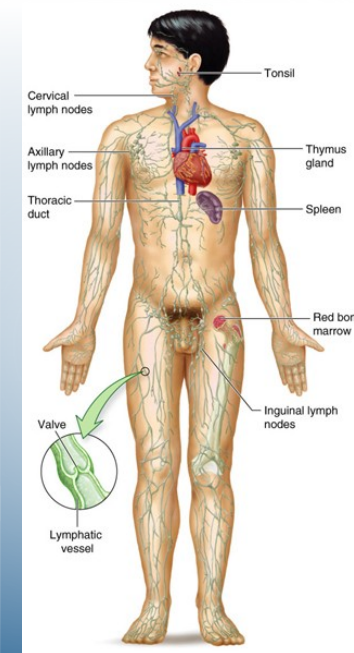
- Helps defend against disease
- Part of immune system
- Problems seldom cause emergencies
- Always take precautions against infection
- Tetanus vaccine provides protection





## Endocrine System

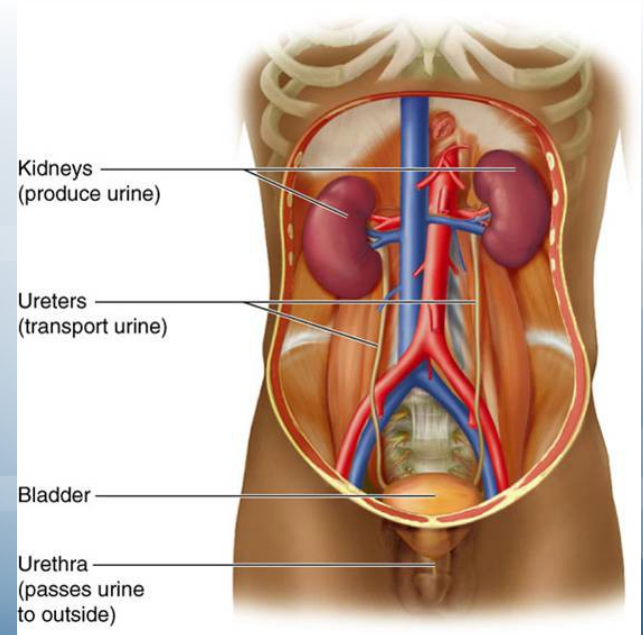
- Includes glands that produce hormones that help regulate body functions
- Most problems develop slowly and are rarely emergencies
- Imbalances may cause diabetic emergencies





## Urinary System

- Blood transports wastes to kidneys.
- Kidneys filter wastes and produce urine.





## Emergencies Related to the Urinary System

- Traumatic injury may damage organs
  - Look for blood in urine
- Health problems
  - May cause change in urination
- Dehydration
  - Lack of urination



## Reproductive System

### Female

- Produces eggs
- Supports and nurtures fetus in uterus
- Childbirth
- Lactation

### Male

- Produces and transports sperm



## Emergencies Related to the Reproductive System

- Abdominal injuries may damage genitals or reproductive organs.
- In rare situations, a pregnant woman may develop complications.



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# Learning Checkpoint 3

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## Chapter – Opening Scenario

You are called to the storage area at the back of the warehouse where an employee has just been found lying on the floor. As you approach, you think that she may have fallen from the stepladder or a higher shelf, but you do not immediately see what is wrong.





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# Discussion and Questions

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