Chapter 1

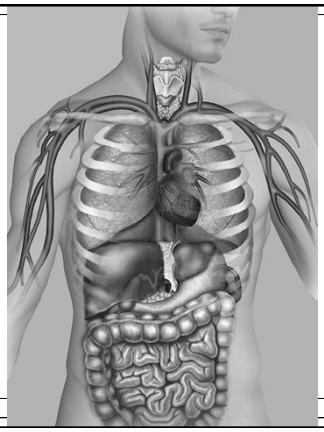
1

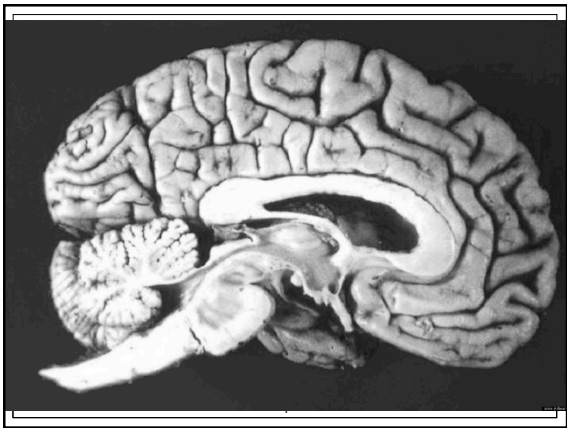
HUMAN BODY: AN ORIENTATION

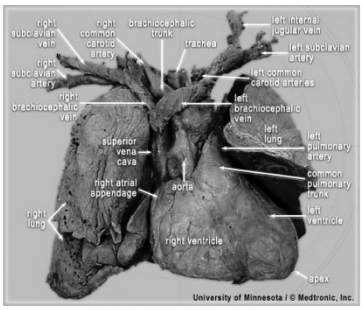
Anatomy

2

- The study of the structure and shape of the body and body parts and their relationships to one another.
- Is static and can be studied on dead specimens during a dissection.
- Uses directional and observational terms to describe what is seen.
- Measures shapes, sizes and weights.







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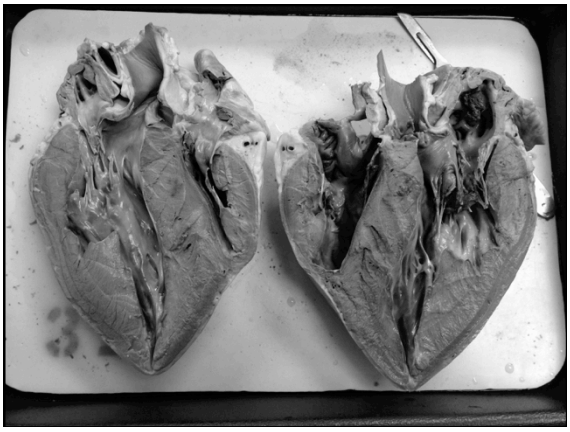


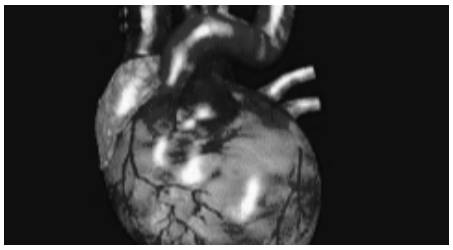
Physiology

7

- The study of how the body and its parts work or function.
- Is dynamic and can be studied through experiments and uses the principles of chemistry and physics.
- Often studied on living subjects, for example the digestion of food or the beating of a heart.

Heart Beating

8



Levels of Structural Organization

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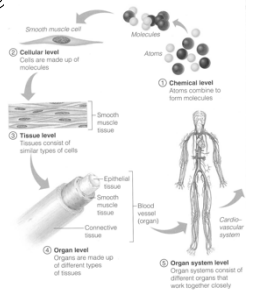
- Atoms-The simplest level of organization or the chemical level.
- Cells-The smallest unit of living things.



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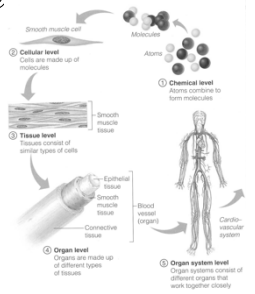
- Tissues-Collections of cells with a common function.
- Organs-Composed of two or more tissue types.



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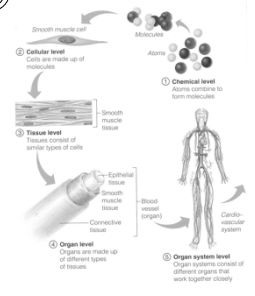
- Organ Systems-A group of organs that work together to accomplish a common purpose.
- Organism-The living body



Organ System Overview

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Integumentary System

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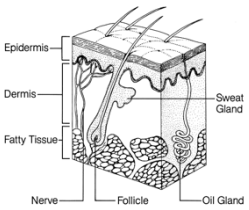
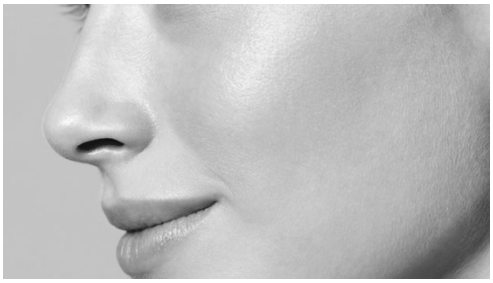
- The external covering of the body or the skin.
- Waterproofs and cushions the body.
- Protects underlying organs from drying out and mechanical damage.
- Common damage to the skin include cuts and sunburn.





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Skeletal System

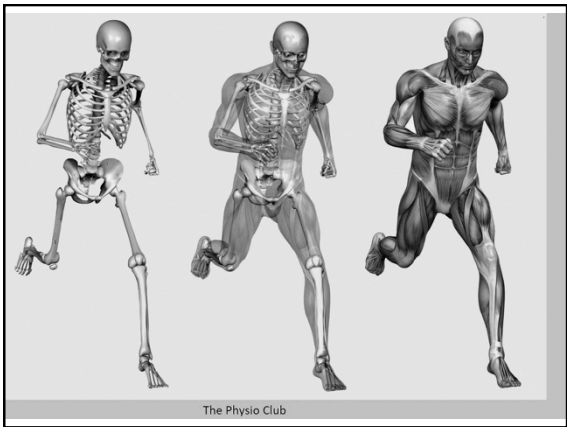
15

- Consists of bones, cartilage, ligaments and joints.
- Supports the body and provides a framework for skeletal muscles to attach.

Muscular System

17

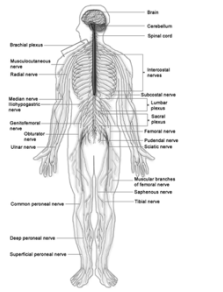
- Muscles contract or shorten to provide movement.
- Maintains posture and produces heat.
- Moves limbs.
- Allows facial expression.



Nervous System

19

- Fast acting control system.
- Responds to internal and external changes in the body.



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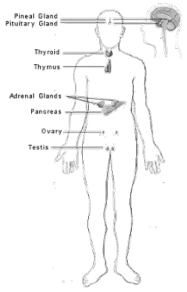
Endocrine System

22

- Glands secrete hormones that regulate processes such as growth, reproduction and nutrient use.
- Controls the body with chemicals called hormones.
- Glands include the thyroid, ovaries, testes, pituitary, adrenal and pancreas.



Nervous vs Endocrine

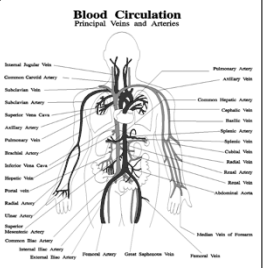
23

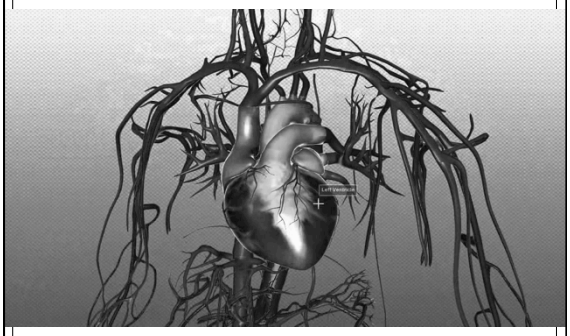
- The nervous system is many times faster than the endocrine system. This is a necessity for survival, for example, being able to dodge something heading towards you.
- Endocrine hormones work much slower.

Cardiovascular System

24

- Heart pumps blood throughout the body in blood vessels.
- Blood vessels transport blood to the body tissues which carries oxygen, carbon dioxide, nutrients and wastes.





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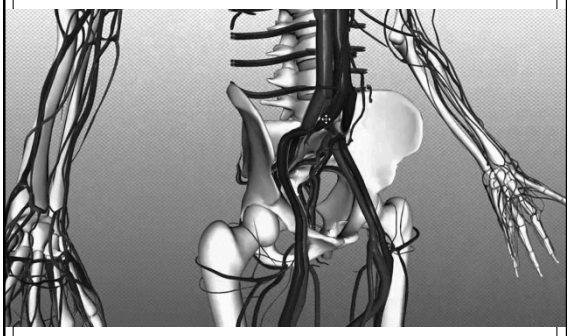

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Lymphatic System

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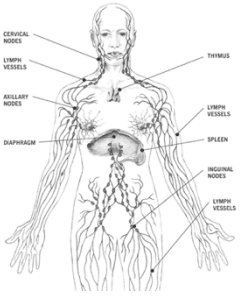
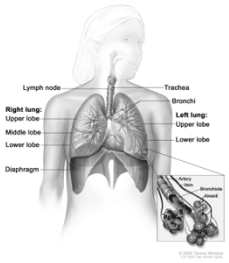
- Picks up fluid leaked from blood vessels and returns it to the blood.
- Houses white blood cells involved in immunity.
- Destroys bacteria and tumor cells.

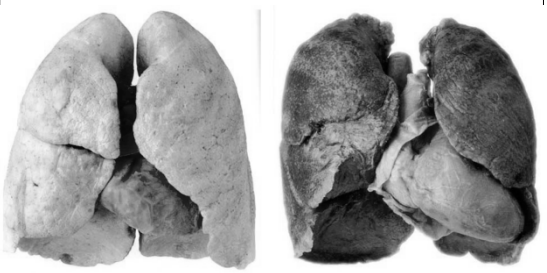


Respiratory System

28

- Keeps blood constantly supplied with oxygen and removes carbon dioxide which occurs in the lungs.





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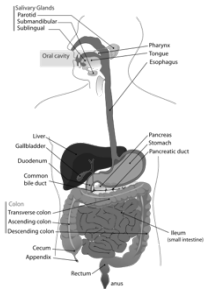
Digestive System

30

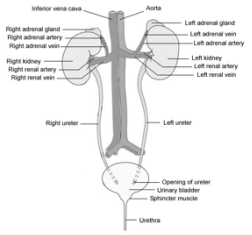
- Breaks food down into absorbable units that enter the blood for distribution to the body.



Urinary System

31

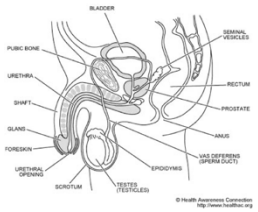
- Eliminates nitrogenous wastes from the body and regulates water.



Male Reproductive System

32

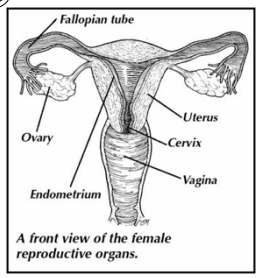
- To produce offspring.
- Testes produce sperm and male sex hormones.



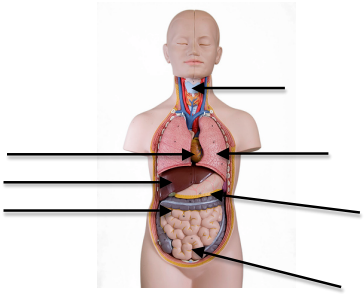
Female Reproductive System

33

- Ovaries produce eggs and female sex hormones.
- Structures provide sites for fertilization and development.
- Mammary glands produce milk to nourish the newborn.
- Provides for conception and childbearing.



A front view of the female reproductive organs.



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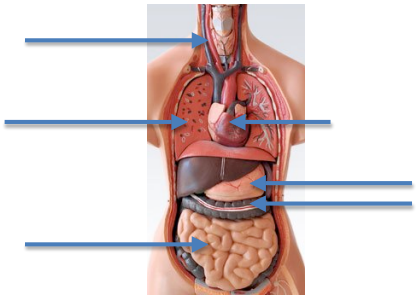

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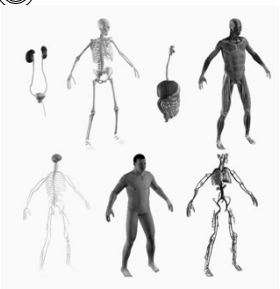
Maintaining Life

36

Maintenance of Boundaries

37

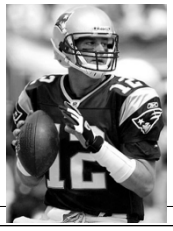
- Keeps the body' s internal environment distinct from the external environment.
- Membranes around organs as well as the skin.



Movement

38

- Includes all the activities promoted by the muscular system.
- Walking, throwing or riding a bicycle.



Responsiveness

39

- Ability to react to stimuli.
- Major role of the nervous system.

Digestion

40

- Food ingested is broken down to its chemical building blocks.

Metabolism

41

- All chemical reactions that occur within body cells.
- Breaks down complex molecules into smaller ones and makes larger molecules from smaller ones.
- Uses nutrients and oxygen to produce ATP.
- Regulated by hormones secreted by the glands of the endocrine system.

Excretion

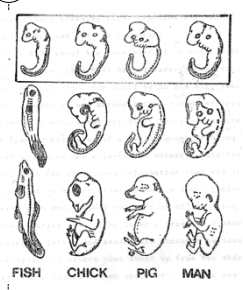
42

- Elimination of carbon dioxide by the lungs and elimination of nitrogenous wastes by the kidneys.
- NOT POOP, it was just a funny pic.

Reproduction

43

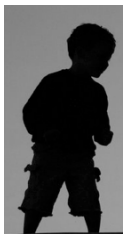
- Provides new cells for growth and repair.



Growth

44

- Increase the number of cells faster than they are destroyed.



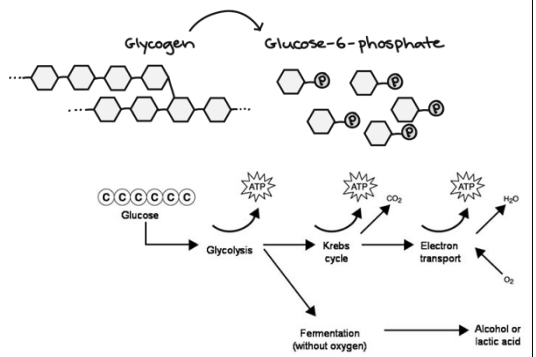
Survival Needs

45

Nutrients

46

- Taken in via the diet and contain chemicals used for energy and cell building.
- Carbohydrates, proteins and fats are sources of nutrients



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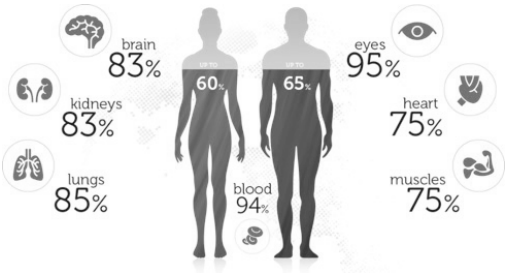
Water

48

- 60-70% of the body' s weight.
- Provides the fluid base for body secretions and excretions.

49

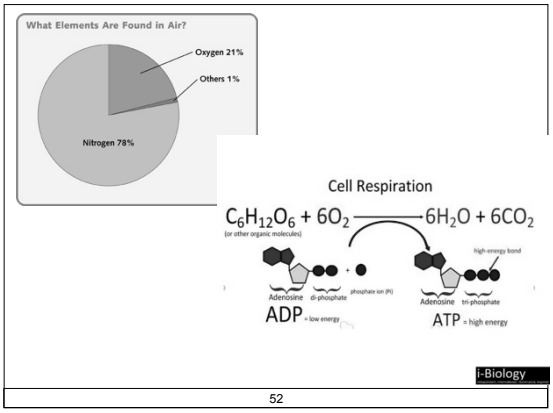


50

Oxygen

51

- Oxygen is necessary to release energy from chemical reactions that take place in the body.
- Needed to release energy from food.
- 20% of the air we breathe is oxygen
- Oxygen is made available to the body through efforts of the respiratory and cardiovascular systems.



52

Body Temperature

53

- The body must remain at 37°C (98°F).
- If the temperature is too low, metabolic activities slow down.
- If the temperature is too high, chemical reactions proceed too quickly or proteins begin to break down or become nonfunctional.

Atmospheric Pressure

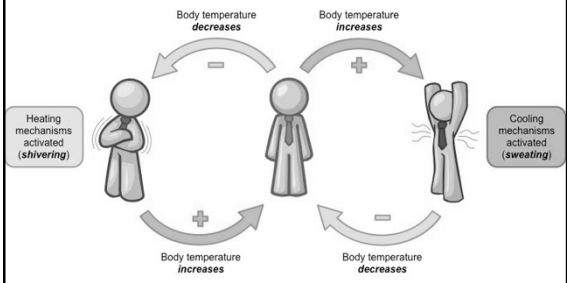
54

- Breathing depends on the pressure exerted on the body.
- If the altitude is too high (lower pressure) gas exchange may be to low to support metabolic activity.
- Mountain climbers need to bring oxygen tanks because oxygen is needed to support metabolic activities.

Homeostasis

55

- The tendency of the body's systems to maintain a relatively constant or balanced internal environment.



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Homeostatic Control Mechanisms

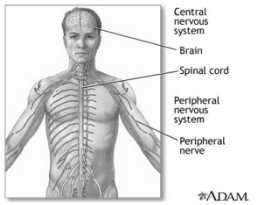
57

- Communication between organ systems is essential.
- The nervous and endocrine systems are chiefly responsible through chemical or electrical responses.
- Require a receptor, a control center and an effector.

Receptor

58

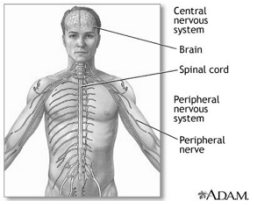
- A sensor that monitors changes in the environment called stimuli.
- Message is sent to the control center along the afferent pathway.



Control Center

59

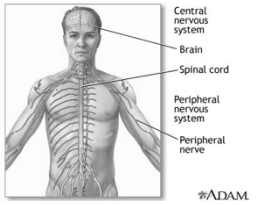
- Analyzes the information from the receptor and determines the appropriate response.

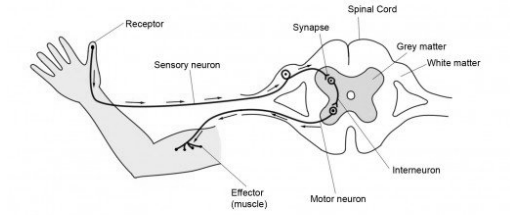


Effector

60

- Control center determines the response and activates the effector.
- Provides the means for the control centers response to the stimulus along the efferent pathway.
- The effector is usually a muscle or gland.





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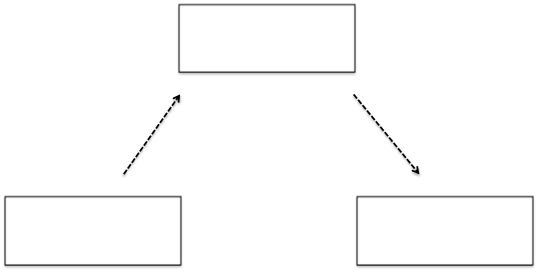


**This occurs between the muscular and nervous system

62

Negative Feedback Mechanism

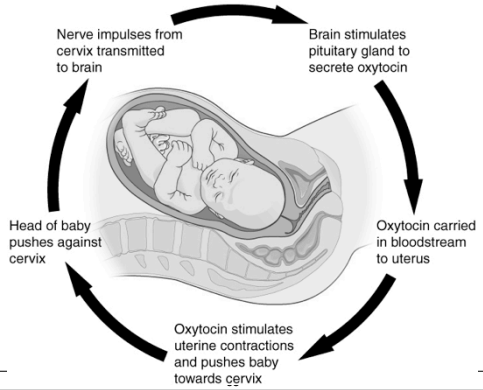
63

- The net effect of the response to the stimulus is to shut off the original stimulus or reduce its effects.
- Example-body releases insulin when sugar is ingested.
- Most common feedback system in the body.

Positive Feedback Mechanisms

64

- Increases or enhances the original stimulus.
- Examples are blood clotting or the birth of a baby.

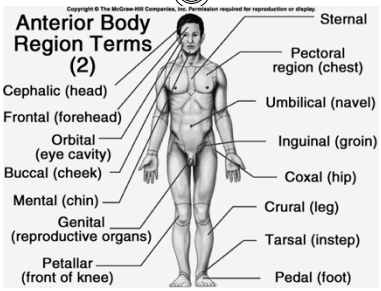


Language of Anatomy

66

Anterior (Front)

67



Posterior (Back)

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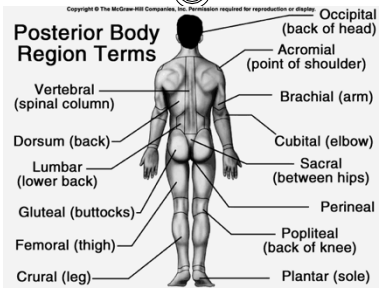

Anatomical Position

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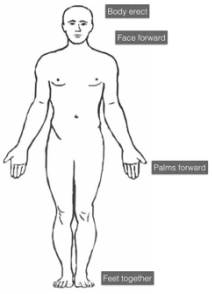

Medial and Lateral

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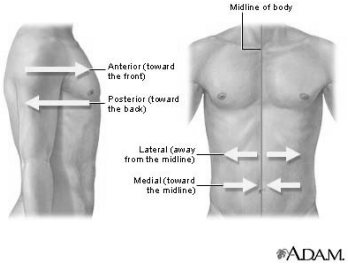
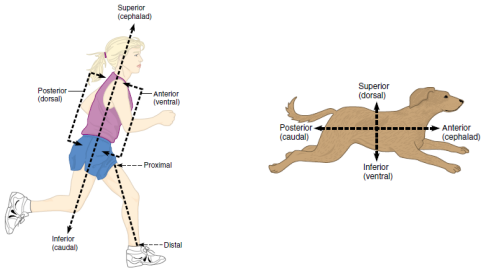


2 Legs vs. 4 Legs



Planes of the Body

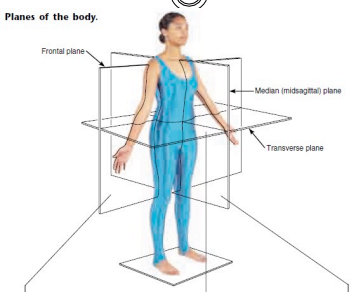


TABLE 1.1 Orientation and Directional Terms

Term	Definition	Illustration	Example
Superior (cranial or cephalad)	Toward the head end or upper part of a structure or the body; above		The forehead is superior to the nose.
Inferior (caudal)†	Away from the head end or toward the lower part of a structure or the body; below		The navel is inferior to the breastbone.
Anterior (ventral)*	Toward or at the front of the body; in front of		The breastbone is anterior to the spine.
Posterior (dorsal)*	Toward or at the backside of the body; behind		The heart is posterior to the breastbone.

†The term *caudal*, literally "toward the tail," is synonymous with *inferior* only to the inferior end of the spine.
**Ventral* and *anterior* are synonymous in humans; this is not the case in four-legged animals. *Ventral* refers to the "belly" of an animal and thus is the inferior surface of four-legged animals. Likewise, although the dorsal and posterior surfaces are the same in humans, the term *dorsal* refers to an animal's back. Thus, the dorsal surface of four-legged animals is their superior surface.

TABLE 1.1 Orientation and Directional Terms

Term	Definition	Illustration	Example
Medial	Toward or at the midline of the body; on the inner side of		The heart is medial to the arm.
Lateral	Away from the midline of the body; on the outer side of		The arms are lateral to the chest.
Intermediate	Between a more medial and a more lateral structure		The armpit is intermediate between the breastbone and shoulder.
Proximal	Close to the origin of the body part or the point of attachment of a limb to the body trunk		The elbow is proximal to the wrist (meaning that the elbow is closer to the shoulder or attachment point of the arm than the wrist is).

TABLE 1.1 Orientation and Directional Terms

Term	Definition	Illustration	Example
Distal	Farther from the origin of a body part or the point of attachment of a limb to the body trunk		The knee is distal to the thigh.
Superficial (external)	Toward or at the body surface		The skin is superficial to the skeleton.
Deep (internal)	Away from the body surface; more internal		The lungs are deep to the rib cage.

Body Cavities

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Dorsal Body Cavities

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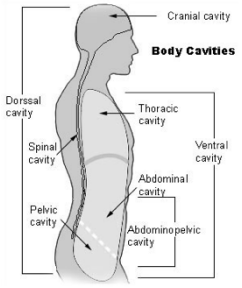
- Cranial Cavity contains the brain inside of a bony skull.
- Spinal Cavity contains the spinal cord protected by vertebrae.
- Both dorsal cavities are surrounded by bone to protect the internal structures.



Ventral Body Cavities

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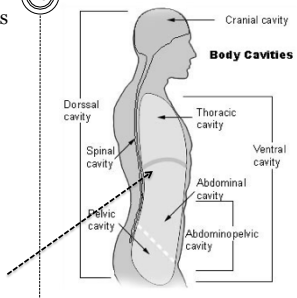
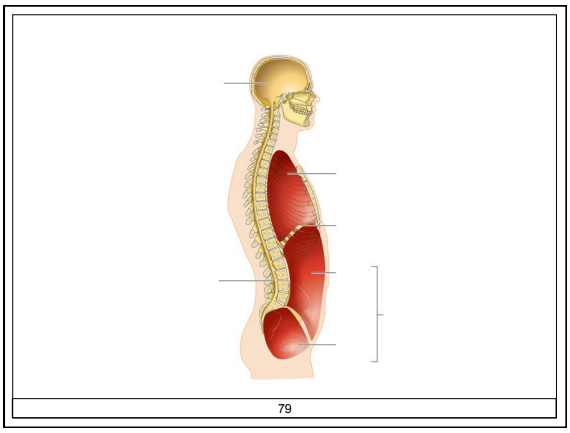
- Thoracic cavity contains the heart and lungs protected by the ribs.
- Abdominal cavity (abdominopelvic) contains the stomach, liver and intestines.
- The thoracic and abdominal cavities are separated by a muscle called the diaphragm.





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