Chapter 1  Body Organization

♦ Definition of Human Sexuality

  human sexuality
  -the behavioral, social, and biological influences that affect the sexual attraction between one human and another

♦ Levels of Body Organization
  -In order to study human sexuality, one must understand the levels of body organization (Figure 1.1, Derrickson):

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atom
-the smallest stable unit of matter
-Examples:
  • a carbon (C) atom
  • a hydrogen (H) atom
  • an oxygen (O) atom
  • a nitrogen (N) atom
  • a phosphorus (P) atom

molecule
- a chemical component that consists of two or more atoms that are joined together by covalent bonds (i.e. electron sharing).
-Examples:
  • a molecule of water (H₂O)
  • a molecule of ammonia (NH₃)
  • a molecule of glucose (C₆H₁₂O₆)
  • a molecule of deoxyribonucleic acid (DNA)

cell
-the smallest unit of life
-Examples:
  • a neuron (brain cell)
  • an epithelial cell
  • a muscle cell
  • a red blood cell

-Components of a Cell
-A cell contains the following components:
  1. plasma membrane
     -also called the cell membrane
     -regulates the movement of substances into and out of the cell
  2. cytosol
     -the fluid within the cell
     -consists of H₂O (the main component) and dissolved substances such as nutrients like glucose
  3. nucleus
     -contains the cell’s DNA, which is organized into chromosomes
     -The chromosomes contain genes, which are sequences of DNA that determine our physical traits.
  4. mitochondrion
     -The mitochondrion (plural is mitochondria) is the “power house” of the cell.
     -synthesizes adenosine triphosphate (ATP), which is used as an energy source
tissue
-a group of similar cells that perform a common function

-There are 4 major types of tissues: epithelial tissue, connective tissue, muscle tissue, and nervous tissue.

1. epithelial tissue
-tissue that covers the body, lines hollow organs, and forms glands

-Examples of Epithelial Tissue
  • Epithelial tissue covers the body.
    -The epidermis (outer layer of the skin) is epithelial tissue (Figure 1.2, Derrickson).
  • Epithelial tissue lines hollow organs.
    -Epithelial tissue lines the **lumen** (interior space) of hollow organs such as the stomach, intestines, blood vessels, vagina, uterus, and Fallopian (uterine) tubes (Figure 1.3, Derrickson).
  • Epithelial tissue forms glands.

**gland**
-a cluster of epithelial cells that secrete substances

-There are 2 major types of glands: exocrine glands and endocrine glands (Figure 1.4, Derrickson).

a. exocrine glands
-glands that secrete substances into body cavities or onto the body surface through **ducts**
-Examples
  1. salivary glands
    -secrete saliva into the mouth (oral cavity) (Figure 1.5, Derrickson)
  2. mammary glands
    -located in the breast (Figure 3.8, Crooks)
    -secrete milk
  3. sweat glands
    -located in the skin
    -secrete sweat onto the skin surface (Figure 1.2, Derrickson)
b. endocrine glands
   - ductless glands that secrete hormones into the blood
     - The hormone then travels to its target cell to cause a specific biological response.
   - Examples of endocrine glands (Figure 1.6, Derrickson)
     1. pituitary gland
     2. thyroid gland
     3. parathyroid glands
     4. adrenal glands
     5. pancreas
     6. ovaries
     7. testes

2. connective tissue
   - tissue that supports, insulates, and protects organs
   - Examples
     • adipose tissue
       - connective tissue that stores triglycerides (fat) (Figure 1.7, Derrickson)
     • dermis
       - connective tissue that forms the inner layer of the skin (Figure 1.8, Derrickson)
     • bone tissue
       - hard connective tissue that forms bones (Figure 1.9, Derrickson)
     • cartilage
       - connective tissue that is resilient (i.e. its shape bounces back after being deformed)
       - located in many places throughout the body: nose, external ear, and larynx (Adam’s apple) (Figure 1.10, Derrickson)
     • blood
       - fluid connective tissue found in the blood vessels of the body
       - consists of blood cells (such as red blood cells, white blood cells, and platelets) and a fluid called plasma that consists of H₂O, ions, nutrients, gases, wastes, etc. (Figure 1.11, Derrickson).
3. **muscle tissue**  
-also called **muscular tissue**

- tissue that contracts (shortens) in order to cause movements of different parts of the body

- 3 types
  a. **skeletal muscle**  
  - muscle tissue that attaches to the bones of the body (Figure 1.12, Derrickson)  
  - striated (contains alternating light and dark bands)  
  - voluntarily controlled
  
  b. **cardiac muscle**  
  - muscle tissue that forms the bulk of the heart wall (Figure 1.13, Derrickson)  
  - striated  
  - involuntarily controlled
  
  c. **smooth muscle**  
  - muscle tissue that is located within the walls of hollow organs (blood vessels, stomach, intestines, uterus, etc.) (Figure 1.14, Derrickson)  
  - looks smooth because it lacks striations  
  - involuntarily controlled

4. **nervous tissue**  
- tissue that detects and responds to changes in the environment  
- found in the brain, spinal cord, and nerves of the body  
- consists of cells called **neurons** (Figure 1.15, Derrickson)

**organ**  
- a component of the body that consists of two or more different types of tissues that have a common function and typically have a characteristic shape  
- Examples:
  - brain  
  - kidney  
  - heart  
  - large intestine  
  - lungs  
  - liver
organ system
-an interaction of organs that perform a common function
-Examples:
  ● digestive system
  ● nervous system
  ● cardiovascular system
  ● respiratory system
  ● urinary system
  ● reproductive system

organism
-the living individual formed by the interaction of all of the organ systems of the body
Figure 1.1
Levels of Body Organization

CHEMICAL LEVEL
Atoms (C, H, O, N, P)
Molecule (DNA)

CELLULAR LEVEL
Smooth muscle cell

TISSUE LEVEL
Smooth muscle tissue

SYSTEM LEVEL
Pharynx
Esophagus
Liver
Stomach
Pancreas
Gallbladder
Small intestine
Large intestine

ORGAN LEVEL
Stomach
Epithelial tissue

DIGESTIVE SYSTEM
Smooth muscle tissue layers

Outer layer of epithelial tissue and connective tissue

ORGANISMAL LEVEL

Figure 1.2
Example of Epithelial Tissue

- Epidermis (outer layer) of the skin
Figure 1.3
Example of Epithelial Tissue
● Inside layer lining the lumen of a hollow organ
Figure 1.4
Example of Epithelial Tissue

- Glands
Figure 1.5
Examples of Exocrine Glands
• Salivary Glands
Figure 1.6
Examples of Endocrine Glands

- Pineal gland
- Hypothalamus
- Pituitary gland
- Parathyroid glands (behind thyroid gland)
- Thyroid gland
- Skin
- Thymus
- Heart
- Liver
- Stomach
- Adrenal Gland
- Kidney
- Pancreas
- Small Intestine
- Ovary (in females)
- Testes
Figure 1.7
Example of Connective Tissue
• Adipose Tissue
Figure 1.8
Example of Connective Tissue
- Dermis (inner layer) of the skin
Figure 1.9
Example of Connective Tissue
● Bone Tissue
Figure 1.10
Example of Connective Tissue
● Cartilage
Figure 1.11
Example of Connective Tissue
● Blood
Figure 1.12
Example of Muscle Tissue
● Skeletal Muscle

![Diagram showing skeletal muscle tissue with labeled parts: skeletal muscle fiber (cell), nucleus, striations, and skeletal muscle fiber.](image)
Figure 1.13
Example of Muscle Tissue
• Cardiac Muscle
Figure 1.14
Example of Muscle Tissue
● Smooth Muscle
Figure 1.15
Example of Nervous Tissue

Neuron of spinal cord

- Dendrite
- Nucleus of neuroglial cell
- Nucleus in cell body
- Axon

Spinal cord

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