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Organization of the Human Body



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A&P Defined

Anatomy – (*ana* = up, *tomy*= a cutting) is the science of structure and the relationships among structures.

Physiology – (*physio*= nature, *logy*= study of) is the science of body functions, or how the body works!!



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5 Characteristics of Living Things

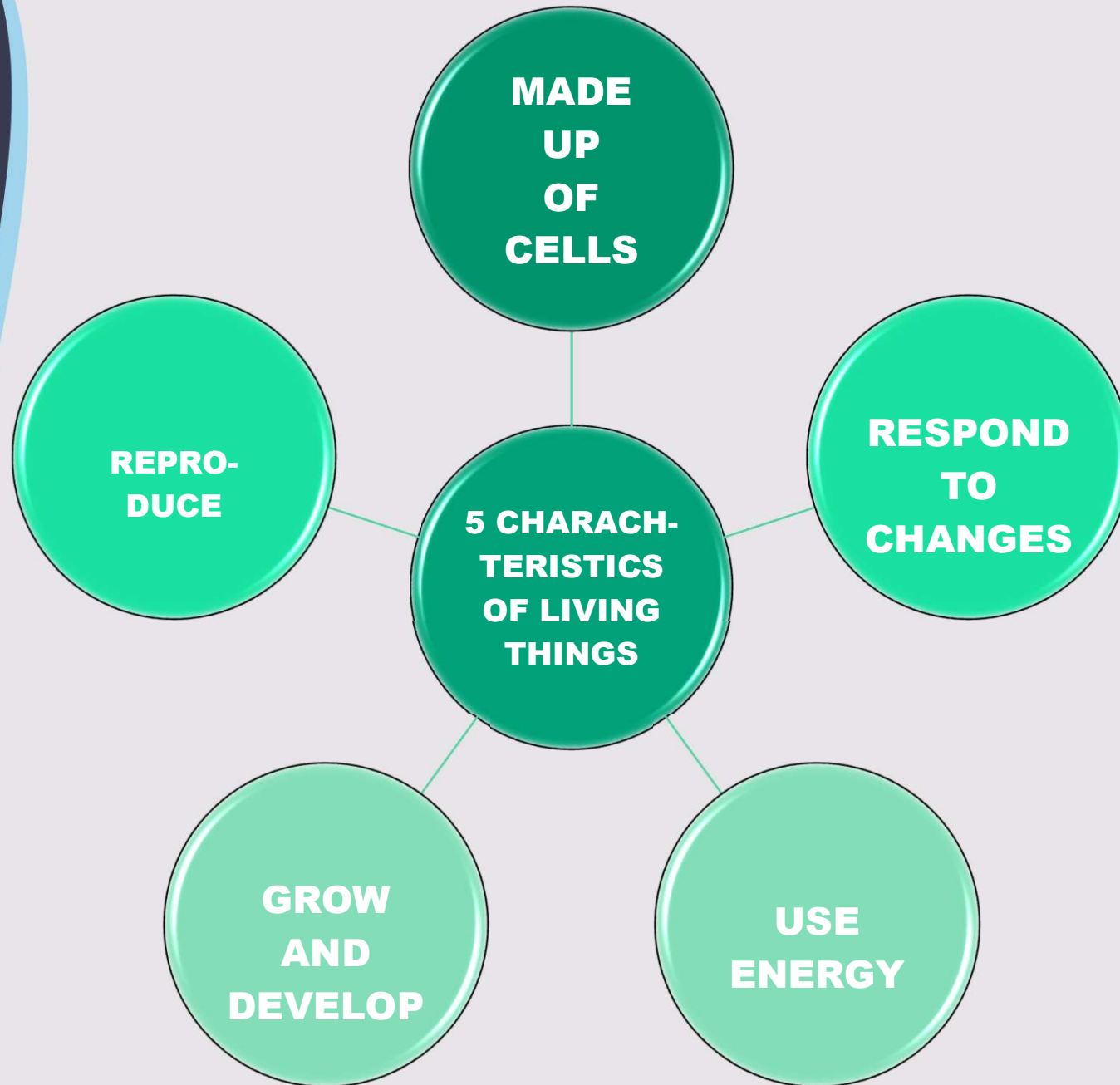
All living things

1. are made of cells
2. use energy
3. grow and develop
4. respond to changes/stimuli
5. reproduce



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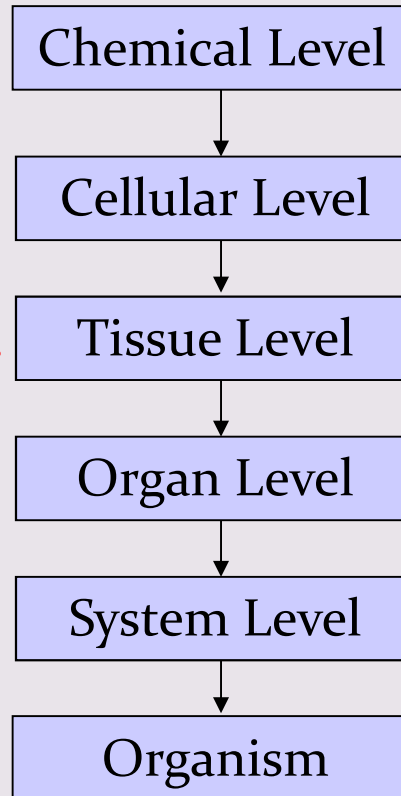
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Levels of Organization and Body Systems

Structural Organization of the Human Body

From lowest
complexity
to highest...

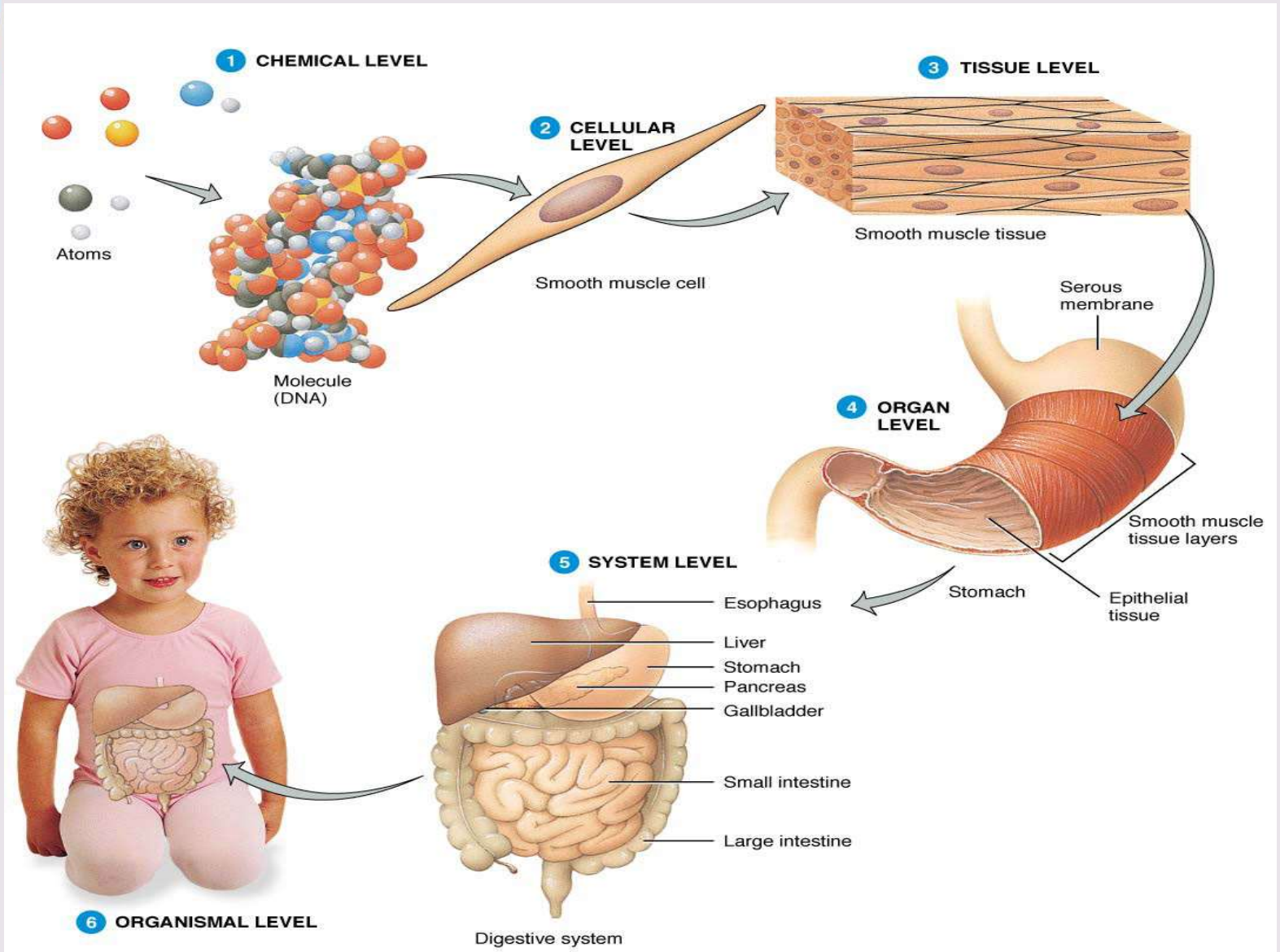


Every lower
level is
composed of
the ones
above.



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Levels of Structural Organization in the Body



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Levels

Each of these levels works together to maintain homeostasis within human beings.

Chemical Level



Carbon, Hydrogen, Oxygen, Nitrogen, Calcium, and others are essential for maintaining life.



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Cellular Level

Basic structural and functional unit of an organism.

Tissue Level

Groups of cells, working together in some specialized function. Four types: *epithelial, connective, muscle, and nervous tissues.*

Organ Level

Recognizable shape, made of two or more tissues, specific function.



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System Level

Related organs with a common function. We will become very familiar with system levels.

Organism

All of the above creates an whole organism!



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Principal Systems of the Human Body

1. **Integumentary System** – skin, hair, fingernails
2. **Skeletal System**
3. **Muscular System**
4. **Nervous System**
5. **Endocrine System** – glands and tissues that produce hormones
6. **Cardiovascular System**
7. **Lymphatic and Immune System** – spleen, lymph, tonsils
8. **Respiratory System**
9. **Digestive System**
10. **Urinary System** – kidneys, ureters, bladder and urethra
11. **Reproductive Systems**



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Table 1.1 Components and Functions of the Eleven Principal Systems of the Human Body

1. INTEGUMENTARY SYSTEM

Components:
Skin and structures derived from it, such as hair, nails, and sweat and oil glands.

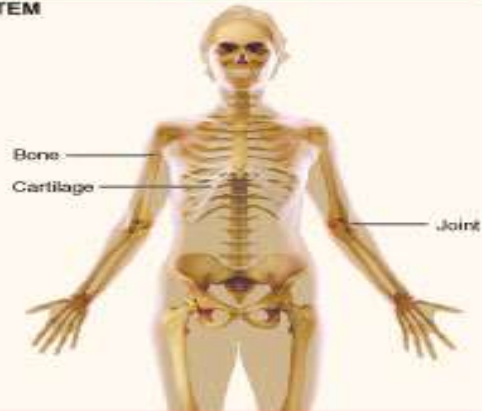
Functions:
Helps regulate body temperature; protects the body; eliminates some wastes; helps make vitamin D; detects sensations such as pressure, pain, warmth, and cold.



2. SKELETAL SYSTEM

Components:
All the bones of the body, their associated cartilages, and joints.

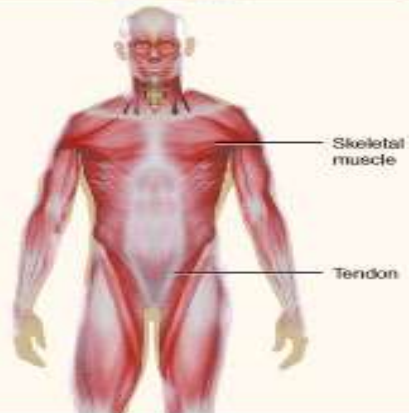
Functions:
Supports and protects the body; assists with body movements; stores cells that produce blood cells, and stores minerals and lipids (fats).



3. MUSCULAR SYSTEM

Components:
Specifically refers to skeletal muscle tissue, which is muscle usually attached to bones (other muscle tissues include smooth and cardiac).

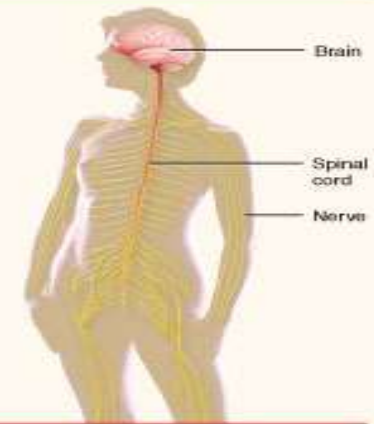
Functions:
Participates in bringing about movement, maintains posture, and produces heat.



4. NERVOUS SYSTEM

Components:
Brain, spinal cord, nerves, and sense organs such as the eye and ear.

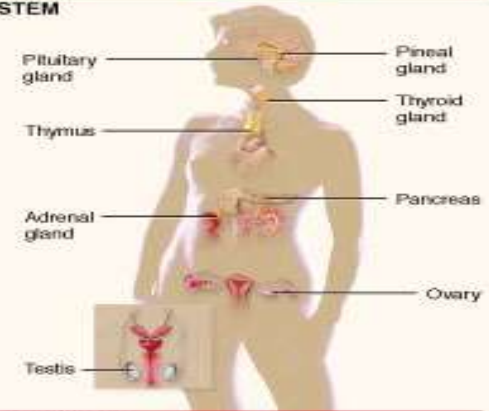
Functions:
Regulates body activities through nerve impulses by detecting changes in the environment, interpreting the changes, and responding to the changes by bringing about muscular contractions or glandular secretions.



5. ENDOCRINE SYSTEM

Components:
All glands and tissues that produce chemical regulators of body functions, called hormones.

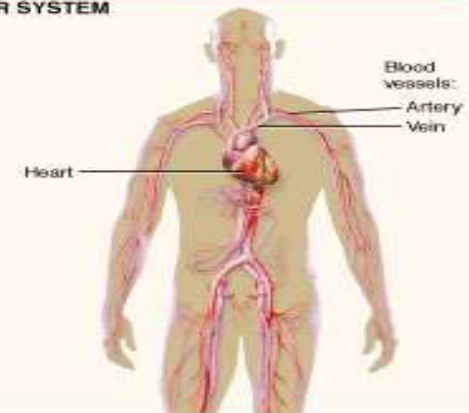
Functions:
Regulates body activities through hormones transported by the blood to various target organs.



6. CARDIOVASCULAR SYSTEM

Components:
Blood, heart, and blood vessels.

Functions:
Heart pumps blood through blood vessels; blood carries oxygen and nutrients to cells and carbon dioxide and wastes away from cells, and helps regulate acidity, temperature, and water content of body fluids; blood components help defend against disease and mend damaged blood vessels.



Components and Functions of the Eleven Principal Systems of the Human Body



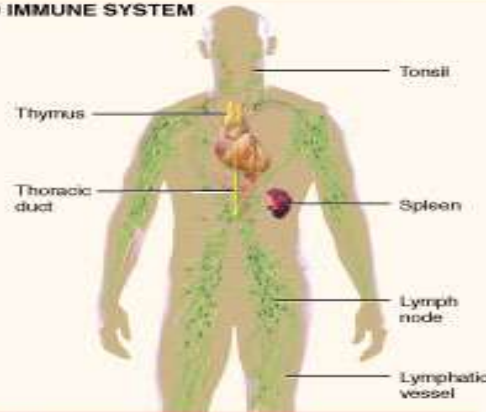
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7. LYMPHATIC AND IMMUNE SYSTEM

Components:
Lymphatic fluid and vessels; spleen, thymus, lymph nodes, and tonsils; cells that carry out immune responses (B cells, T cells, and others).

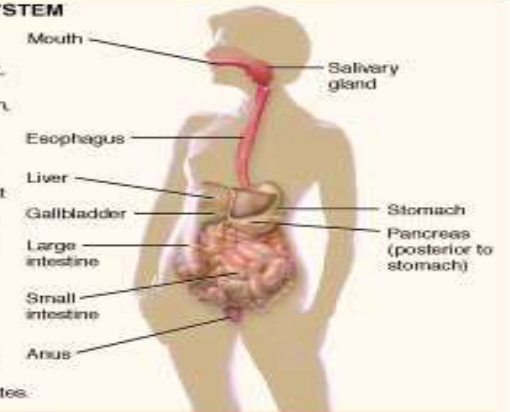
Functions:
Returns proteins and fluid to blood; carries lipids from gastrointestinal tract to blood; contains sites of maturation and proliferation of B cells and T cells that protect against disease-causing organisms.



9. DIGESTIVE SYSTEM

Components:
Organs of gastrointestinal tract, including the mouth, esophagus, stomach, small and large intestines, rectum, and anus; also includes accessory digestive organs that assist in digestive processes, such as the salivary glands, liver, gallbladder, and pancreas.

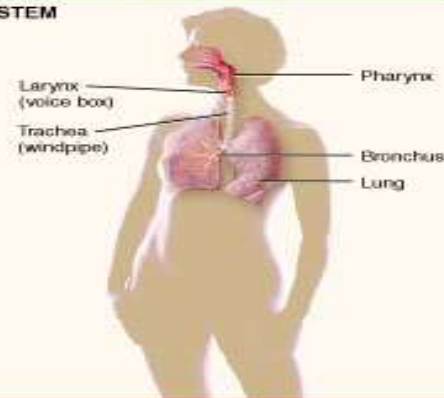
Functions:
Achieves physical and chemical breakdown of food; absorbs nutrients; eliminates solid wastes.



8. RESPIRATORY SYSTEM

Components:
Lungs and air passageways such as the pharynx (throat), larynx (voice box), trachea (windpipe), and bronchial tubes leading into and out of them.

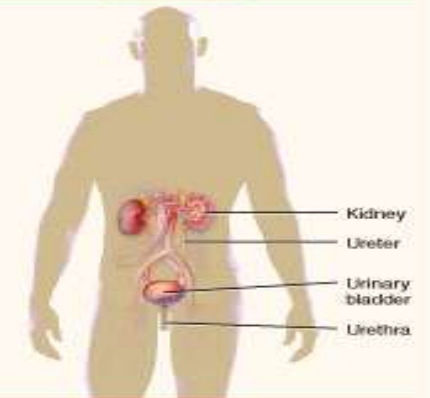
Functions:
Transfers oxygen from inhaled air to blood and carbon dioxide from blood to exhaled air; helps regulate acidity of body fluids; air flowing out of lungs through vocal cords produces sounds.



10. URINARY SYSTEM

Components:
Kidneys, ureters, urinary bladder, and urethra.

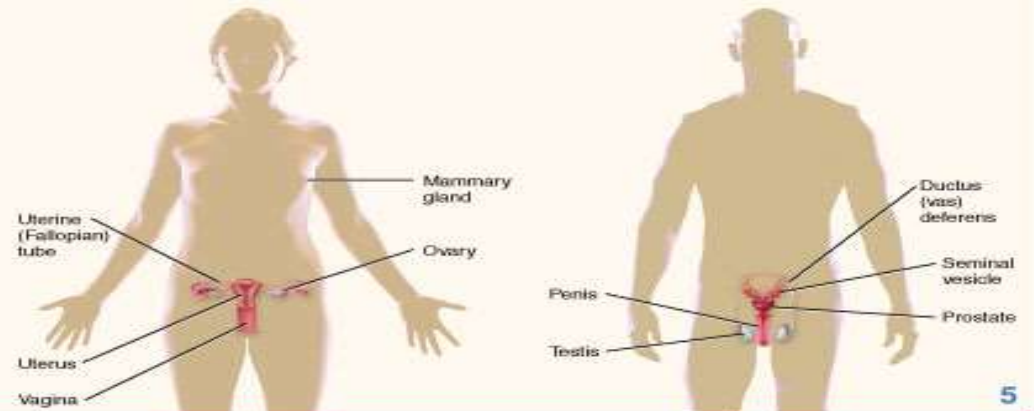
Functions:
Produces, stores, and eliminates urine; eliminates wastes and regulates volume and chemical composition of blood; maintains body's mineral balance; helps regulate red blood cell production.



11. REPRODUCTIVE SYSTEMS

Components:
Gonads (testes or ovaries) and associated organs: uterine tubes, uterus, and vagina in females, and epididymis, ductus (vas) deferens, and penis in males. Also, mammary glands in females.

Functions:
Gonads produce gametes (sperm or oocytes) that unite to form a new organism and release hormones that regulate reproduction and other body processes; associated organs transport and store gametes. Mammary glands produce milk.



Components and Functions of the Eleven Principal Systems of the Human Body



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Life Processes

Metabolism: the sum of all chemical processes that occur in the body.

Responsiveness: how a body detects and responds to changes in its internal or external environment.

Movement: motion of the whole body, organs, single cells, even organelles.

Growth: increase in body size; the size of cells, number of cells, or amount of material surrounding cells.

Differentiation: process when unspecialized cells become specialized cells. i.e. egg cell into you!

Reproduction: formation of new cells for growth, repair or replacement or making someone new.