



Study of Organism in Human Body and Levels of Organism

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Introduction : The chemical level of organization, scientists consider the simplest building blocks of matter: subatomic particles, atoms and molecules. All matter in the universe is composed of one or more unique pure substances called elements,

familiar examples of which are hydrogen, oxygen, carbon, nitrogen, calcium, and iron. The smallest unit of any of these pure substances (elements) is an atom. Atoms are made up of subatomic particles such as the proton, electron and neutron. Two or more atoms combine to form a molecule, such as the water molecules, proteins, and sugars found in living things. Molecules are the chemical building blocks of all body structures.

A cell is the smallest independently functioning unit of a living organism. Even bacteria, which are extremely small, independently-living organisms, have a cellular structure. Each bacterium is a single cell. All living structures of human anatomy contain cells, and almost all functions of human physiology are performed in cells or are initiated by cells.

A human cell typically consists of flexible membranes that enclose cytoplasm, a water-based cellular fluid together with a variety of tiny functioning units called organelles. In humans, as in all organisms, cells perform all functions of life. A tissue is a group of many similar cells (though sometimes composed of a few related types) that work together to perform a specific function. An organ is an anatomically distinct structure of the body composed of two or more tissue types. Each organ performs one or more specific physiological functions. An organ system is a group of organs that work together to perform major functions or meet physiological needs of the body.

The human body is incredibly complex, but it does have an underlying organization. Learning this organizational structure can really help you visualize and understand how the human body is built and how it functions. The levels of organization start at the most complex level and end at the most basic level, from the whole organism to the cellular level. Each step down in level represents a decrease in complexity. The levels include:



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1. Cells
2. Tissues
3. Organs
4. Organ systems

Cells : There are More than 100 trillion cells in the body, More than 100 different kinds of cells in the body and The cell types in the body are grouped by their function into four basic types of tissue: epithelial, nervous, connective, and muscle.

Tissues : Epithelial tissue lines most body surfaces, and it protects other tissues from dehydration and physical damage. The epithelial layer is usually no more than a few cells thick. Nervous tissue consists of nerve cells and their supporting cells. Nerve cells carry information throughout the body. Connective tissue support, protect, and insulate the body. Connective tissue includes fat, cartilage, bone, tendons, and blood. Muscle tissue enables the movement of body structures by muscle contraction. Muscle tissue include skeletal muscle (voluntary), smooth muscle (involuntary), and cardiac muscle.

Organs : Tissues work together to perform a specific function. When two or more types of tissue are combined they make an organ. For example; the heart contains cardiac muscle tissue and connective tissue and is stimulated by the nervous tissue. There are four large fluid filled spaces called body cavities that house and protect the major internal organs of the body.

1. Thoracic cavity – Heart and lungs are protected by the rib cage and sternum.
2. Cranial cavity – Brain is encased by the skull.
3. Abdominal cavity – Digestive and reproductive organs are protected by the pelvis and abdominal muscles.
4. Spinal cavity – Spinal cord is protected by the vertebrae.

Organ System : The different organs in an organ system interact to perform a certain function. For example the digestive system is composed of the stomach, intestines, liver, gallbladder and pancreas. Therefore, if one organ fails it impacts the entire system. Some organs function in more than one system.

Organism Level



The top level is an easy one. This is just the organism, or the life form and all the systems, organs, tissues, cells, and molecules that it contains.

Organ System Level

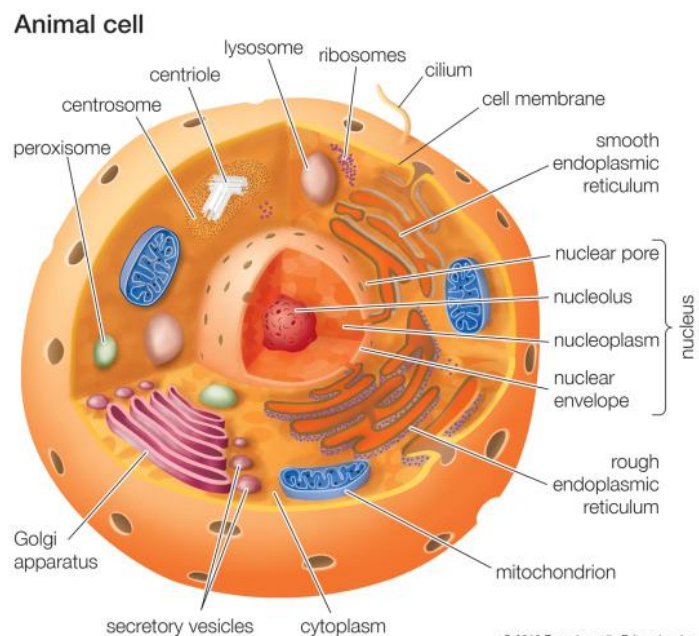
The first step down starts to break up the body, or the organism, into major systems that are dedicated to specific functions. Organ systems are made up of organs that work together to perform specific and vital functions within the body. These are the digestive, urinary, muscular, and reproductive systems. You probably even have a pretty good idea of some of the major functions for these systems. In total, there are eleven organ systems in the body. In addition to those listed above, we also have the respiratory, cardiovascular, nervous, endocrine, lymphatic, skeletal, and integumentary systems.

Organ Level

organs that are part of those organ systems. Imagine an airport, a great example of a system, dedicated to getting each passenger from the front entrance onto a plane. Within the system, there are multiple separate units: check-in, security, gates, boarding bridges, etc. These units are like organs: each has a dedicated function and only together do they achieve the overall goal of the system. Within an organ system, an organ is a structure composed of multiple tissue types that carries out a specific function.

Tissue Level

A tissue is a group of similar cells working together to perform a function. There are four tissue types within the human body. That means that any individual organ can only be composed of at most four different tissue types; this is why on your stroll through the organs, you would certainly start to notice some similar looking tissues. Tissues are groups of similar cells that have a common function. A tissue must contain two





different types of cells. The four basic tissue types in humans include epithelium, connective, muscle, and nervous tissue. Let's look at the major features of the four tissue types.

Epithelial tissue- cells are pressed up against one another and can form barriers (think skin).

Connective tissue- cells are embedded in a fluid and protein mixture that varies in consistency from completely liquid (blood) to rigid (bone).

Chemical level- To study the chemical level of organization, scientists consider the simplest building blocks of matter: subatomic particles, atoms and molecules. All matter in the universe is composed of one or more unique pure substances called elements, familiar examples of which are hydrogen, oxygen, carbon, nitrogen, calcium, and iron. The smallest unit of any of these pure substances (elements) is an atom. Atoms are made up of subatomic particles such as the proton, electron and neutron. Two or more atoms combine to form a molecule, such as the water molecules, proteins, and sugars found in living things. Molecules are the chemical building blocks of all body structures.

Cellular level- the cellular level is made up of the smallest unit of living matter, the cell. Individual cells may have some common functions but vary widely in size and shape. Humans are multi-cellular animals. That means we are made of lots of cells, not just one cell. The cells in many multi-cellular animals and plants are specialised, so that they can share out the processes of life. They work together like a team to support This level is made up of the smallest unit of living matter, the cell. Individual cells may have some common functions but vary widely in size and shape. Each type of cells carries out a set of unique tasks within the human body.

The human body has 6 main levels of structural organization. We will begin with the simplest level within the structural hierarchy.

Organ system level- One or more organs work in unison to accomplish a common purpose. For instance, the heart and blood vessels work together and circulate blood throughout the body to provide oxygen and nutrients to cells. Besides the cardiovascular system, the other organ systems of the body are the integumentary, skeletal, nervous, muscular, endocrine, respiratory, lymphatic, digestive, urinary, and reproductive systems.



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