

SNC2D BIOLOGY

TISSUES, ORGANS & SYSTEMS OF ...
✦ Animal & Plant Organs
(P.54-60)

Organs

*Similar to cells that work together to form tissues, a group of tissues that work together to perform a complex task are known as an **organ**. And while most organs work within a single organ system, some organs play a role in more than one system. For example, the stomach is part of the digestive system and of no other system but the pancreas is part of both the digestive system and the endocrine system.*

ORGAN

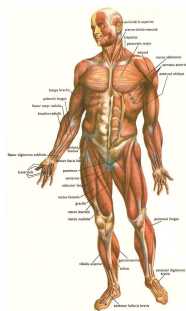
- ✦ different tissues working together to perform a complex task

Animal Organs

PRACTICE

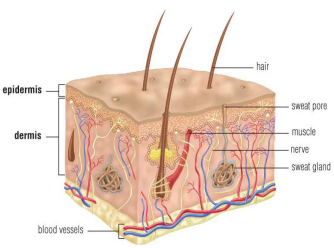
1. How many organs does a human have?

The Terminologica Anatomica lists over 7,500 named parts of the human body. Of course, many of these terms apply to parts of the body that may not be considered organs, and some apply to parts of individual organs. In short, there is no clear answer to this question as much depends upon the definition of an organ.



Animal Organs – The Skin

The largest organ in your body is the **skin**. The skin is made up of two different layers of tissues: the epidermis and the dermis. The **epidermis** is the outer protective layer that is made up of epithelial tissue. The epidermis prevents bacteria and viruses from entering your body. The epidermis is also able to make vitamin D when the skin is exposed to UV radiation.

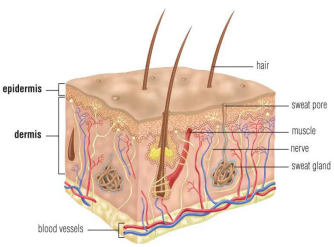


epidermis
dermis
hair
sweat pore
muscle
nerve
sweat gland
blood vessels

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Animal Organs – The Skin

The **dermis** is the inner layer and is made of connective tissue, nerve tissue, and muscle tissue. Blood vessels in the skin dilate to release excess heat. Pores in the skin secrete sweat to cool the body. Layers of fat provide insulation. The dermis also contains nerves that sense pain, pressure, heat, and cold and send this information to the brain. It is muscle tissue in the dermis that produces "goosebumps".

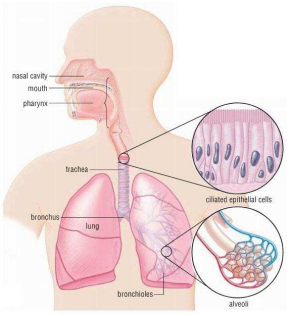


epidermis
dermis
hair
sweat pore
muscle
nerve
sweat gland
blood vessels

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Animal Organs – The Lungs

The **lungs** are a pair of organs involved in respiration. Your lungs allow you to breathe in oxygen and breathe out carbon dioxide. Cells need oxygen to function. The lungs are made of connective and epithelial tissue. The lungs are coated with two sacs of connective tissue separated by a thin layer of fluid. This not only protects the lungs but also reduces the effects of friction when the lungs move.

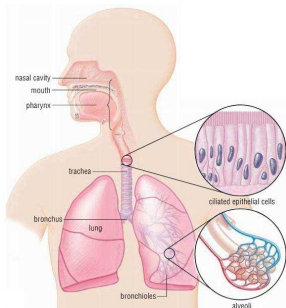


nasal cavity
mouth
pharynx
trachea
lung
bronchus
bronchioles
alveoli
ciliated epithelial cells

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Animal Organs – The Lungs

When you breathe, air passes through the pharynx, the trachea, the bronchus and smaller bronchial tubes into tiny air sacs, called **alveoli**. The alveoli, which are made of a thin layer of epithelial tissue, are surrounded by thin-walled blood vessels called **capillaries**. Oxygen travels from the alveoli through the capillaries into the blood. Carbon dioxide travels from the bloodstream across the alveoli to the air in the alveoli.



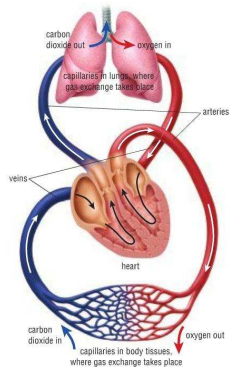
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Animal Organs – The Heart

The **heart** is a muscular pump that supplies blood to all parts of the body. An adult human heart is about 300 g and is the size of a fist. In an average lifetime, the heart beats about 3.5 billion times.



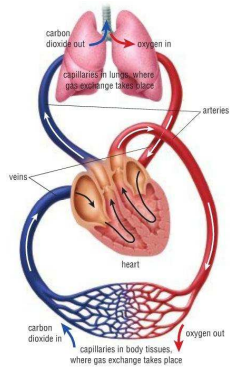
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Animal Organs – The Heart

The heart is divided into four chambers: the left and right atria, and the left and right ventricles. The right side of the heart (right atria and right ventricle) pumps blood to the lungs so that the blood can pick up oxygen. The left side of the heart (left atria and left ventricle) pumps the oxygenated blood through the aorta to the rest of the body.



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Animal Organs – The Stomach

When you eat, various organs assist with the digestive functions to break down the food. For example, your mouth takes in food and begins digestion. Once the food enters your body, it travels from the mouth down a tube called the **esophagus**. The food moves along the esophagus because of the rhythmic constriction and relaxation of the smooth muscles that line the esophagus. This movement is known as peristalsis. The esophagus is lined with a protective layer of epithelial tissue.

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Animal Organs – The Stomach

Further down the canal, food enters the **stomach**, which is made of epithelia, connective, nervous, and muscle tissues. The stomach churns food and mixes it with digestive juices and enzymes. Finally, the digested nutrients and undigested waste products move into the small and large intestine, which are areas of chemical digestion and removal of wastes. Solid wastes are stored in the rectum and exit the body through the anus.

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Animal Organs

ANIMAL ORGANS

- ❖ numerous variety including:
 - skin – largest organ in the body
 - lungs – the organs involved in respiration
 - heart – supplies blood to all parts of the body
 - stomach – digests food

RECALL!

While most organs work within a single organ system, some organs play a role in more than one system. For example, the stomach is part of the digestive system and of no other system but the pancreas is part of both the digestive system and the endocrine system.

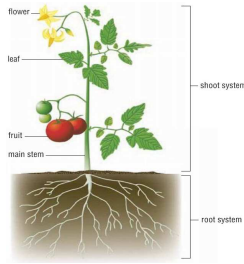
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Plant Organs

PRACTICE

2. How many organs does a plant have?

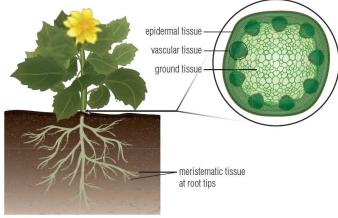
Plants are much less sophisticated than animals and only contain four organs – the roots, the leaves, the stem, and the flower or fruit.



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Plant Organs – The Roots

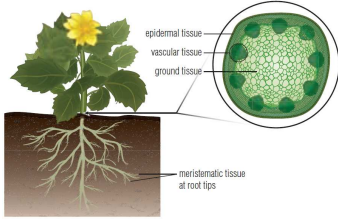
The **roots** anchor the plant in the soil, which permits the plant to grow above the soil without toppling over. Roots also collect water from the surrounding soil and transport it to the stem, and store food that is made in other parts of the plant. Different tissues in the root work together to accomplish these functions.



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Plant Organs – The Roots

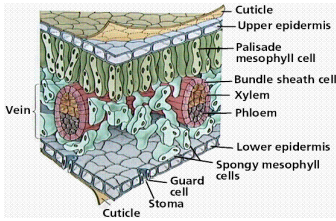
The bottom of the root is covered with protective epidermal tissue known as the **root cap**. Just below the epidermal tissue is a layer of meristematic tissue, which allows the root to grow. There are also layers of ground tissue and vascular tissue that make up the centre of the root.



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Plant Organs – The Leaf

Carbon dioxide enters, and oxygen and excess water exit through openings in the leaf epidermal tissue called stomata. These openings are controlled by special cells known as guard cells. Most of the leaf is made of a specialized ground tissue called **mesophyll**. Photosynthesis takes place in the mesophyll.



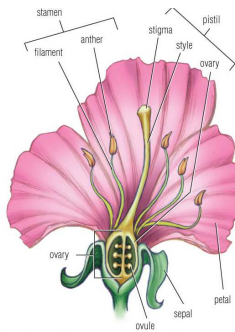
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Plant Organs – The Flower

The **flower** is the reproductive structure of the plant. The main function of the flower is to produce seeds through sexual reproduction. The flower contains male organs, called **stamens**, which consist of a filament with an anther at the tip. The anther produces pollen, which are the male sex cells. The flower also contains female organs, called the **pistil**, which consists of the ovary, style, and stigma. Female sex cells, called eggs, are located in the ovary.



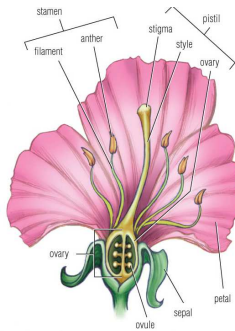
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Plant Organs – The Flower

When the pollen and an egg unite, the fertilized egg becomes a seed. Some seeds are surrounded by flesh and are called the fruit. Other types of seeds have no fleshy covering but are encased in a hard shell. Like other parts of the plant, new cells are made from meristematic tissue. As the flower structures develop, the unspecialized meristematic tissue differentiates to form the other parts of the flower, such as the sepal and the stamen.



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Plant Organs

PLANT ORGANS

- ❖ 4 distinct plant organs:
 - roots – anchors the plant; collects water; food storage
 - stem – transports water and nutrients throughout the plant; supports the leaves and flowers
 - leaf – where photosynthesis occurs
 - flower/fruit – reproductive structure (seeds)

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Check Your Learning

1. Look at the animal organs and job descriptions given. Match each organ to its proper job description.

• heart	⑦	① filters and cleans the blood
• teeth	③	② controls the whole body
• intestines	④	③ grinds food
• skin	⑥	④ breaks down food and absorbs the nutrients
• kidney	①	⑤ exchanges gases
• esophagus	⑨	⑥ covers and protects the surface
• bladder	⑧	⑦ pumps blood around the body
• brain	②	⑧ stores urine
• lungs	⑤	⑨ passes food from the mouth to the stomach


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Check Your Learning

2. Why are so many organs made of connective tissue and epithelial tissue?

connective tissue – supports, protects and connects the body's organs
epithelial – protects and allows nutrients to easily pass through


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 **Check Your Learning**

3. Why is it beneficial to have the heart and lungs in close proximity?

so oxygen can be quickly delivered to the body and carbon dioxide can be quickly removed from the body


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 **Check Your Learning**

4. Why are organs such as the lungs, heart, and stomach made up of many different kinds of specialized cells rather than only one kind?

specialized cells can only perform one function – however, when many specialized cells (i.e. tissues), doing different functions, work together, they can perform complex functions


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 **Check Your Learning**

5. Why do plants have only a few organs while animals have many organs?

since plants use photosynthesis to make their own food they do not need to move around in search of food – as a result they do not need the complex organ systems found in animals


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 **Check Your Learning**

6. What would happen if plants were not covered with epidermal tissue?

the plant would quickly dry out and die – in most plants, the epidermal tissue secretes a waxy substance known as the cuticle that forms a protective coating and reduces water loss

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 **Check Your Learning**

TEXTBOOK
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