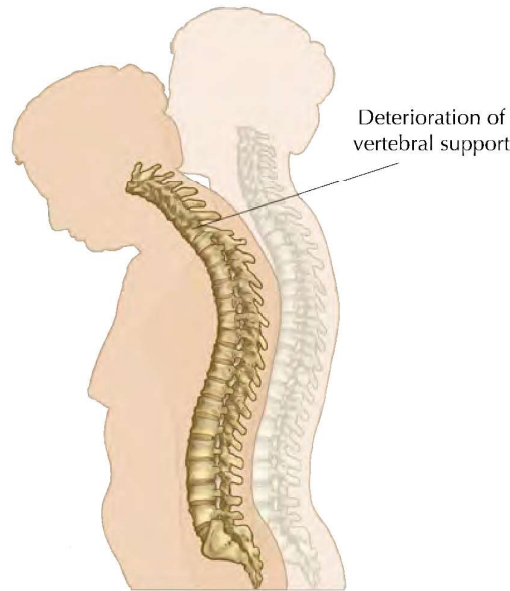
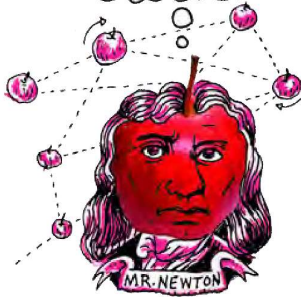


DID YOU KNOW?

Babies are born with 305 bones while adults only have 206 bones. As babies grow into adults, many smaller bones fuse together to form bigger bones.



As this woman got older, she developed osteoporosis causing her vertebral column to crumble and collapse and so she now stoops over.

2.5 The excretory system

We will now be looking at the excretory system. This is often confused with egestion, which we previously learned about.



ACTIVITY: Differentiating between excretion and egestion

Do you remember learning about the difference between excretion and egestion? Explain what you understand the difference between these terms are.

1. Egestion is...

2. Excretion is ...

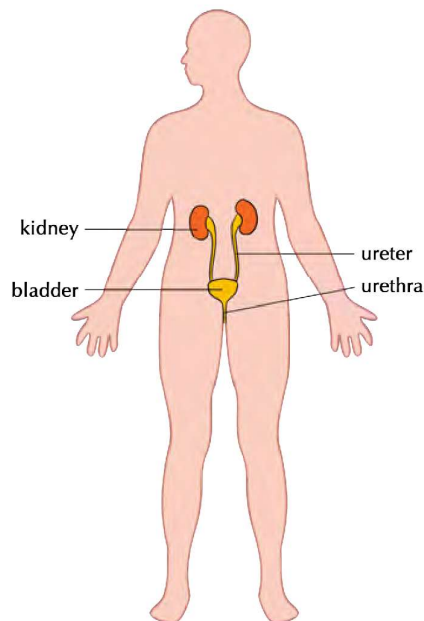
Purpose of the excretory system

Our cells use oxygen and nutrients to function and in the process also produce various metabolic waste products including:

- **urea:** a substance that is formed when protein is broken down in the liver
- **carbon dioxide:** a by-product of cellular respiration

The organs of the excretory system are responsible for removing these harmful metabolic waste products from the blood so that they do not build up to high concentrations. But, in the process, they have to retain the nutrients and water for the body to function. One of the main functions of the excretory system is to prevent too much or too little water in the body.

Components of the excretory system



The excretory system is responsible for removing metabolic waste products from the blood

We already know that the lungs excrete carbon dioxide (CO_2) when you exhale. Another organ that excretes waste is the skin. When you sweat, your skin excretes excess water, salts and a small percentage of urea. In this section, however, we will focus on the excretory system to remove metabolic waste from our blood in the form of urine.

To do this, the body uses the urinary system that consists of four main parts.

1. Kidneys

The kidneys filter all the blood in your body to remove urea from the blood. You have two kidneys, each about the size of your fist and bean-shaped. Your kidneys produce urine which is a combination of excess water and waste products.

2. Ureters

There are two ureters (thin tubes) which connect each kidney with the bladder and carry the urine from the kidney to the bladder.

NEW WORDS

- bladder
- excretion
- kidney
- metabolic waste products
- metabolise
- toxic
- urea
- ureter
- urethra
- urinate



DID YOU KNOW?

The first kidney transplant occurred in 1954.



DID YOU KNOW?

On average, your kidneys produce 1.5 liters of urine each day.



DID YOU KNOW?

Your kidneys filter about 125 ml of blood every minute! Since you have about 7 to 8 litres of blood in your body, all your blood gets filtered 20 to 25 times per day through your kidneys!



NEW WORDS

- antibiotic
- infection



VISIT

A summary video of the excretory system.

bit.ly/16Ou9IA



3. Bladder

The bladder is a balloon-like organ that collects the urine before excreting it during urination.

4. Urethra

The urethra is a tube that connects the bladder to the outside of the human body through which the urine is excreted.

Main processes in the excretory system

There are four main processes discussed below.

1. Filtration: All the blood in the body passes through the kidneys as part of the circulatory system. The kidneys filter the blood to remove unwanted minerals and urea, and also excess water. Some water is removed so that the metabolic waste products can be excreted in solution in the liquid urine.

2. Absorption: Once the blood is filtered by the kidneys, the substances that the body needs are re-absorbed back into the blood so that they are not lost in the urine.

3. Diffusion: The substances are transported into and out of the specialised cells of the kidney through the process of diffusion.

4. Excretion: The kidneys funnel the liquid urine through the ureters to the bladder where it is stored. When the bladder has filled up, it uses muscles to force the urine out of the body through the urethra. This is called excretion.

Health issues involving the excretory system

Common diseases of the excretory system include:



A patient receiving dialysis to filter his blood because the kidneys are not working as they should.

Kidney Failure: When this happens the kidney loses its ability to properly filter and remove metabolic waste which allows this waste to build up in the body. This is very harmful and may be fatal. In such cases the patient needs to undergo very regular kidney dialysis. Dialysis involves using a machine which filters the blood for the patient to remove waste products.

Kidney Stones: Kidney stones form when fluid intake is too low, resulting in the concentration of solutes (salts and minerals) in the kidney becoming too high. This can result in a small crystal (stone) forming. The kidney stone may stay in the kidney or move down the ureter to be excreted in the urine. A larger stone may however cause severe pain along the urinary tract and may even get stuck, blocking the flow of urine and causing severe pain or bleeding.



A kidney stone which is about 4.5 mm in diameter.

Bladder infection: This is one of the most common infections in women but is quite rare in men. Bacteria can enter the bladder and cause an infection. This causes swelling and pain when urinating.

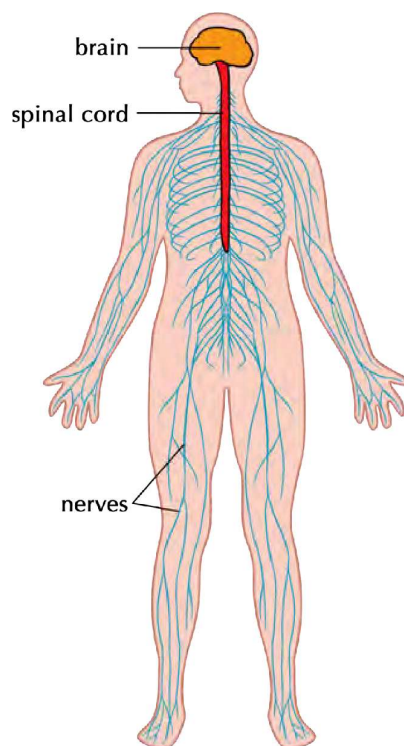
2.6 The nervous system

Purpose of the nervous system

Our nervous system is a complex network that transmits nerve impulses between different parts of the body. The nerves in our body receive **stimuli** from inside the body or from the environment (from the ears, eyes, skin or tongue for instance). These are turned into **impulses** to the brain and spinal cord.

Components of the nervous system

The nervous system consists of various parts.



1. Nerves

Nerves are the long fibres which transmit messages from the brain and spinal cord to the rest of the body and back. Each nerve is actually an enclosed bundle of nerve cells, called neurons. The nerves work together to carry messages throughout the body. They make up the nerve tissue in the nervous system.

2. Brain

Your brain is located inside your skull. The brain is part of your central nervous system and sends messages to the rest of your body. There are different areas in the brain that have different functions. All these different areas also communicate with each other.

NEW WORDS

- auditory
- brain
- conduct
- degenerative
- impulse
- nerve
- neuron
- optic
- stimulus
- transmit
- vision



VISIT

A song about the nervous system.

bit.ly/13ZsGIR



TAKE NOTE

Stimuli is the plural form of the word stimulus.

