



8. Why do humans shiver when they are cold?

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9. Which part in the brain controls thermoregulation?

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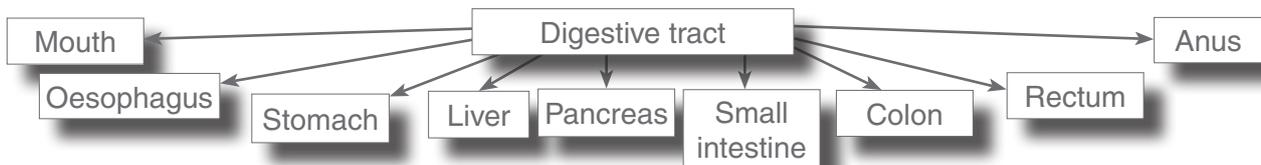
10. Explain point by point the difference between the blood vessels in the skin when you feel hot compared to when you feel cold.

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### Summary

- Steps of nutrition: ingestion → mastication → digestion → absorption → transport → assimilation → egestion
- Two types of digestion: mechanical and chemical



- The mouth consists of:
  - lips and teeth
  - jaws and teeth
  - tongue
  - soft palate
  - salivary glands
- The oesophagus is the tube which connects the throat and the stomach.
- Peristalsis is the process of involuntary muscle contractions causing the bolus to move down the oesophagus.
- The stomach:
  - mechanical digestion
  - chemical digestion
- The liver: just below the diaphragm and partly covers the stomach.
  - Produces bile.
  - Produces glycogen.
  - Stores vitamins.
  - Stores blood and iron
- Gall bladder is attached to the bottom of the liver and stores the bile.
- Functions of bile:
  - Breaks up fats so that they can be digested more easily.
  - Promotes peristalsis in the intestines.
  - It neutralises chyme which comes out of the stomach.
  - It is an antiseptic and prevents the intestine from rotting.



## Summary

- Pancreas: Tongue shaped gland located under the stomach.
  - Secretes pancreatic juice which helps to break down starch, fats and proteins.
  - Pancreatic juice neutralises chyme as soon as it enters the intestines.
  - Secretes the hormones which help control blood sugar levels.
- Small intestine is the tube between the stomach and the colon.
  - Chemical digestion: main part where enzymes are added to food.
  - Most of the digestion takes place here.
  - Contains villi to maximise absorption.
  - Most nutrients are absorbed here.
- Functions of the colon:
  - Absorb water, bile salts, mineral salts and vitamins.
  - Temporary storage of waste products before excretion.
  - Waste products are excreted through the anus.
- Nutrition is the process whereby living organisms consume food and use it for energy to allow life functions such as growth, movement, reproduction and recovery to occur.
- Nutrition is important for energy, growth, health and recovery.
- Important nutrients:

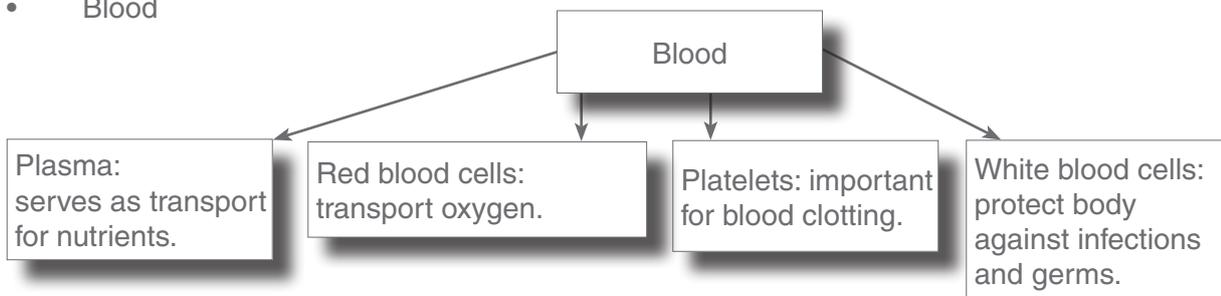
Nutrient	Source	Function	Health risk when there is a deficiency
Carbohydrates	Bread, pasta, potatoes, rice, milk	Source of energy so bodily functions can occur.	1. Weight loss
Fats	Butter, cheese, milk, oil, eggs, meat, nuts	Reserve source of energy; insulate the body against cold.	1. Kidney failure 2. Stunted growth
Proteins	Meat, fish, chicken, nuts, eggs, beans, soya beans, cabbage	Building material for growth and repair. Play an important role in the maintenance of cells and tissue.	1. Kwashiorkor 2. Low resistance 3. Weak muscle development 4. Marasmus
Vitamins	Fresh fruit and vegetables	Promote chemical reactions in the body. Offer resistance against diseases.	1. Night blindness 2. Scurvy 3. Rickets 4. Pellagra
Minerals	Fresh vegetables and fruit, bread, cereals	Serve as regulating substances to ensure good health. Ensure normal growth and development.	1. Anaemia 2. Muscle cramps 3. Pellagra 4. Osteoporosis



### Summary

Nutrient	Source	Function	Health risk when there is a deficiency
Water	Drinking water, drinks, fruit, vegetables	The body consists mainly of water. It is important in all life processes. Supplies fluid for metabolic processes.	1. Dehydration 2. Major water loss can lead to death. 3. Constipation
Fibre	Full grain food, potatoes, apples, maize	Aids digestive system. Prevents constipation and certain cancers	1. Constipation 2. Cancer

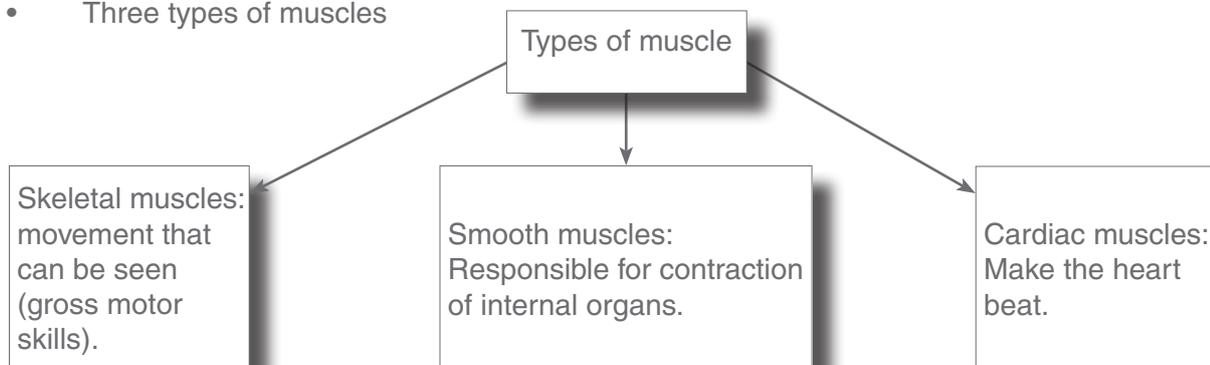
- A balanced diet: sufficient food is ingested in the correct proportions.
- An unbalanced diet: sufficient food is ingested, but in the wrong proportions.
- Malnutrition is the shortage of one nutrient, but an excessive intake of another nutrient.
- Underfeeding is when too few nutrients are ingested.
- Overeating is when too many nutrients are ingested.
- Diseases associated with the digestive system and nutrition: kwashiorkor; liver cirrhosis; diarrhoea; ulcers; bulimia nervosa; anorexia nervosa.
- The circulatory system plays an important role in:
  - transporting nutrients and oxygen to the cells.
  - transporting waste products away so they can be excreted.
- Arteries transport oxygen-rich blood to all parts of the body, except the lungs.
- Veins transport deoxygenated blood back to the lungs via the heart.
- Capillaries branch into the body organs as small narrow tubes.
- Functions of the heart:
  - The heart pumps deoxygenated blood to the lungs where it gets rid of carbon dioxide.
  - Blood that is enriched with oxygen flows back from the lungs to the heart.
  - Then it is pumped to the rest of the body. Thus, the rest of the body is supplied with oxygen.
- Blood





## Summary

- Diseases linked to the circulatory system:
  - Hypertension
  - Heart attack
  - Stroke
- The skeleton consists of:
  - Axial skeleton
  - Appendicular skeleton
- Functions of the skeleton:
  - It is the framework that gives shape to the body.
  - Protects and supports other tissue and organs in the body.
  - Bones constantly produce blood cells, therefore are alive.
  - It serves as storage for minerals like calcium and phosphorus.
- Three types of muscles



- Antagonistic muscles: All muscles work together in pairs.
- Tendons: Attach muscles to the bones.
- Ligaments: Bones that come together form a joint. The bones at a joint are held together by ligaments. Ligaments are very strong, and although they hold the bones together very securely, they still leave room for movement.
- Cartilage: Type of binding tissue which covers the bones at joints.
- Diseases that affect the skeleton:
  - Rickets
  - Osteoporosis
  - Arthritis
- The respiratory system consists of:
 

- Nasal cavity	- Oral cavity
- Throat cavity	- Larynx
- Trachea	- Lung
- Bronchus	- Bronchioles
- Alveolus	- Diaphragm
- During gaseous exchange:
  - Air is inhaled and fills the alveoli with oxygen (O<sub>2</sub>).
  - Alveoli are surrounded by a large number of capillaries.
  - Capillaries bring blood into close contact with the alveoli.



## Summary

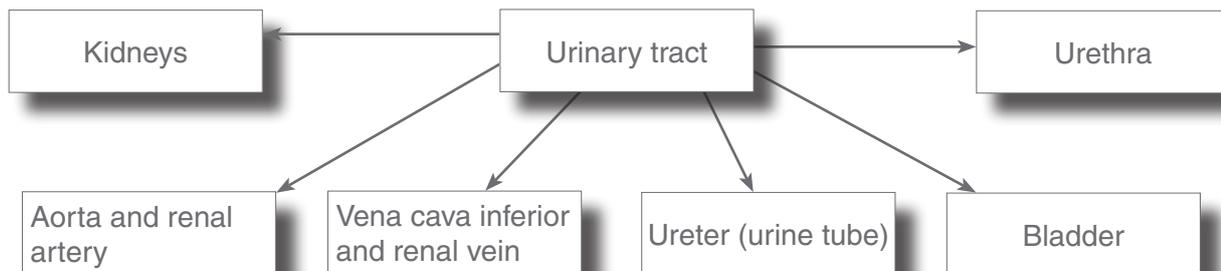
- Blood that flows to the alveoli is deoxygenated and contains carbon dioxide (CO<sub>2</sub>).
- Diffusion takes place.
- Oxygen moves through the thin walls of the alveoli to the blood vessels.
- Carbon dioxide moves through the thin walls of the blood vessels to the alveoli.
- In the blood, oxygen binds to haemoglobin to form oxyhaemoglobin.
- Oxygen-rich blood is transported to the heart b.m.o. circulation.
- Oxygen-rich blood is pumped to the rest of the body under high pressure.
- Carbon dioxide is exhaled.

- Respiration

Inhalation	Exhalation
Active process	Passive process
Muscles contract.	Muscles relax.
Oxygen is inhaled.	Carbon dioxide is exhaled.
Blood transports oxygen from the lungs to tissue.	Blood transports carbon dioxide from tissue to lungs.
Oxygen required for respiration (consumed).	Carbon dioxide is a waste product (produced).

- Lung diseases:
  - Asthma
  - Bronchitis
  - Lung cancer
  - Asbestosis

- Excretory system



- Functions of the kidneys:

- Main role is the excretion of waste products.
- Regulates the amount of water found in blood and tissue fluid.
- Regulates the amount of acid and mineral salts.

- What takes place in the kidneys?

- Filtration
- Re-absorption
- Urine is produced



## Summary

- Diseases linked to the kidneys:
  - Kidney stones
  - Bladder infection
  - Kidney failure
- Five sensory organs:
  - Eye
  - Ear
  - Tongue
  - Skin
  - Nose
- The eye:
  - Sclera:
    - White part of the eye
  - Cornea:
    - The transparent layer which helps to refract the incoming light.
    - Helps to focus.
  - Iris:
    - Green, blue or brown part of the eye
    - Small muscles contract or relax to make the pupil bigger/smaller.
  - Pupil:
    - The black part in the centre of the eye, which is actually a hole.
    - Light enters the eye through the pupil.
  - Lens:
    - It focuses light on the retina in the back of the eye.
  - Retina:
    - The retina contains millions of photoreceptors that convert light into electrical impulses which are sent to the brain via a nerve.
- The ear is divided into three parts:
  - Outer ear:
    - Ear lobe (pinna)
    - Auditory canal
  - Middle ear:
    - Eardrum
    - Ossicles:
      - Consist of hammer, anvil and stirrup.
  - Inner ear:
    - Semi-circular canals
    - Cochlea:
      - Filled with fluid.
      - Consists of cells with small, sensitive hairs (vibrating hairs).
    - Auditory nerve:
      - When the hair cells sense movement in the fluid, they send information to the brain.
      - The brain interprets the information and identifies the sound.



## Summary

- The tongue:
  - is a movable muscular organ.
  - has taste buds on the surface.
  - plays an important role in the chewing and swallowing of food.
  - plays a role in speech.
- Skin protects and covers everything on the inside of the body.  
Functions of skin:
  - Protects internal organs against the environment.
  - Controls body temperature.
  - Sense of touch
- The nose:
  - Functions of nose:
    - Breathing
    - Plays an important role in our sense of taste.
    - We use our noses to smell.
- The brain:
  - cerebrum
  - cerebellum
  - medulla oblongata
  - hypothalamus

The brain is linked to the rest of the body through a nervous system which consists of neurons.

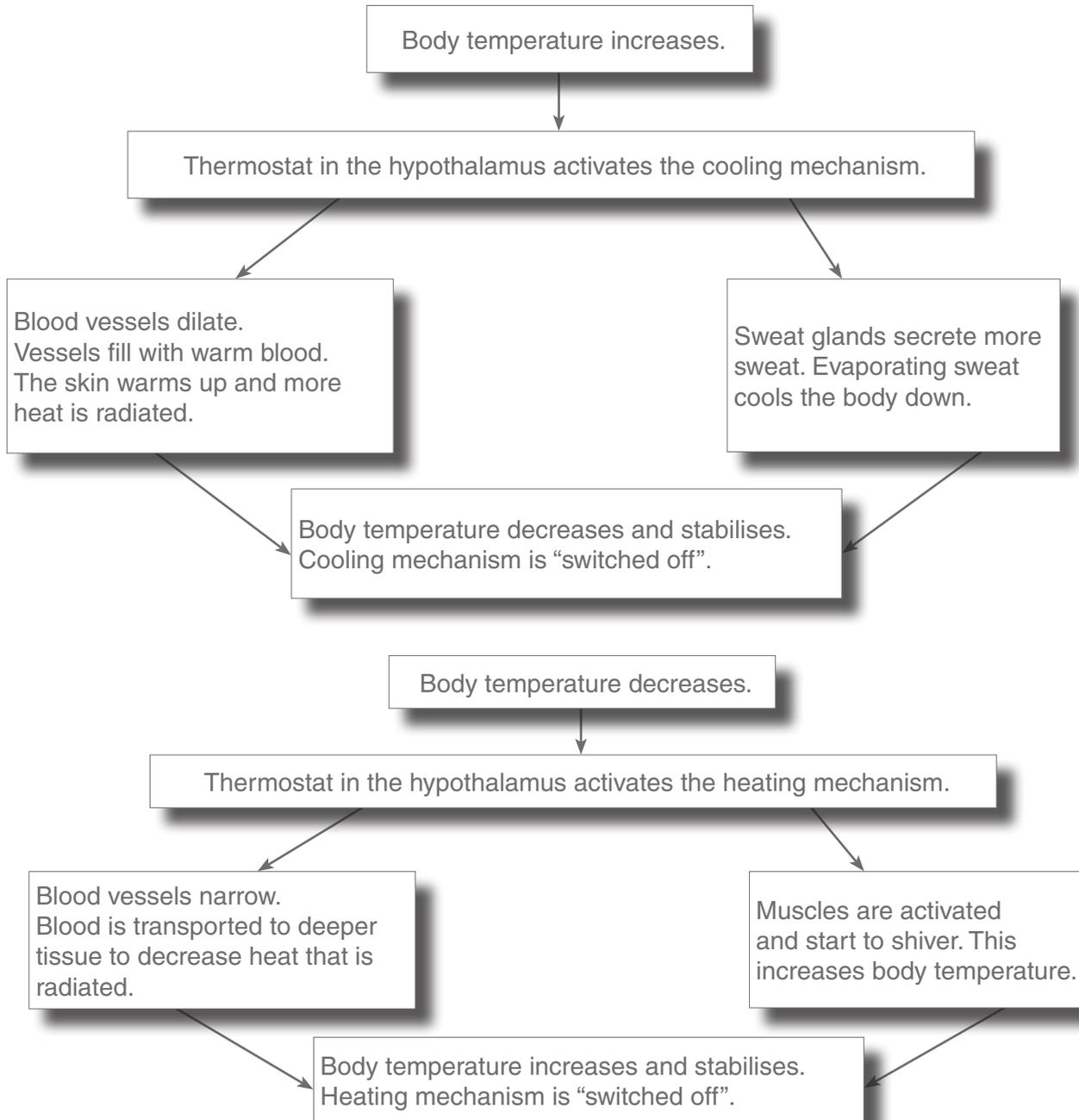
Neuron	Description
Sensory neuron	Conveys impulses from sense organs to the brain and spinal cord.
Motor neuron	Conveys impulses from the brain and spinal cord to other organs.
Interneuron	Connects sensory neurons and motor neurons.

- Spinal cord:
  - It conveys impulses between the brain and the body.
  - It controls reflex movements.
- Most common form of deafness is nerve deafness.  
Mainly caused by:
  - Sudden or long periods of exposure to loud noise.
  - Hair cells in the ear are damaged and this can lead to deafness.
- Some of the effects of drugs and alcohol on the brain:
  - Ability to concentrate decreases.
  - Reflexes slow down.
  - Reaction rate decreases.
  - Effects co-ordination.
  - Causes drowsiness.



## Summary

- Thermoregulation



- Diseases associated with the nervous system:
  - Deafness
  - Blindness
  - Nearsightedness (myopia)