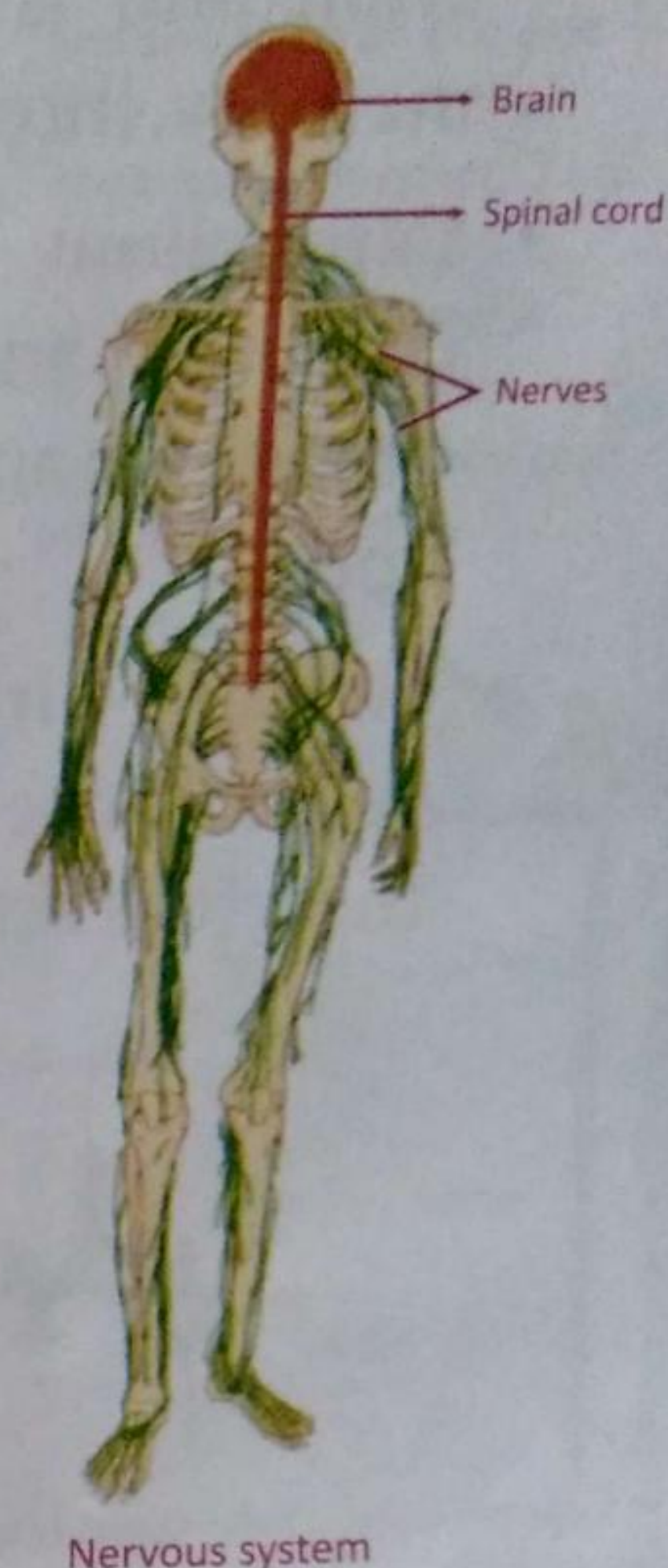


2

The Nervous System

The brain is the centre of the human nervous system, as it is for most other animals. The nervous system transmits and processes information about the world to the brain, causing the appropriate reactions in the body. In humans, most of the information is routed through the **central nervous system**.

The central nervous system consists of the **spinal cord** and the brain. The **brain** is where information is processed and stored, and it is responsible for controlling bodily functions and thoughts. It is exactly like the Central Processing Unit (CPU) of the computer. **Neuroscience** is the science that studies the central nervous system, including the brain.

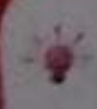


Nervous system

Brain

The brain is a delicate organ that is protected by the hard skull.

Blood is transported to the brain by blood vessels, like it is to any other part of the body. The brain requires between 15% to 20% of the blood in the body. It has a complex system of blood vessels that

 **Neuroscience** – The science that studies the central nervous system, including the brain.

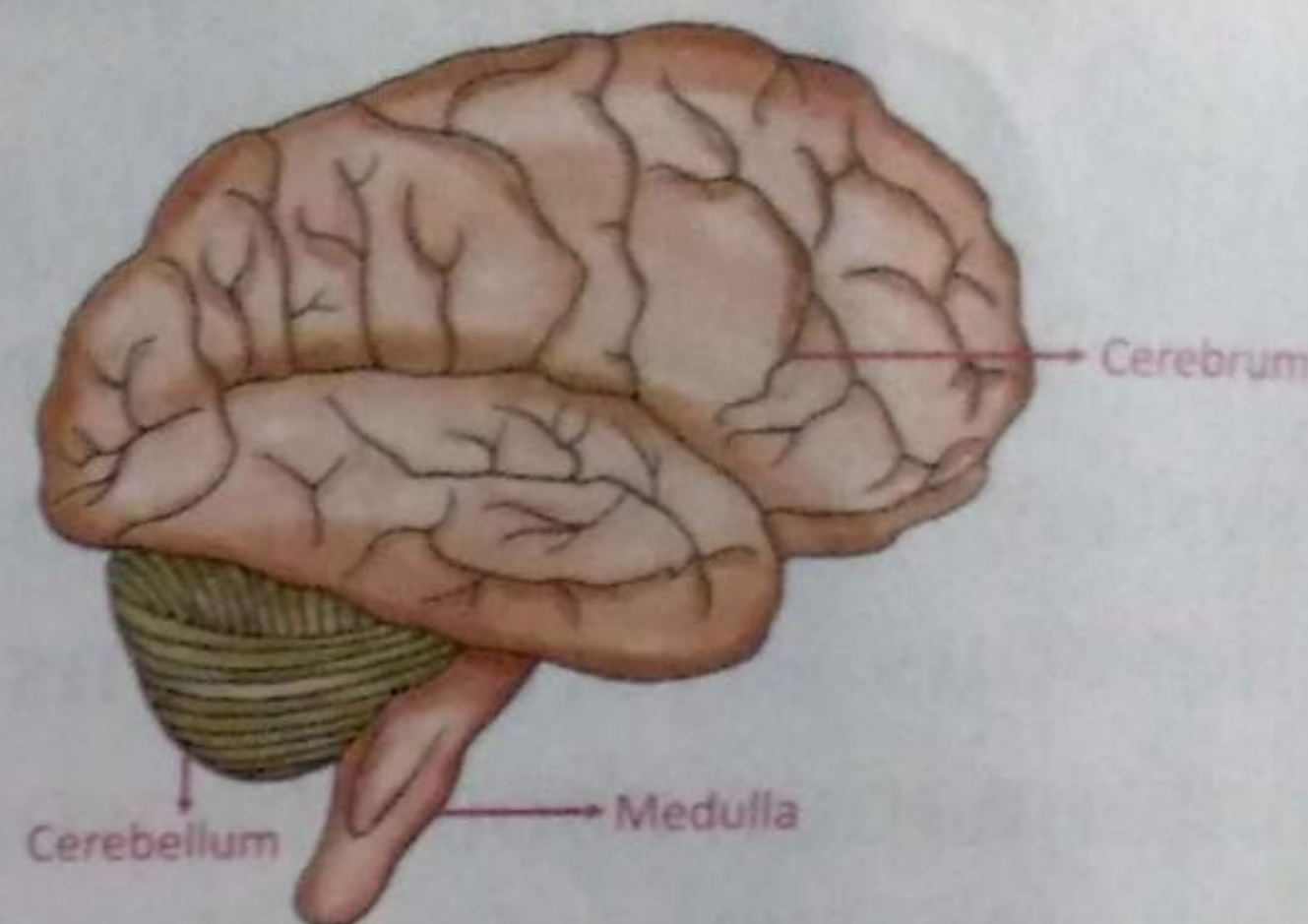
ensures that the brain never stops getting the materials it requires to function like oxygen and carbohydrates. Waste materials like ammonia and carbon dioxide, are removed from the brain by the blood in the blood vessels. This is because the brain

never stops functioning, even when we are sleeping.

Parts of the Brain

The human brain has three parts:

- **Cerebrum** – It is the largest part of the brain and is responsible for learning, memory, intelligence and logic.
- **Cerebellum** – It is situated below the cerebrum and takes care of the muscle coordination and the balance of the body.



Ans 2 ✓ **Medulla** – It is a tiny stem like portion below the cerebellum. It controls the heartbeat, breathing, swallowing and sneezing. It is therefore active even when the body is sleeping.)

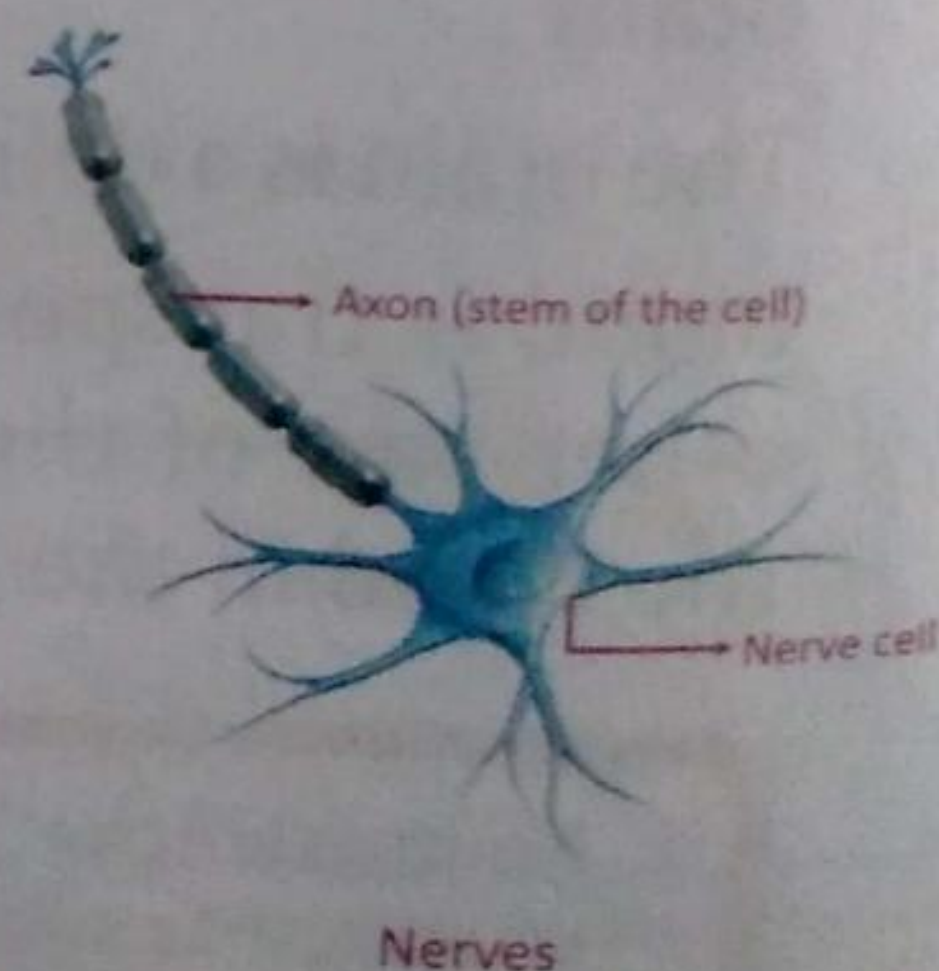


Spinal Cord

The spinal cord is a system of nerves running from the base of the brain to the lower end of the backbone. They are safely enclosed in the vertebrae.

Nerves

The different parts of the brain are made up of special cells. These cells are called **neurons** or nerve cells. The neurons together make up a system of nerves that runs through the body sending and receiving messages. The nerves from the various body parts join the spinal cord which then sends the messages to the brain.



Ans 5

Types of Nerves

(According to the function performed by the nerves they can be classified into three types:)

✓ **Sensory Nerves** – The nerves that bring messages from the sensory organs to the brain.

✓ **Motor Nerves** – The nerves which carry the signals or directions from the brain or the spinal cord to the body parts.

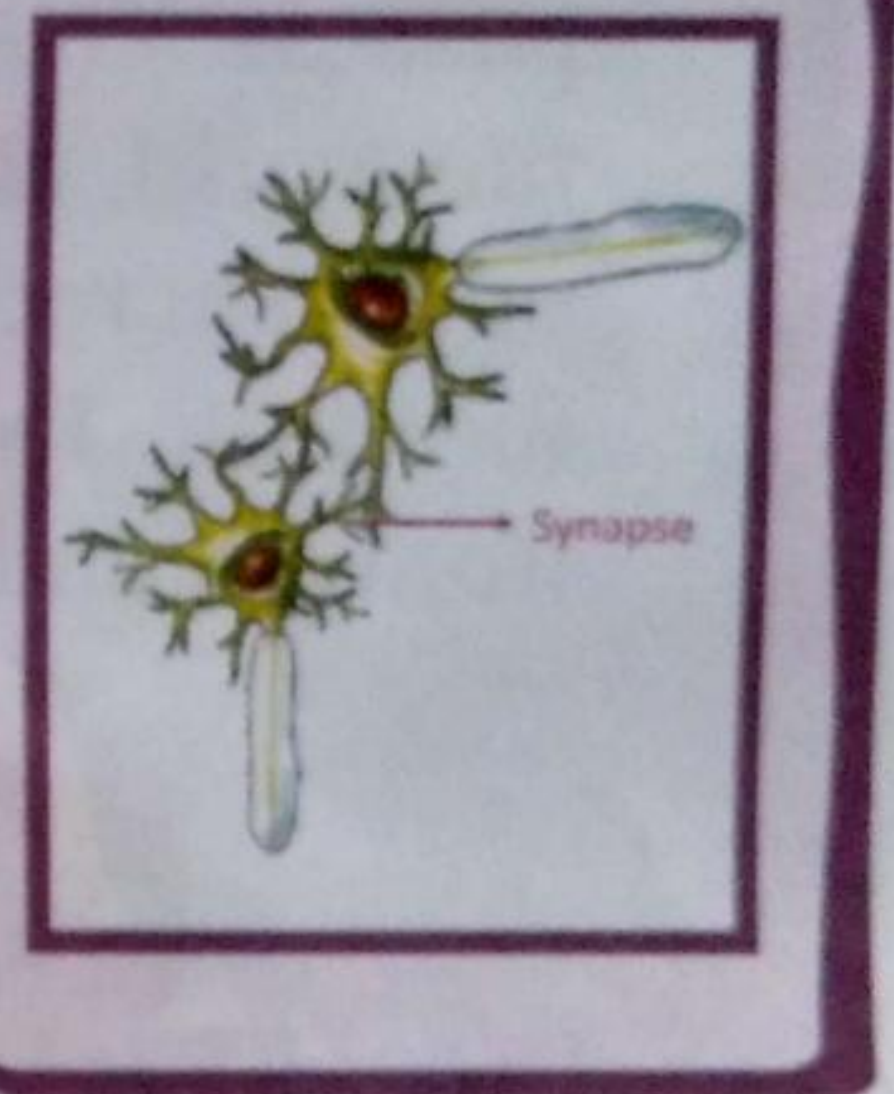
✓ **Mixed Nerves** – The nerves that carry messages to the brain as well as bring orders from the brain.)

It has been estimated that there are about one-hundred billion neurons in the average brain. Neurons are similar to other living cells, yet they are also unique because they form connections between each other. This connection is called a **synapse**, which enables neurons to transmit information between one another.

Quick Revision:

Write True or False against the following statements:

1. Brain needs 90% of the blood in the body. False
2. Brain produces ammonia and carbon dioxide as waste. True
3. Medulla works even during sleep. True
4. Nerves are made up of neurons. True
5. Motor nerves only bring back messages to the brain. False
6. Neuroscience is the science dealing with sense organs. True



☀ Reflex Actions

Though the nerves carry the messages from the body parts to the brain and then obtain and transfer orders from the brain to the body parts, some actions in our body are spontaneous. For example blinking of the eyes, flexing of fingers as they touch a hot object, watering of the mouth etc., are examples of spontaneous reactions to external stimulus. These actions are also called **reflex action**.

These actions are controlled by the spinal cord which orders the



motor nerves directly. A new born baby shows many reflexes, e.g., the baby would clench a fist around anything placed in its hands.

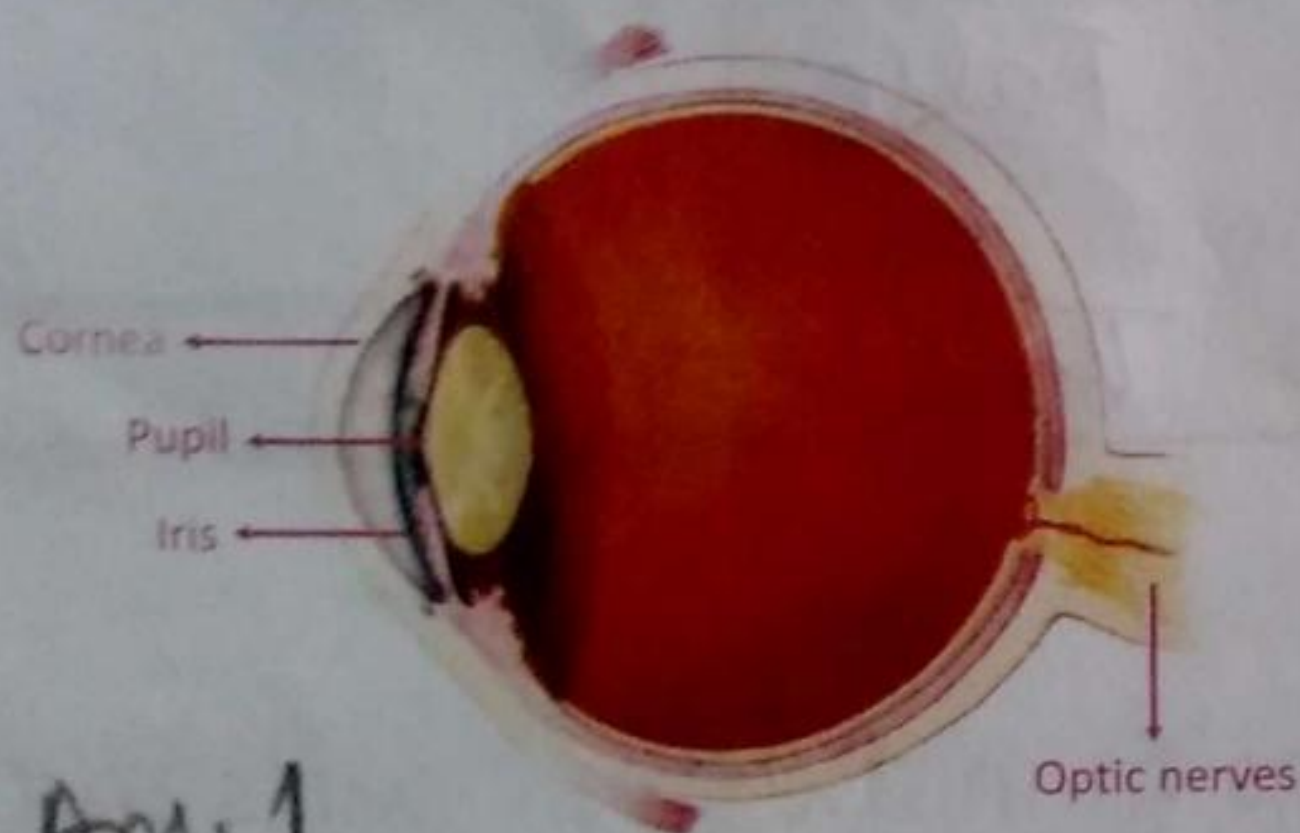


💡 **Stimulus** – It is an external influence on the body like a pin prick, a hot vessel or even a piece of chocolate that evokes a response.

☀ Sense Organs

The Eyes

The eyes are undoubtedly the most sensitive and delicate organs we possess. They present us with the window through which we view the world, and are responsible for four-fifths of all the information our brain receives. The eyes are placed in the sockets just below our forehead. The eyelids and the eyelashes constantly protect the eyes from dirt and dust.



Ans 1

Structure of the eye

Structure of the Eye

The **cornea** is the transparent area in front of the eye. The coloured circle in the centre is called the **iris**. The light enters the eye through the **pupil**. The eyes are connected to the brain with a set of **optic nerves**.

(Eye Care

Ans 4

In order to protect these delicate organs, we must:

- Wash the eyes with clean water two to three times a day.
- Never rub the eyes.
- Never work in dim or very bright light.
- Never read in a moving vehicle.
- Contact an eye specialist in case of reading difficulties.)



The Ears

The ears help us catch and understand sound. Each ear is made of three parts:

Outer ear

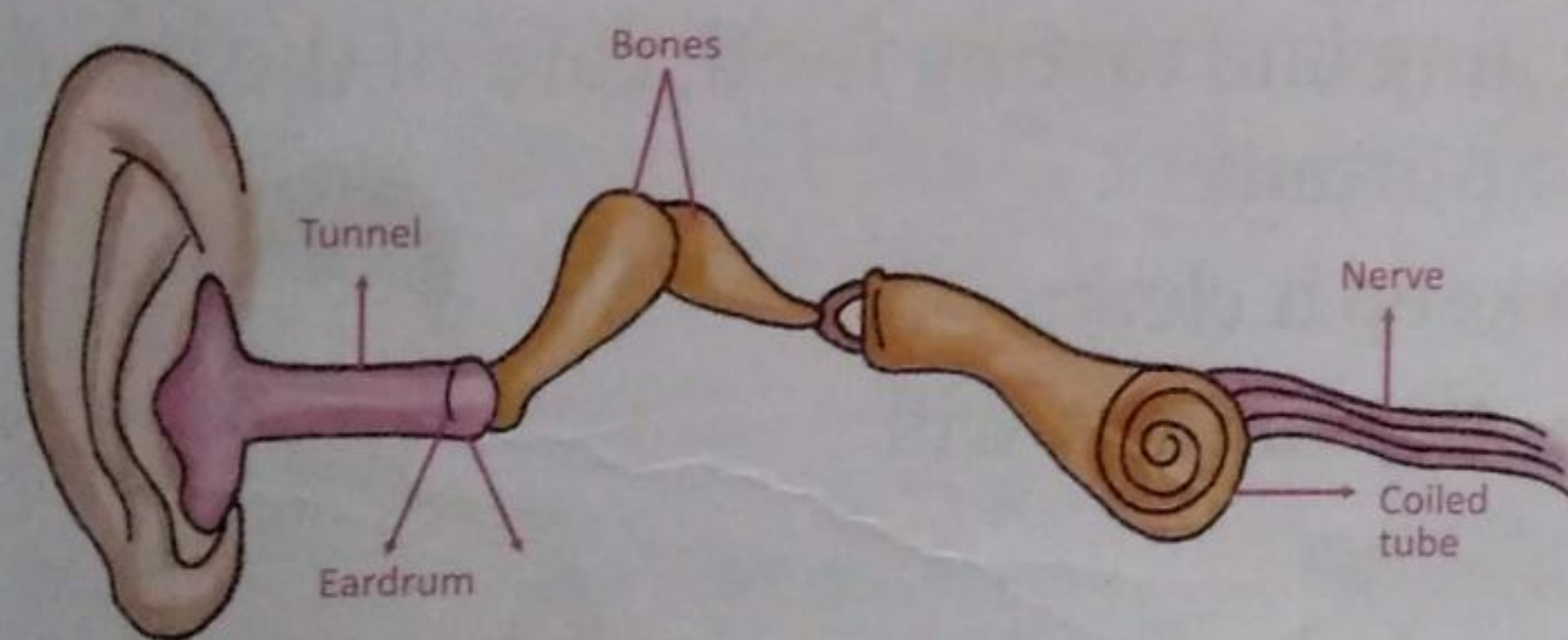
This is the part that we can see and it also includes the **ear canal**. They act like a funnel to catch sound waves and direct them to the **ear drum**.

Middle ear

This is a small air-filled space on the inside of the eardrum.

Inner ear

An electrical impulse (signal) is created which is sent along the auditory nerve to the brain. The brain then works out what you are hearing.



💡 **Auditory nerves** – The nerves carrying sound.

When you really want to listen to something you tell your brain to concentrate on that sound.

If your ears are healthy and are both working well, they can 'turn down' other sounds while you concentrate on what you want to hear.

Ear Care

(The ear drum is a very delicate and fragile part of the ear. Thus a lot of care is required while keeping your ears clean:

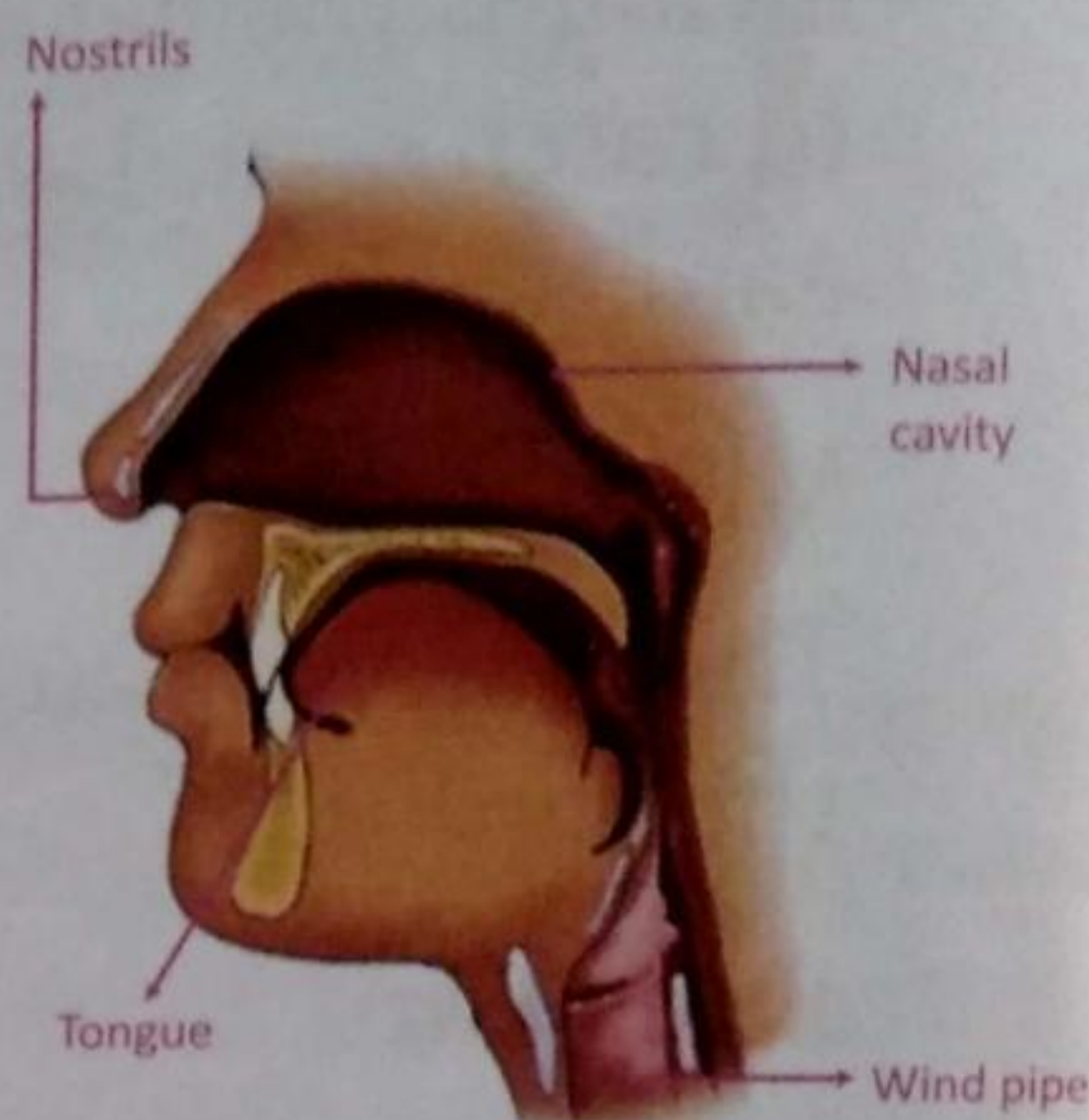
- Never clean ears with a pointed object like a matchstick or a hair pin. Use cotton buds available in the market.
- Use a dry towel to clean ears after a bath.
- Never put oil inside the ears in case of pain in the ears. Visit a doctor immediately.)



Cotton buds

The Nose

The nose is the gateway to the respiratory system. It has two holes called the **nostrils**. The air that we breathe in travels through the nostrils into the **nasal cavity**, it then goes down the **throat** and from the **trachea**, into the **lungs**. The nose also warms, moistens, and filters the air before it goes to the lungs. The nerve endings in the upper part of the nose are sensitive to smell.



Nose Care

For ease in breathing, smelling and tasting food, care of the nose and the nasal passage is very important.

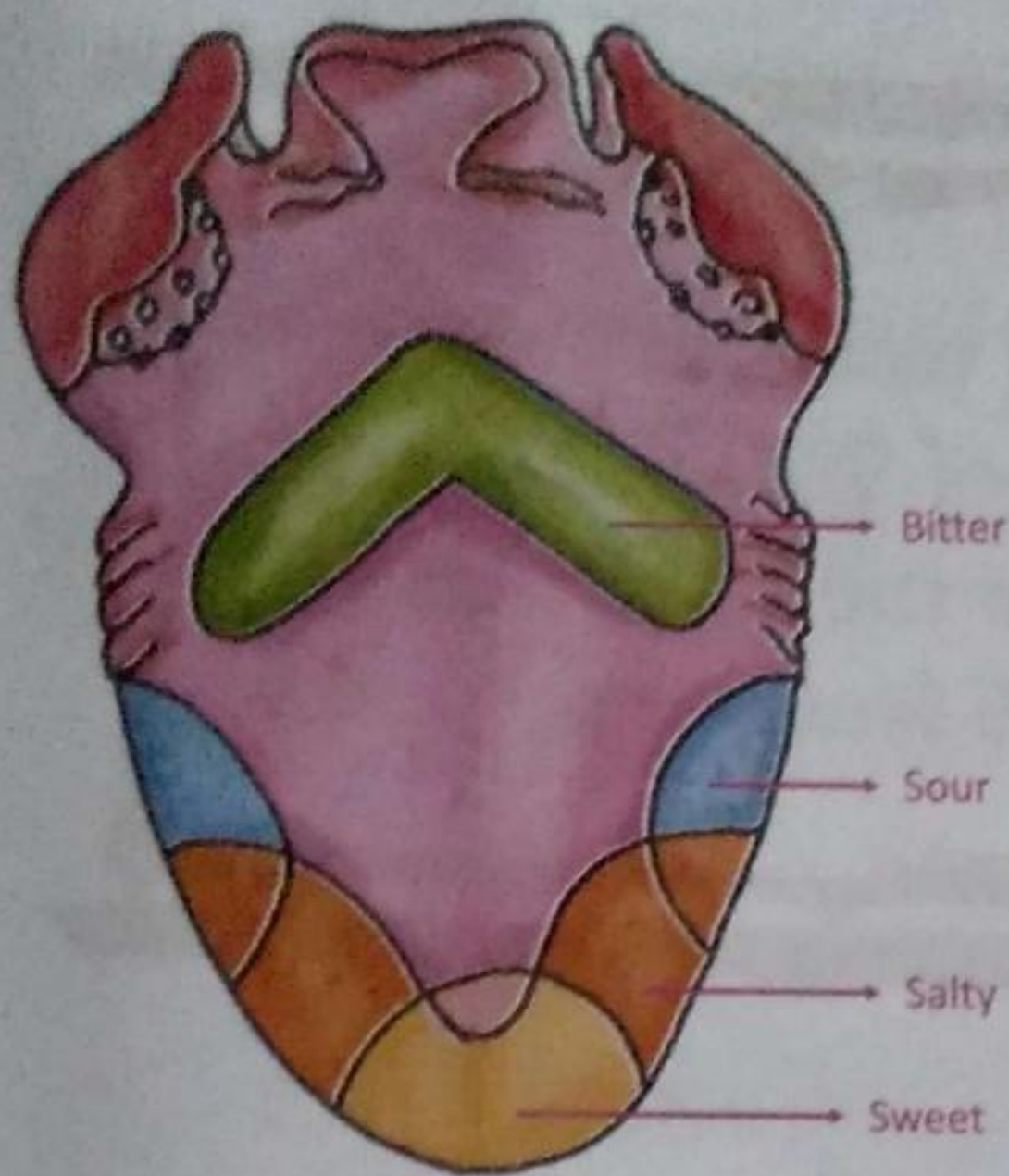
- Gently blow the nose to keep it clean.
- Do not pick your nose, the fingers will carry the germs.
- Steam inhalation is a good idea to clear a blocked nose.
- Pranayam and breathing exercises keep your breathing strong and in rhythm.



Pranayam also relaxes the mind

Tongue

Ans 3 The tongue is made up of many groups of muscles which run in different directions so that the tongue can also move in many different directions! The tongue is held to the floor of the mouth with a thin and smooth skin called the **mucous membrane**. The tongue's muscles need a lot of blood because they are working all the time.

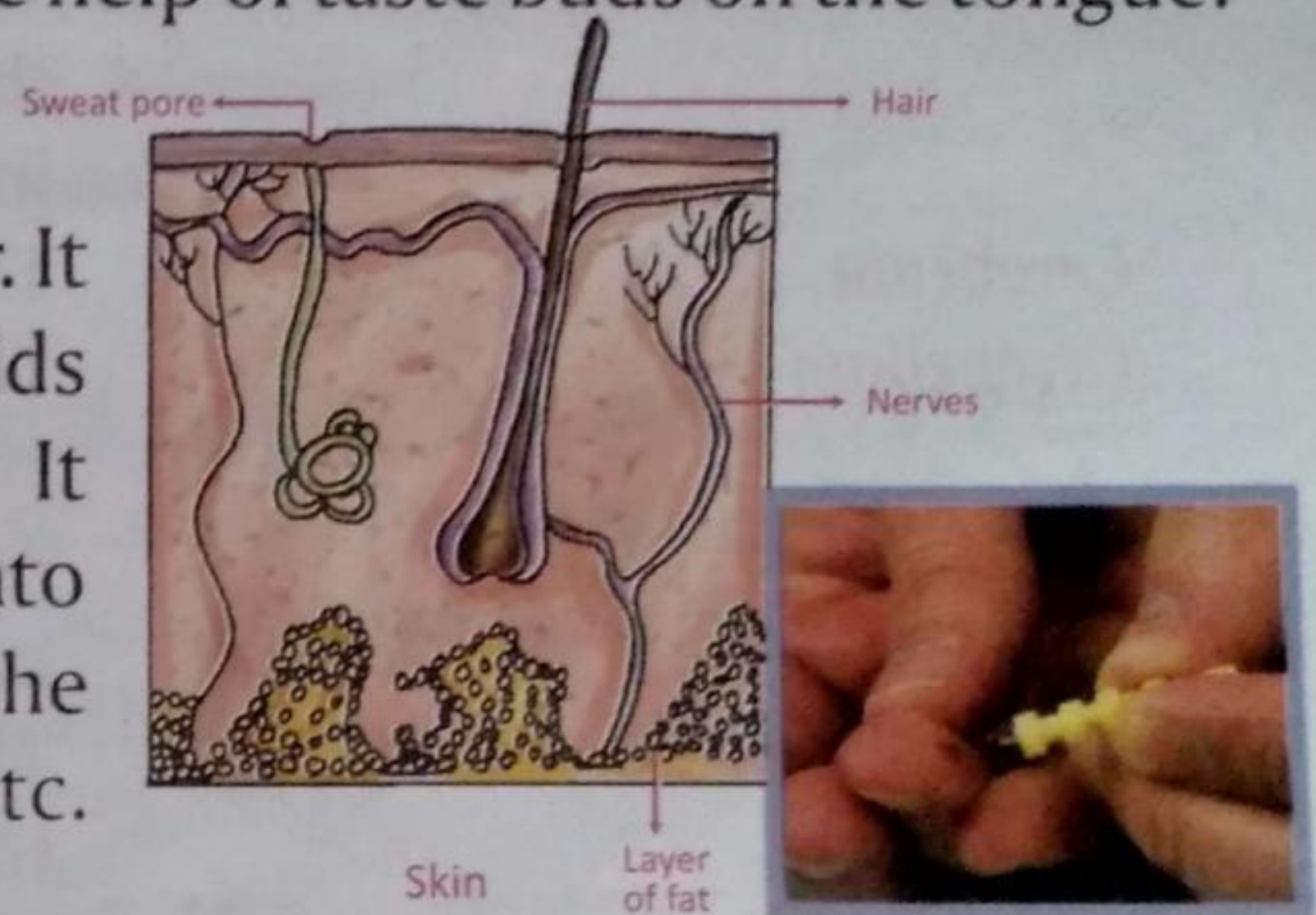


Taste buds on the tongue

The front part of the tongue helps in making different sounds while talking or singing. It works with cheeks and teeth to move food around the mouth while eating and chewing. It moves saliva around the mouth and aids in digestion. The muscles at the back of your tongue help to make the sounds of hard letters like 'g'. These muscles also push small bits of food and saliva into the oesophagus. The tongue and nose work together, smelling and tasting the food with the help of taste buds on the tongue.

Skin

The skin holds the body together. It stops the water and the body fluids from leaking out of the body. It prevents germs from entering into the body. It senses whether the things are hot, cold, hard, soft etc. The skin also senses pain.



Am 4 Skin Care

(In order to keep our skin smooth and glowing, we should:

- Take a bath regularly with a medicated soap.
- Dry ourselves completely after taking a bath.
- Apply oil to our skin to keep it smooth.
- Wear clothes according to the season.
- In case of cut or wound, we should immediately apply antiseptic lotion or cream.
- We should not expose our skin too much to direct sunlight.)



9. The nose warms, moistens and filters the air before it goes into the lungs.
10. The mucous membrane holds the tongue to the floor of the mouth.



Let's Answer

A. Match the following to make correct pairs:

I	II
Cerebrum	Sends electrical impulses
Cerebellum	Catches sound waves
Motor Nerves	Carriers between eyes and brain
Optic Nerves	Controls learning
Inner Ear	Maintains balance
Ear canal	Carry messages from brain

B. Complete the sentences:

1. A reflex action is instant and does not involve the brain. Such action are controlled by spinal cord.
2. Mixed nerves carry Messages to the brain as well as bring orders from the brain.
3. Blood vessels from the brain remove waste materials like Ammonia and Carbon dioxide.
4. Ear canal acts like a funnel to catch sound waves and direct them to the ear drum.

C. Rewrite the following statements correctly:

1. The light enters the eye through the iris.
The light enters the eye through the pupil.
2. Auditory nerves connect the ears to the brain.
Auditory nerves carrying sound to the brain.
3. The nerve endings in the nasal cavity are sensitive to smell.
The nerve ending in the upper part of the nose are sensitive to smell.
4. The tongue's muscles can work with limited supply of blood.
The tongue's muscles need a lot of blood because they are work all the time.
5. Pranayam and breathing exercises have no effect on breathing.
Pranayam and breathing exercises keep your breathing strong and in ryth.