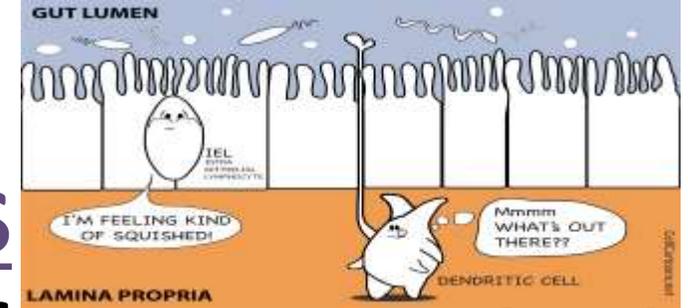


ANIMAL TISSUES

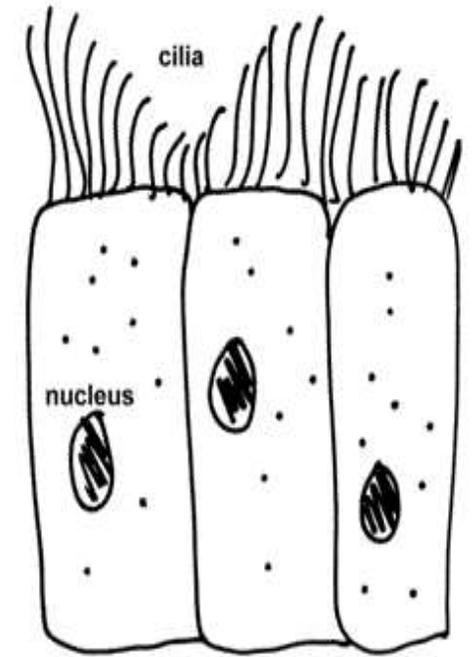
1. EPITHELIUM TISSUES



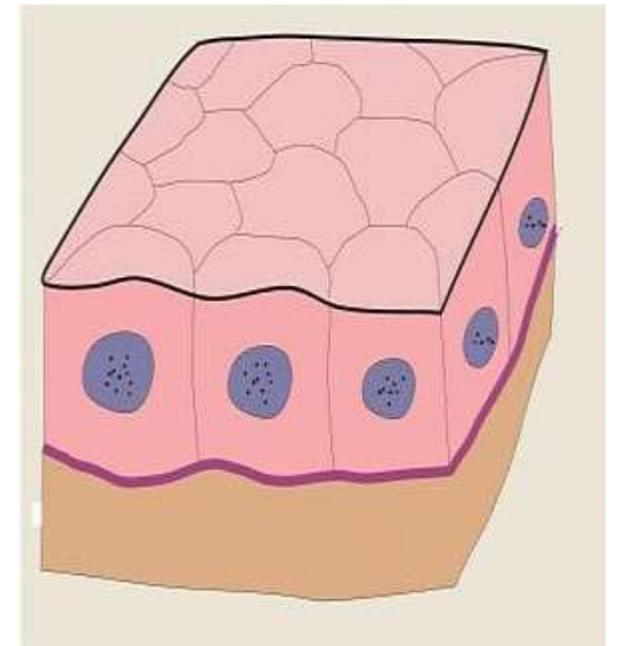
The Epithelium is a protective **cover** for many animal structures – usually one cell-layer thick.

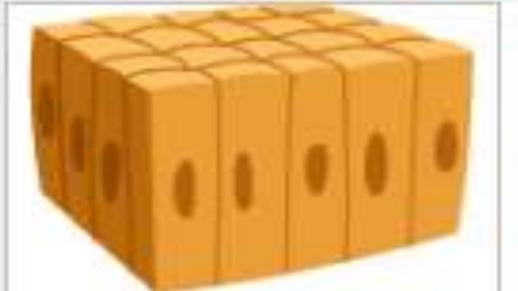
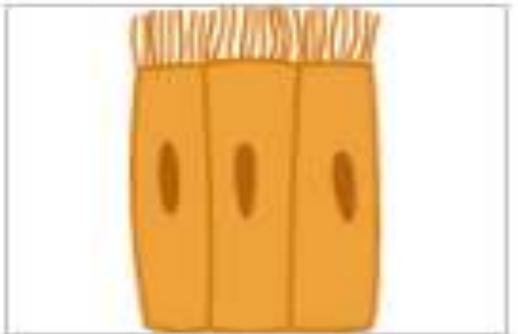
- **Squamous Epithelium** – made of *squashed* flat cells. Line the lungs and blood vessels. Allow gases and dissolved nutrients to pass through.
- **Columnar Epithelium** – shaped like longer *columns*. Line the intestines, allowing nutrients to pass out of them, and into the blood vessels. Goblet Cells can be amongst them, and these produce mucus.

- **Ciliated Epithelium** – columnar cells with *villi* (*cilia*) extending from them. In the wind-pipe (trachea), the *villi* brush out (**move**) mucus with dust in it. In the female’s fallopian tubes, they **move** the ovum (egg) to the womb from the ovary.

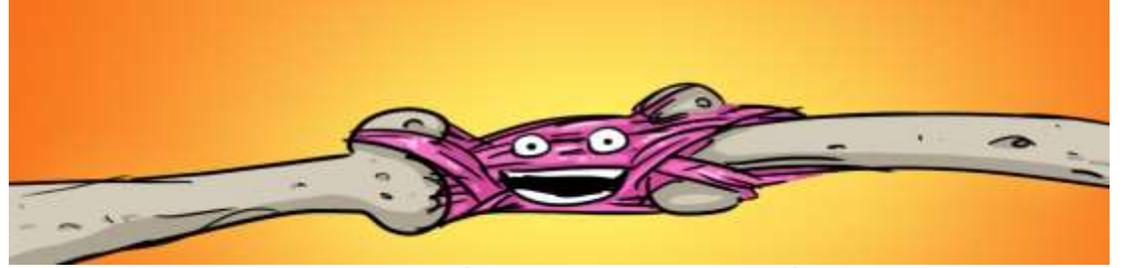


- **Cuboidal Epithelium** – *cube*-shaped (like dice). Are in kidneys and glands to release (and absorb) substances.



Type of Epithelial Cell	Name	Function	Where Is It Found?
	Simple Squamous Epithelium	Because it is one thin layer, it allows materials to pass through easily by diffusion, filtration and secretion.	Respiratory system (air sacs of the lungs) and coronary; the heart and blood vessels.
	Simple Cuboidal Epithelium	Secretion and absorption	Kidneys and glands.
	Simple (smooth) Columnar Epithelium	Secretes mucus and enzymes. Also responsible for a lot of sensory information being communicated.	Found in places that secrete mucus, such as the stomach and nose. Also found in the mouth and tastebuds and largely responsible for your sense of taste.
	Ciliated Columnar Epithelium	The same long and thin shape as the Simple Columnar, but with special little hairs called Cilia on their outside facing surface. Absorption and also secretion.	Sensitive areas like the uterus and bronchi (lungs). They help take in oxygen in the respiratory tract, and can become easily damaged from things like cigarette tar (leading to Smoker's Cough when they can't function properly).

2. CONNECTIVE TISSUES



Connective Tissues just serve to **join** (connect) other structures of the body, and to **support** them.

- **Areolar Tissue** – found in the *dermis* of the skin, just below its epidermis. **Supports** organs and muscles, and stores fat.
- **White Fibre Tissue** – makes up *tendons*, which join **muscles to their bones**. It is also found between each vertebra of the back-bone.
- **Yellow Elastic Tissue** – makes up *ligaments*, which **join one bone to another**. Also forms your ear.

- **Cartilage** – is at the end of each of your bones to **stop them from grinding** against each other. Some make up those rings in your throat. Others join your ribs to your sternum.

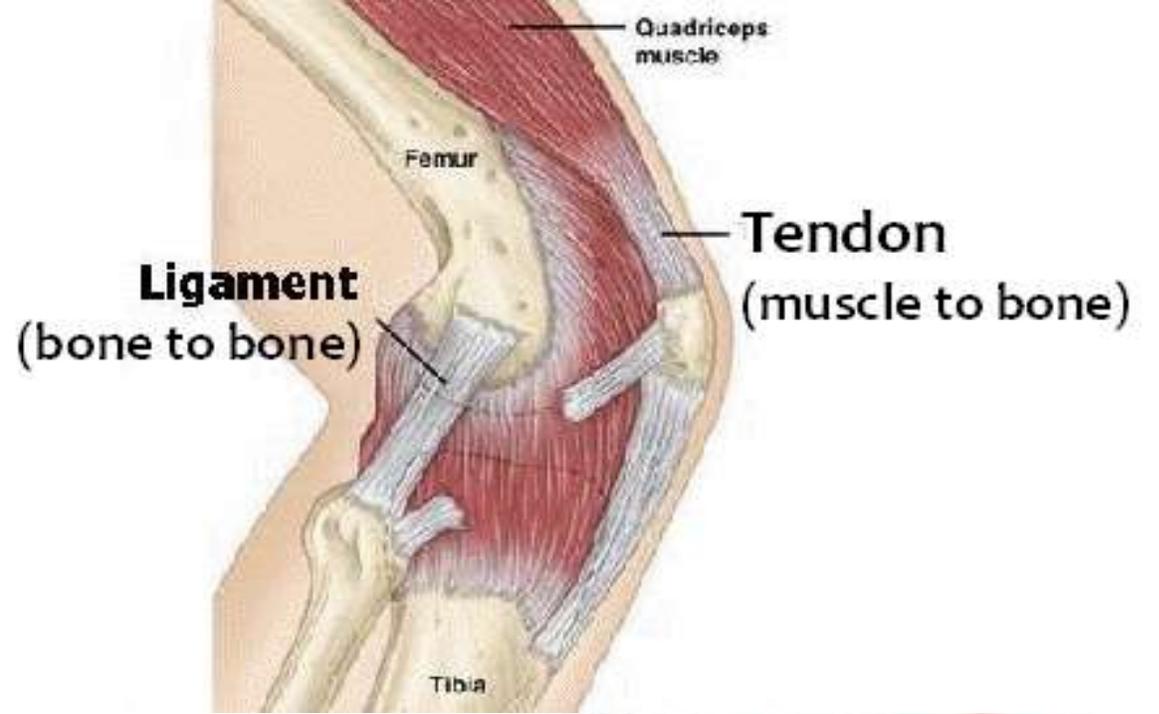
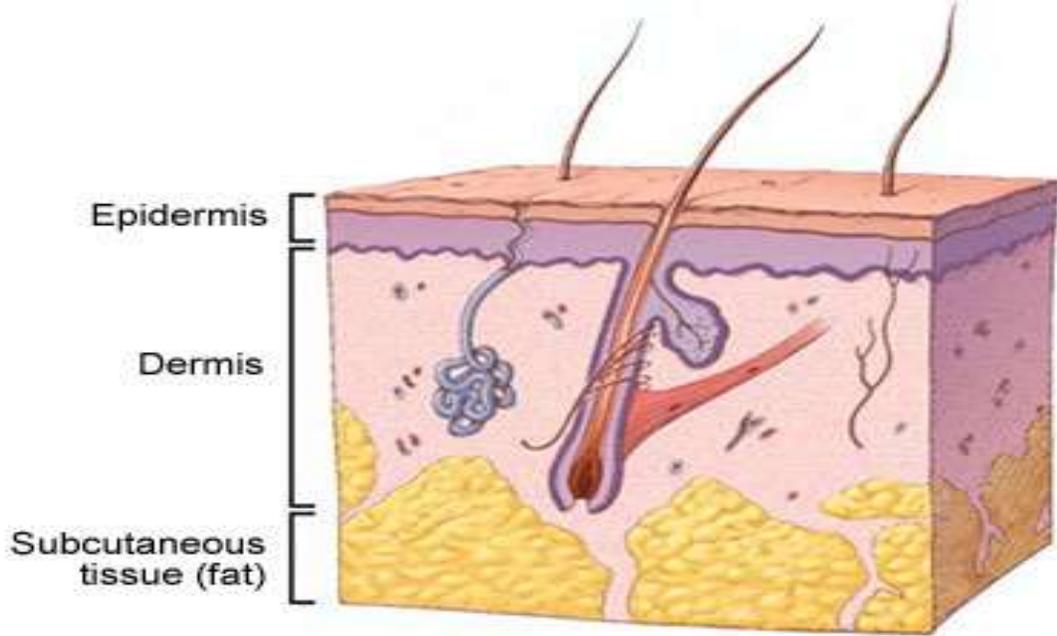


- **Bone** – makes up your **skeleton** to give shape to your body and to protect your organs. Its marrow produces blood.



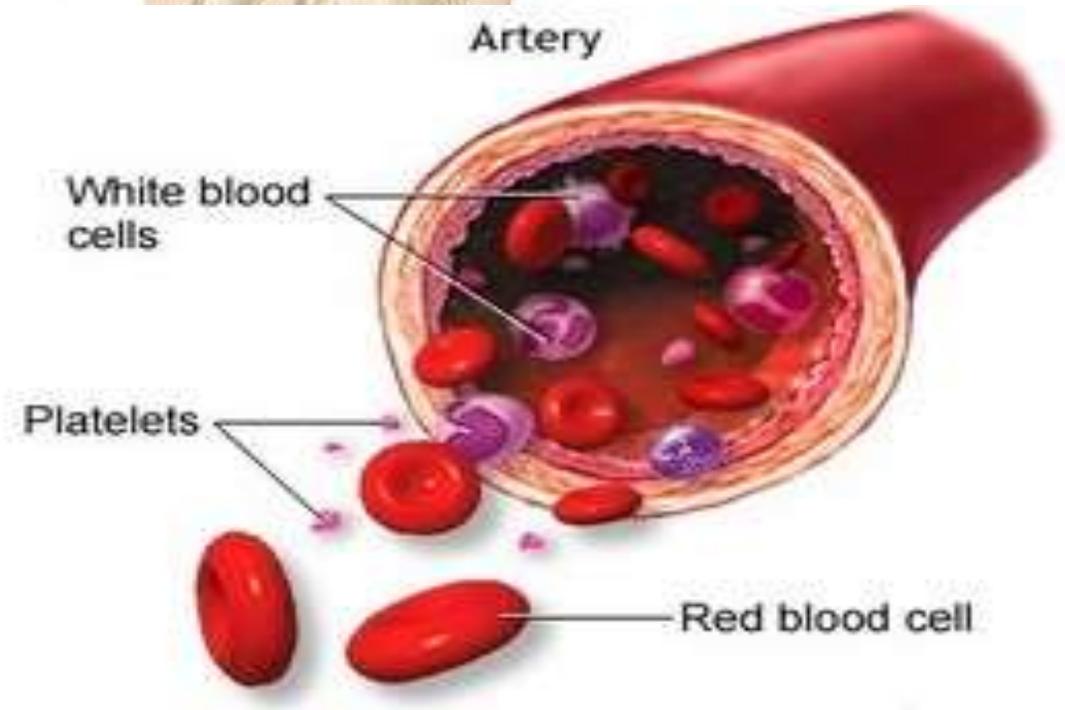
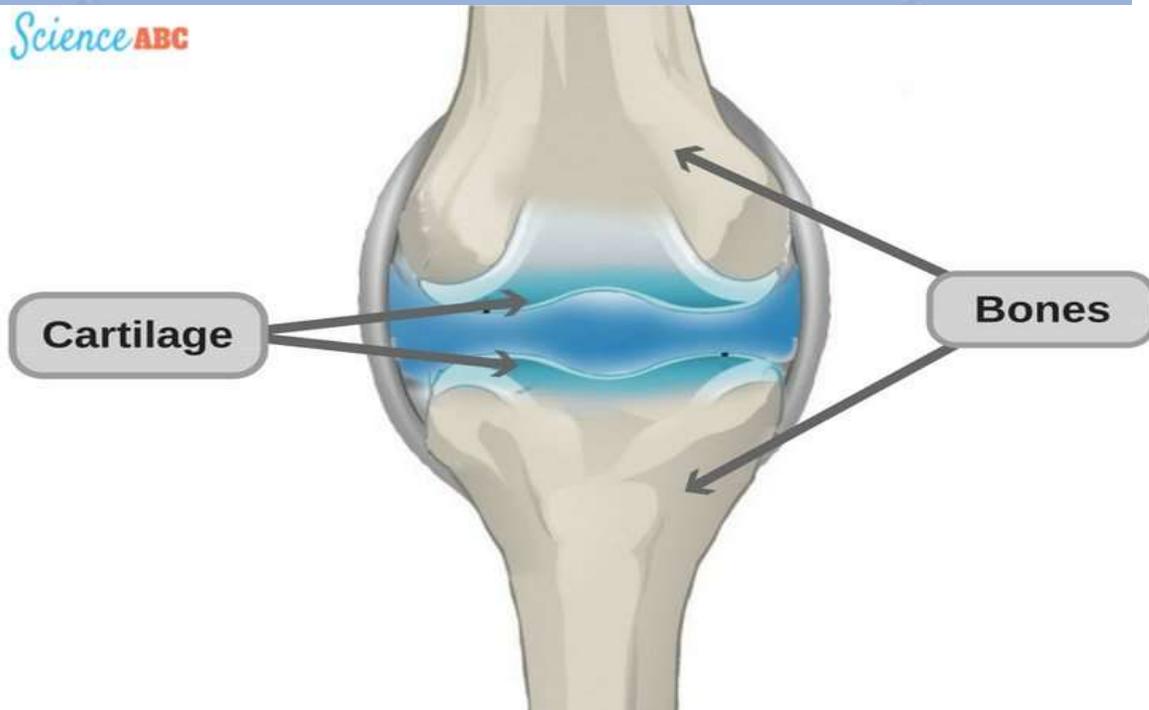
- **Blood** – red corpuscles **carry** everything to where your body needs it. White cells **kill germs**. Platelets **clot** loose blood into a scab to stop it from flowing from a wound.





© Mayo Foundation for Medical Education and Research. All rights reserved.

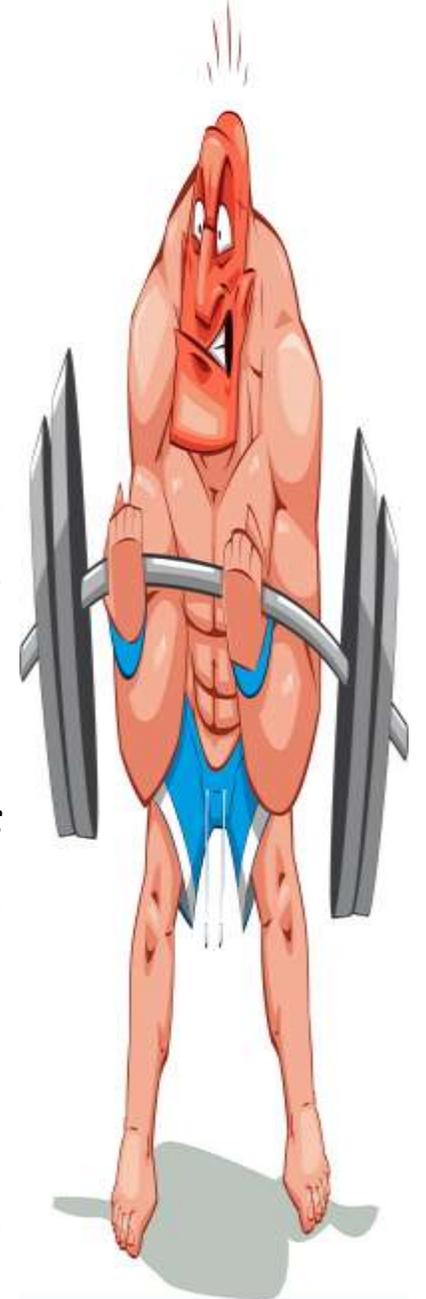
Science ABC



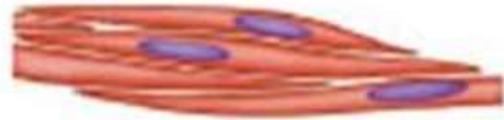
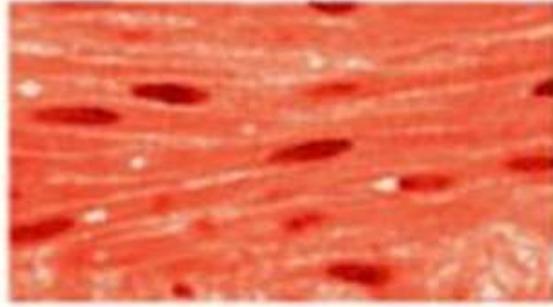
3. MUSCLE TISSUES

Muscles contract, shorten, and pull what they are joined to. This allows *movement* in the body.

- **Voluntary muscles** – your brain can control them, and so can volunteer their use. These are joined to your bones (*skeletal* muscles) to cause movement. Their cells are long, and look like stripes.
- **Involuntary muscles** – contract automatically, so cannot be volunteered by your brain. They are made of long *smooth* cells, which are not stripy. Found in your intestines, lungs, sex organs, blood vessels.
- **Cardiac muscles** – make up the heart so as to pump blood. They are long muscle fibres, that branch out from each other. They work automatically, without any need for thought.

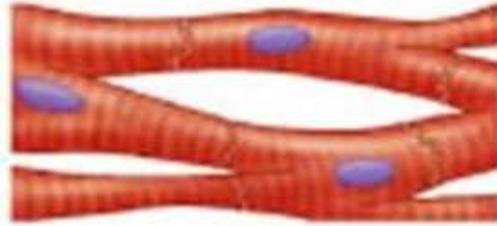
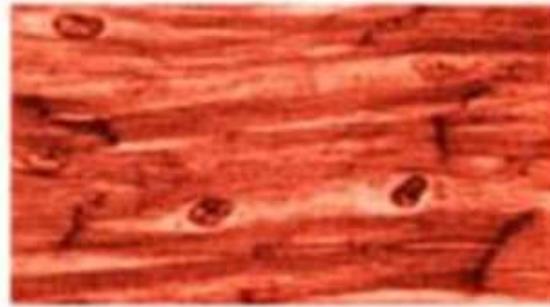


SMOOTH MUSCLE



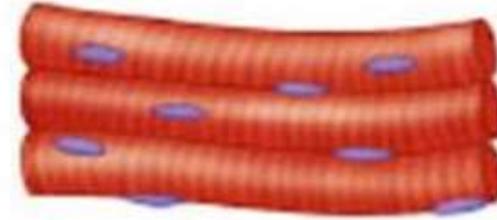
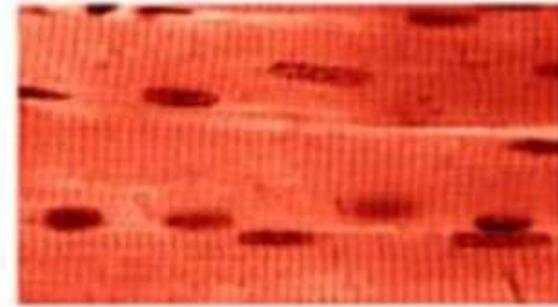
INTERNAL ORGANS

CARDIAC MUSCLE



HEART

SKELETAL MUSCLE



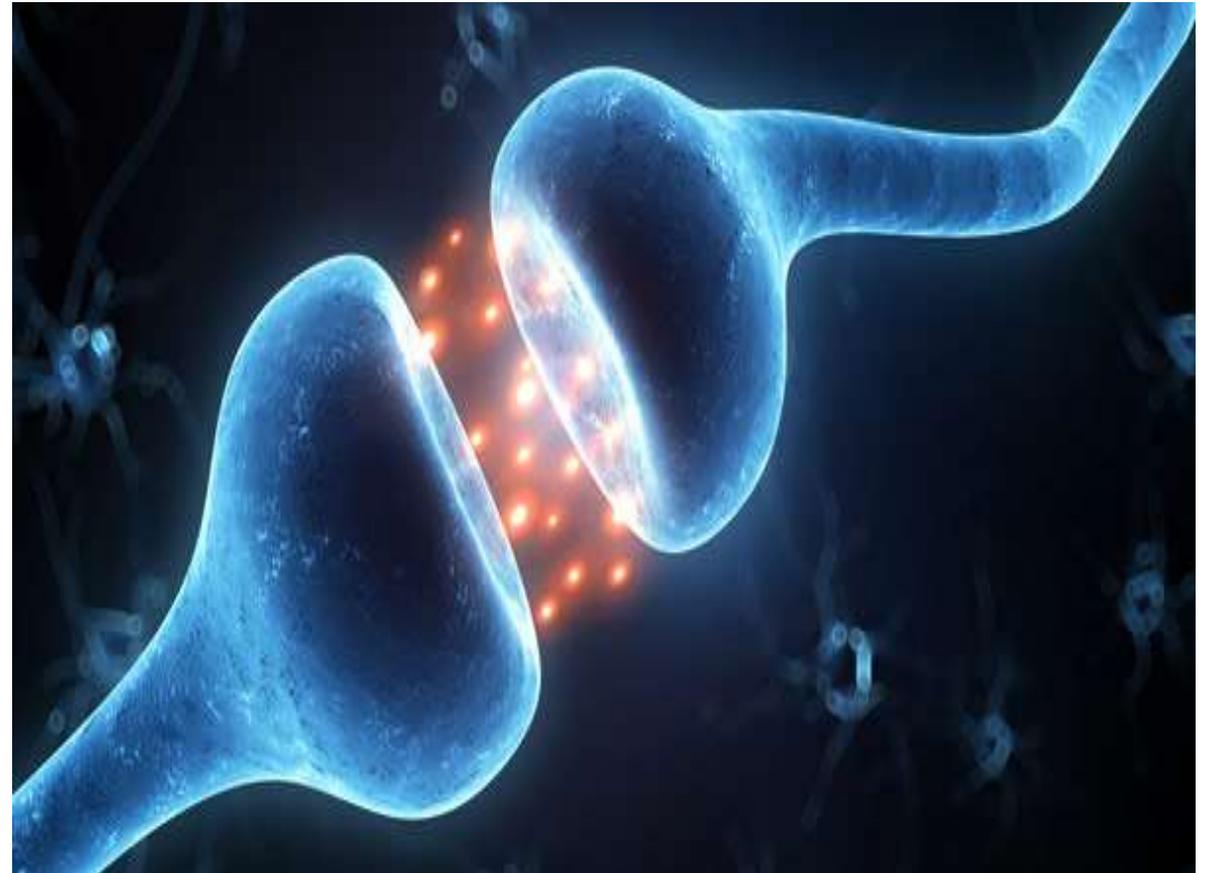
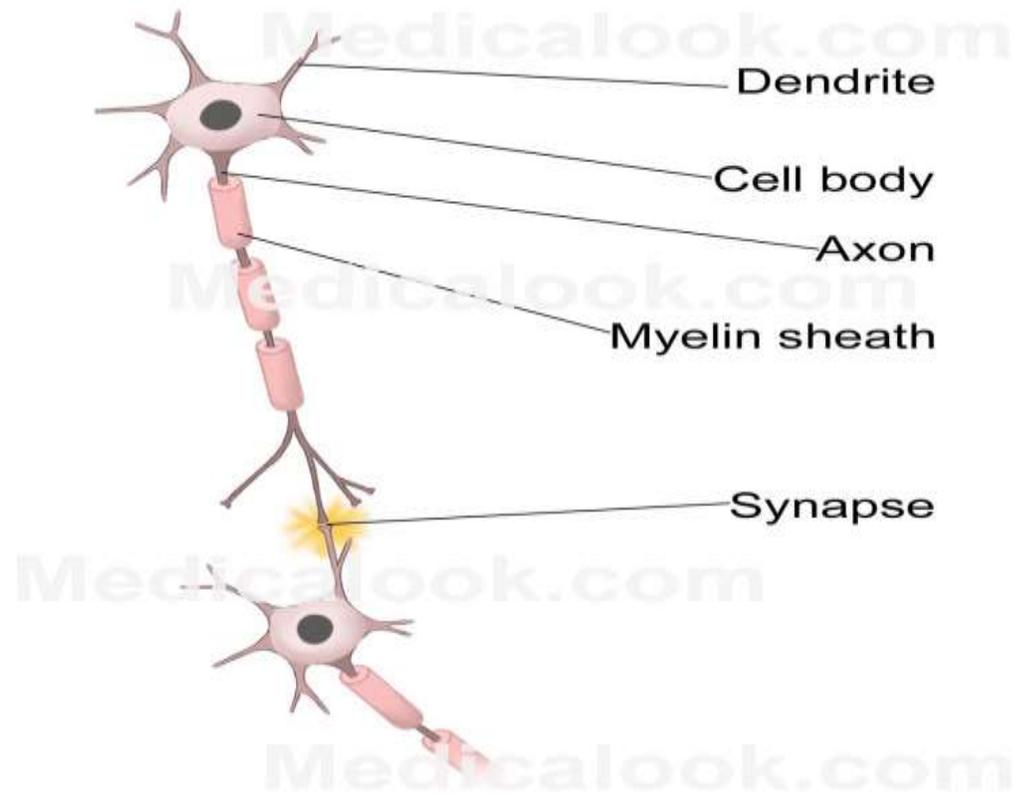
LEG

involuntary

voluntary

4. NERVE TISSUES

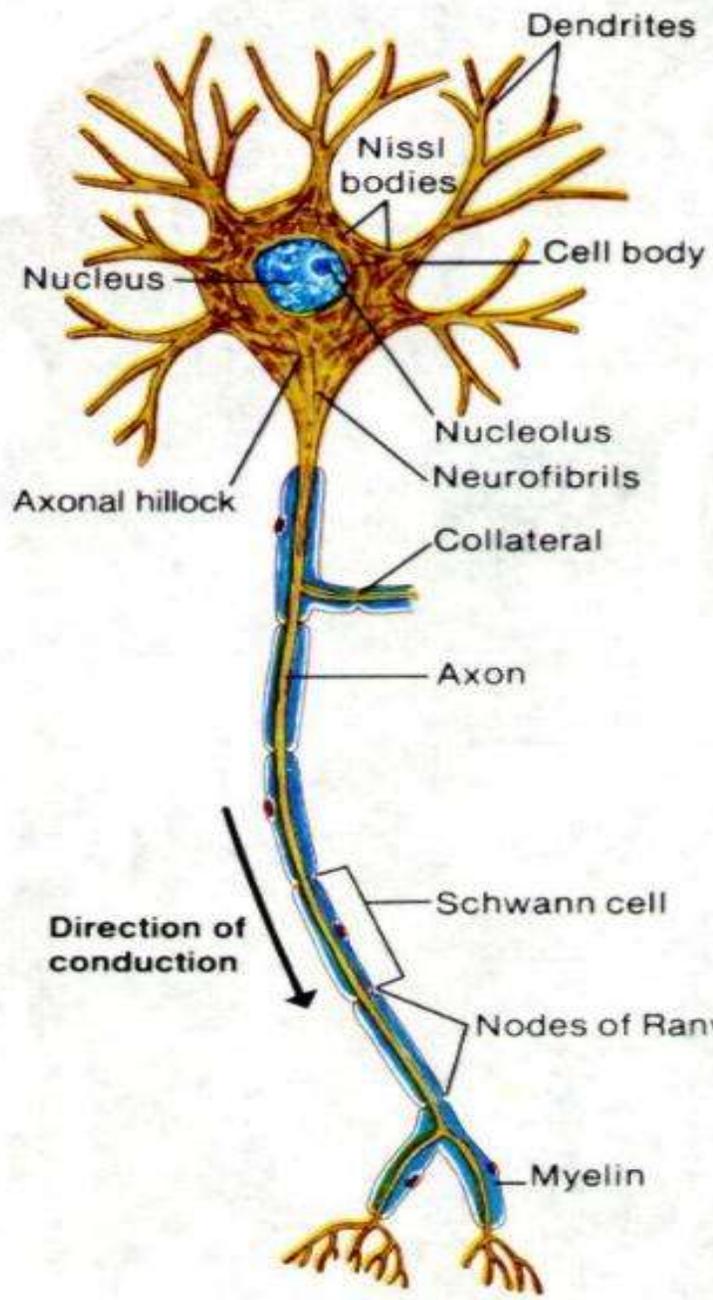
These are cells that join the senses to the **brain**, and the **brain** to its muscles. These **nerve cells** are called ***neurons***.



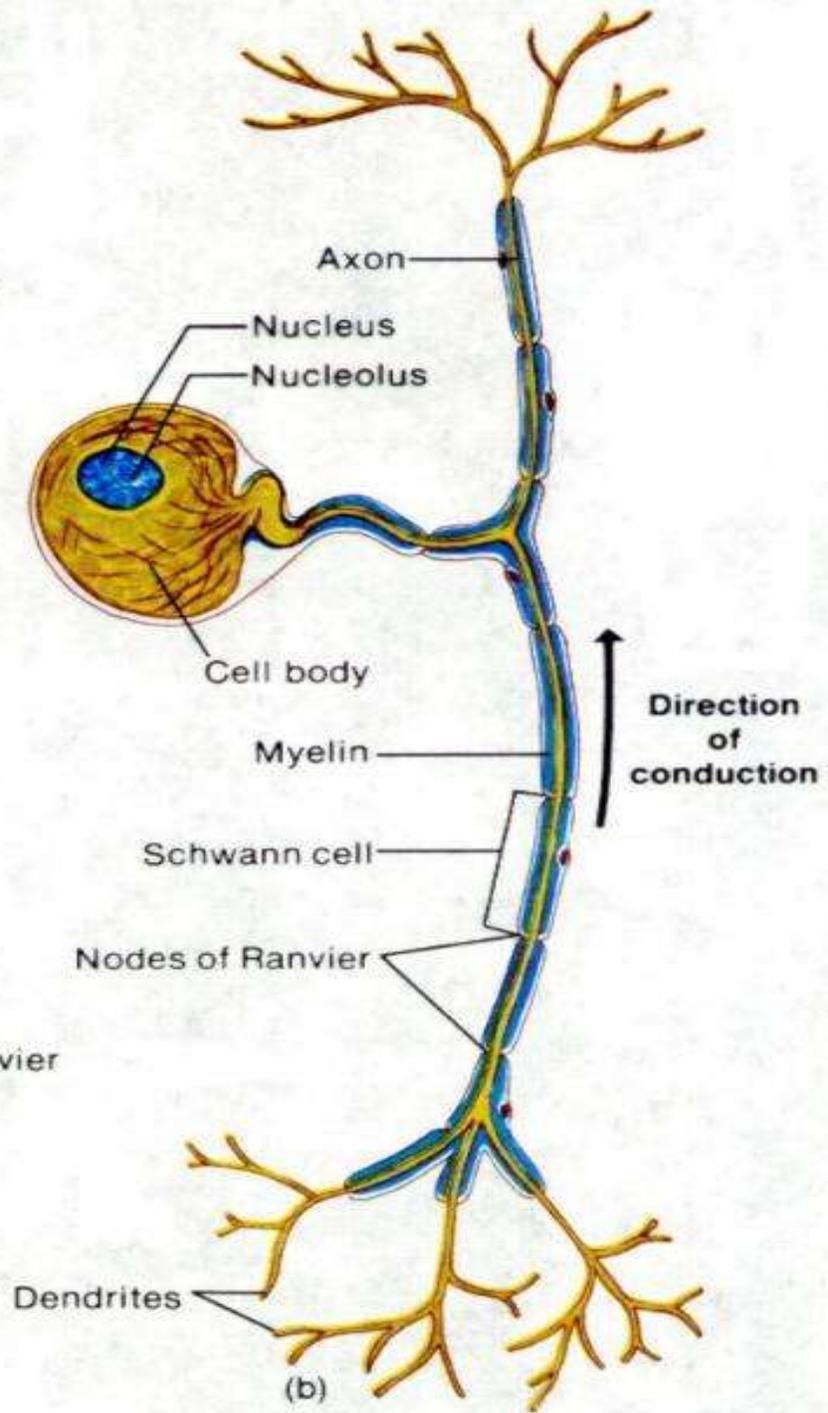
They have a **tiny gap** between them (a ***synapse***), across which the message impulse must jump.



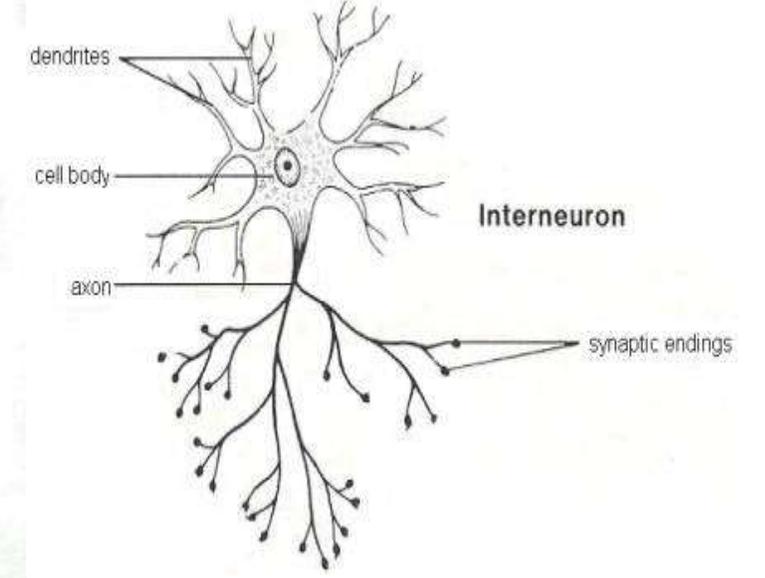
- **Sensory neurons** – carry messages from all of our senses to the brain.
- **Motor neurons** – carry messages from the brain to the muscles and organs (which all act as the **motors** of the body.)
- **Inter-neurons** – are **in the vertebral column** and can connect the sensory pathway directly to the motor pathway to contract muscles in an emergency. (Note: *They connect a Sensory Neuron directly to a Motor Neuron.*)



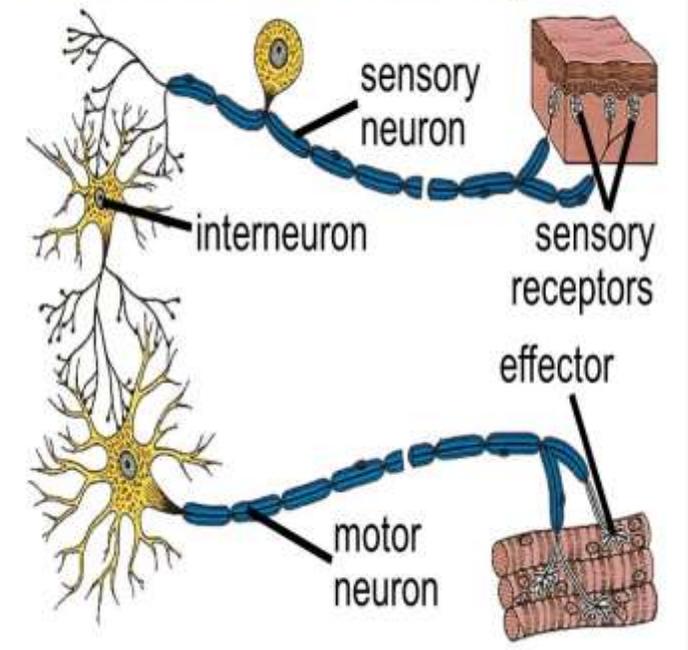
(a)



(b)



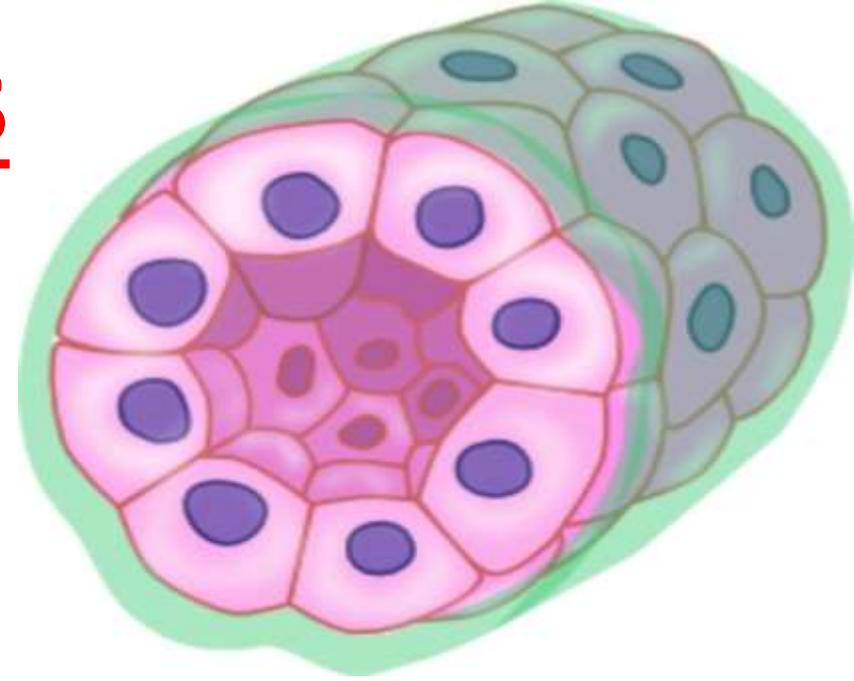
Neuron Interaction & Integration





Animal tissues

Question 1



1. Ciliated columnar epithelium.
2. Refer to study guide.
3. Nasal passages, trachea, bronchial tubes, fallopian tube.
4. Trachea – moves trapped dust particles away from the lungs.
Fallopian tubes – moves egg towards uterus.

Question 2

1. Tissue A – columnar epithelium.
Function – aid in the absorption of food, supports other cells, goblet cells secrete mucous.
Tissue B – squamous epithelium.
Function – protects underlying tissue, allows gasses to pass through easily e.g. alveolus and capillaries.
Tissue C – cuboidal epithelium.
Function – serves as a secretory or absorptive function.
2. Secretes mucous.
3. Surface of skin, lining of mouth cavity, oesophagus and vagina, alveoli in lungs, walls of capillaries.
4. Kidney tubules, thyroid gland, salivary gland, pancreas.

Question 3

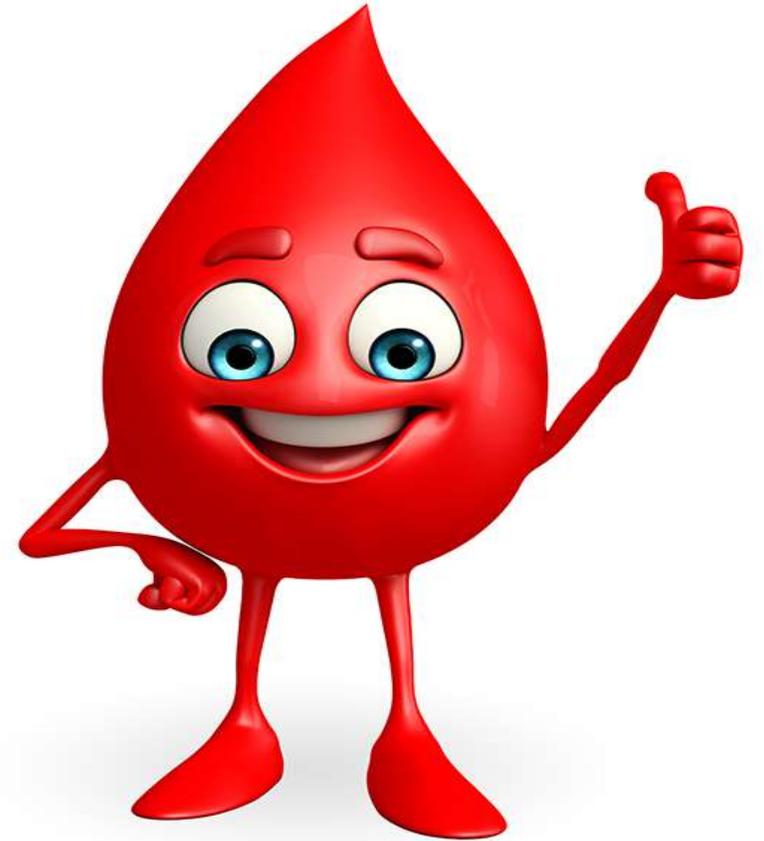
<u>NAME OF TISSUE</u>	<u>LOCATION IN BODY</u>	<u>FUNCTION</u>
Areolar	Skin, between organs	Protects and supports organs and muscles. Stores fat
White fibrous	Tendons	Attaches muscle to bone
Yellow elastic	Ligaments	Attaches bone to bone
Cartilage	Ear lobe/pinna, ends of bones, trachea	Supports and gives shape to the ear, keeps trachea open, prevents friction between bones
Bone	Forms the endoskeleton in mammals	Gives shape to the body, protects internal organs Allows for attachment of muscles.

Question 4

1. Blood plasma, red blood cells, white blood cells, blood platelets.
2. Nutrients, CO_2 , O_2 , waste materials.
3. a. Transports CO_2 and O_2 .
b. Produces anti-bodies to fight infections.
c. Assists with blood clotting.

Question 5

1. A. Smooth muscle – involuntary muscle.
B. Skeletal muscle – voluntary muscle.
C. Cardiac muscle – involuntary muscle.
2. Cardiac muscle.
3. Walls of the digestive, respiratory and reproductive system, walls of the blood vessels.



Question 6

1. Neurons are nerve cells that allow impulses to move throughout the body.
2. a. Carry impulses from receptors towards central nervous system.
b. Carry impulses from the central nervous system to the effectors (muscles and glands).
c. Connects sensory neurons to the motor neurons.
3. REFER TO STUDY GUIDE.



Question 7

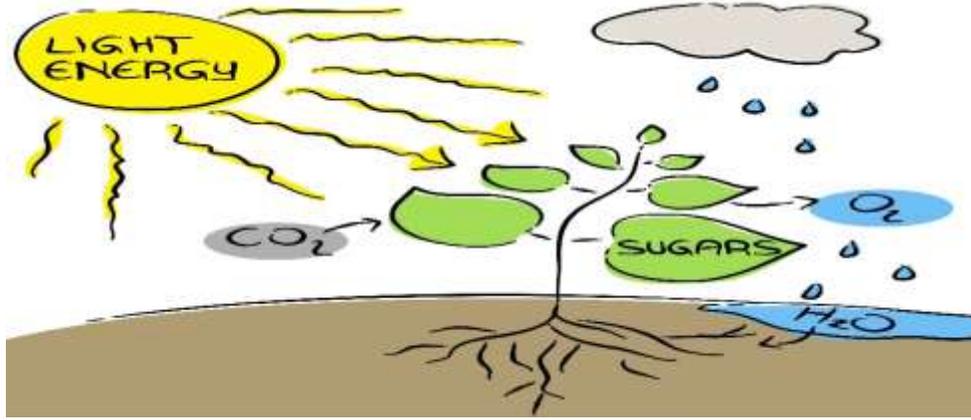
1. a. Aloe – used for skin care, heartburn, stomach ulcers.
b. African potato - treatment of arthritis, allergies. Has anti-inflammatory properties.
c. Rooibos – used as an anti-depressant. Treatment for insomnia and colic.
d. Mentha – used to treat colds, and chest ailments.

Question 7 (Continued)

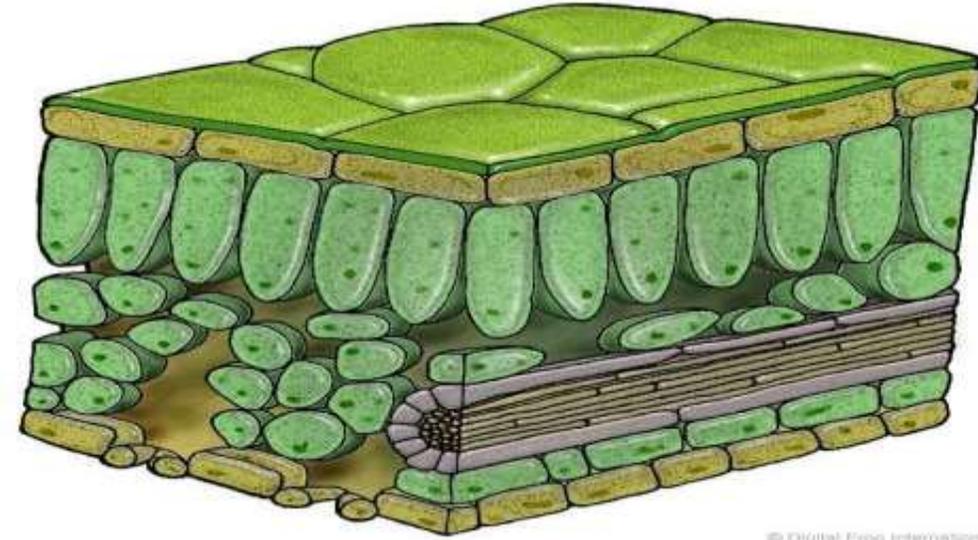
2. Tissue culture refers to a method in which fragments of a plant or animal tissue are introduced into a new, artificial environment, where they continue to function or grow.
3. Embryo, adult bone marrow, blood from the umbilical cord of a new born baby.
4. Treatment of Parkinson's disease.
Treatment of spinal cord injuries.
Treatment of diabetes.
5. Some opponents of stem cell research argue that it offends human dignity and harms or destroys the embryo which is living.
6. The new plants can be grown in a short amount of time.
Only a small amount of initial plant tissue is required.
The new plant and plants are more likely to be free of viruses and diseases.
Process is not dependant on the seasons and can be done throughout the year.
7. Humans are playing God.
There's uncertainty about the survival of the cloned individual.
Could have more people with the same fingerprints.
Bonding will not be the same.

Question 8

Chloroplast, carbon dioxide, stomata, sunlight, water and chlorophyll.



Question 9



1. REFER TO STUDY GUIDE.

2. A. Controls the opening and closing of the stoma.

B. Prevents the evaporation of water.

C. Protects the leaf.

D. Allows circulation of gases within the leaf.

3. Allows sunlight to pass through easily.