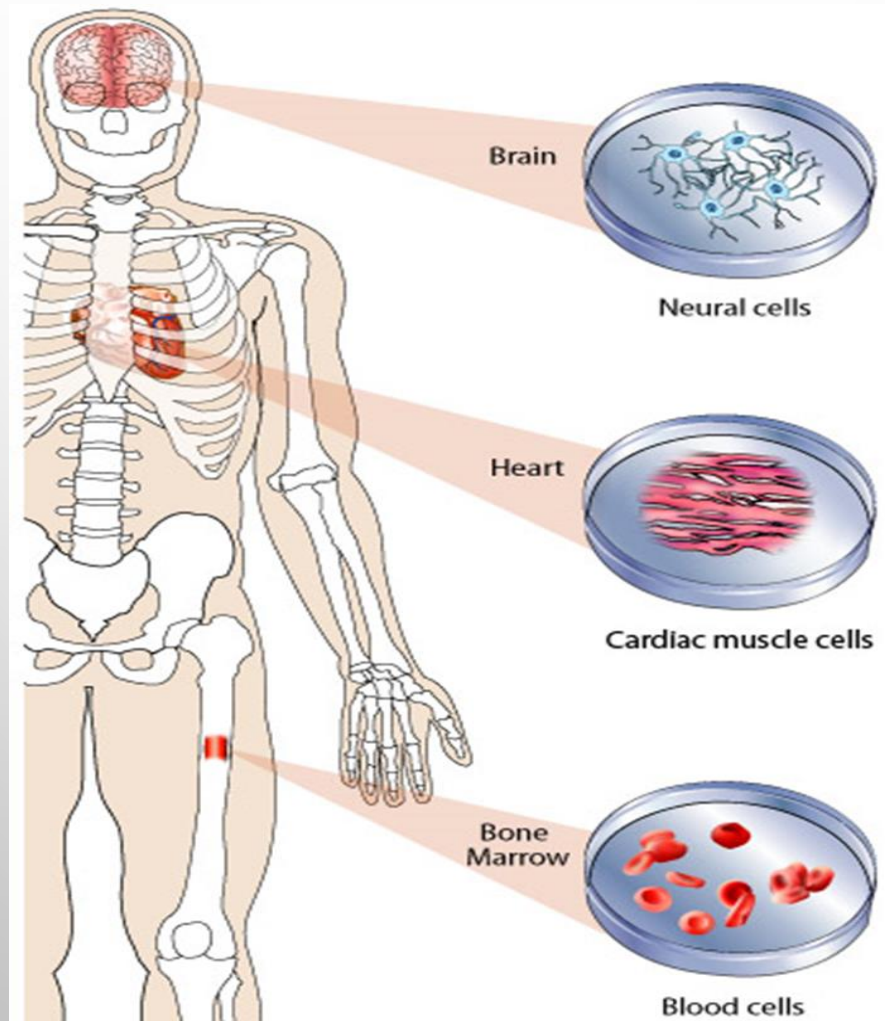


The background of the slide features a light gray gradient with several realistic water droplets of various sizes scattered across the top and bottom edges. The droplets have highlights and shadows, giving them a three-dimensional appearance.

# **SPECIALIZED CELLS**

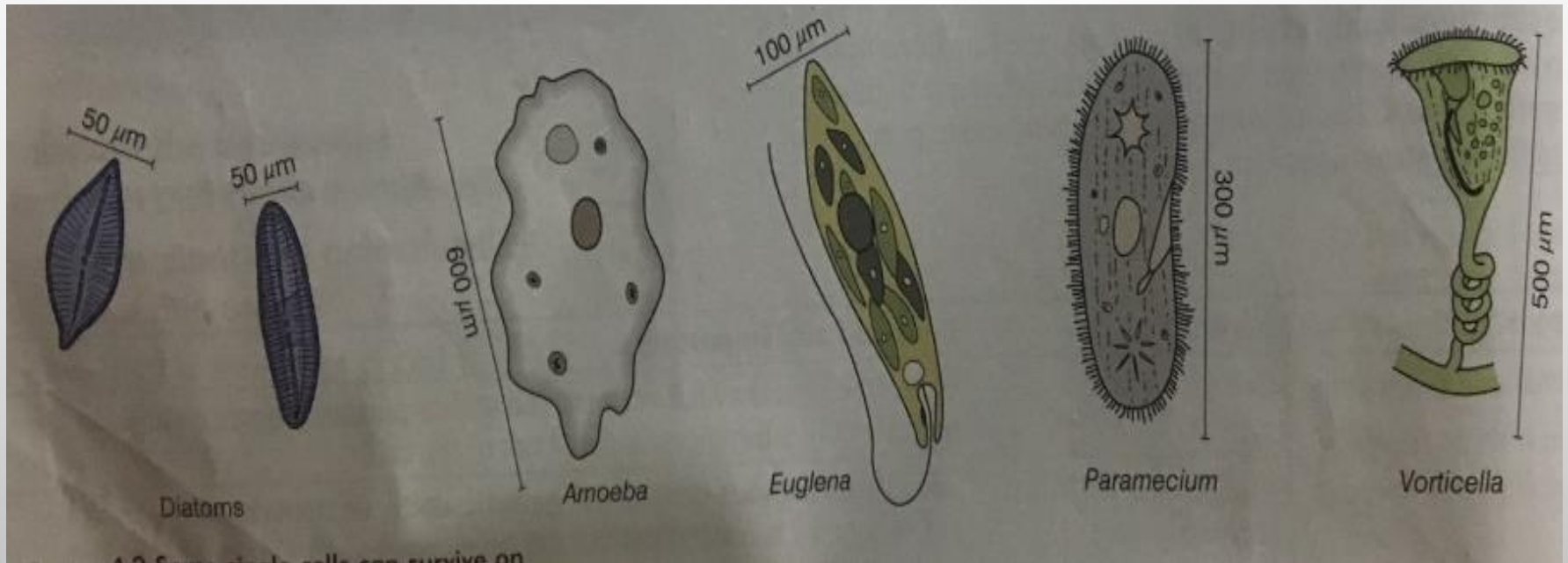
# NAME SOME TYPE OF ANIMAL CELL IN THE HUMAN BODY?



# WHY MULTICELLULAR ORGANISMS CAN'T LIVE WITH ONE TYPE OF CELL.

- MOST CELLS CANNOT SURVIVE ON THEIR OWN, SO THEY JOIN TOGETHER TO FUNCTION AS MULTICELLULAR ORGANISMS.
- CELLS CAN BECOME SPECIALIZED TO PERFORM DIFFERENT FUNCTIONS IN THE BODY.
- THESE CELLS HAVE DIFFERENT STRUCTURES AND FUNCTIONS BUT AS THEY WORK TOGETHER SO THAT THE ORGANISM CAN FUNCTION AS A WHOLE.

# EXAMPLE OF UNI-CELLULAR ORGANISMS



- PLACE CELL ORGANIZATION IN ORDER.

**Cells**

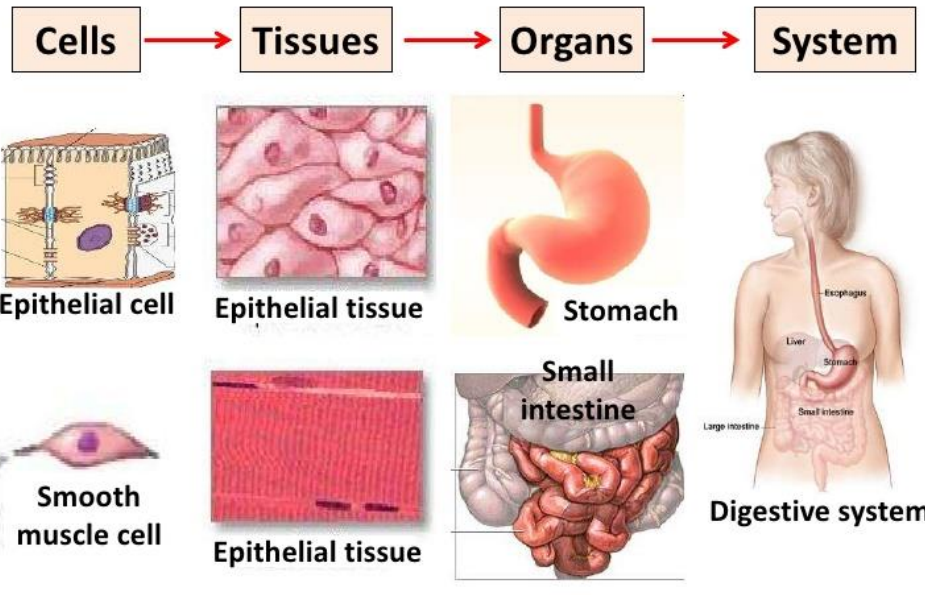
**Organs**

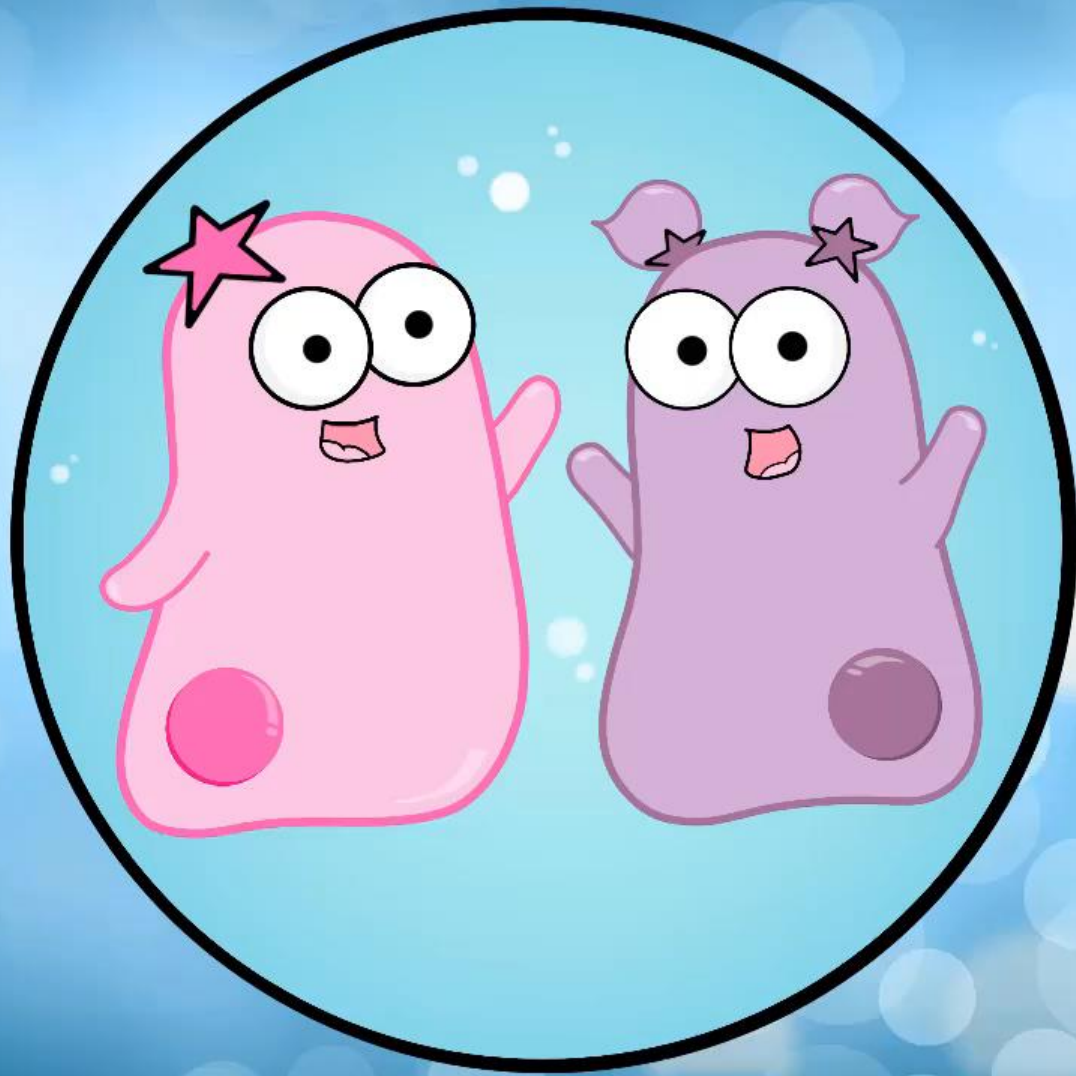
**System**

**Tissues**

# INTRO: PLACE CELL ORGANIZATION IN ORDER.

## CELL ORGANIZATION

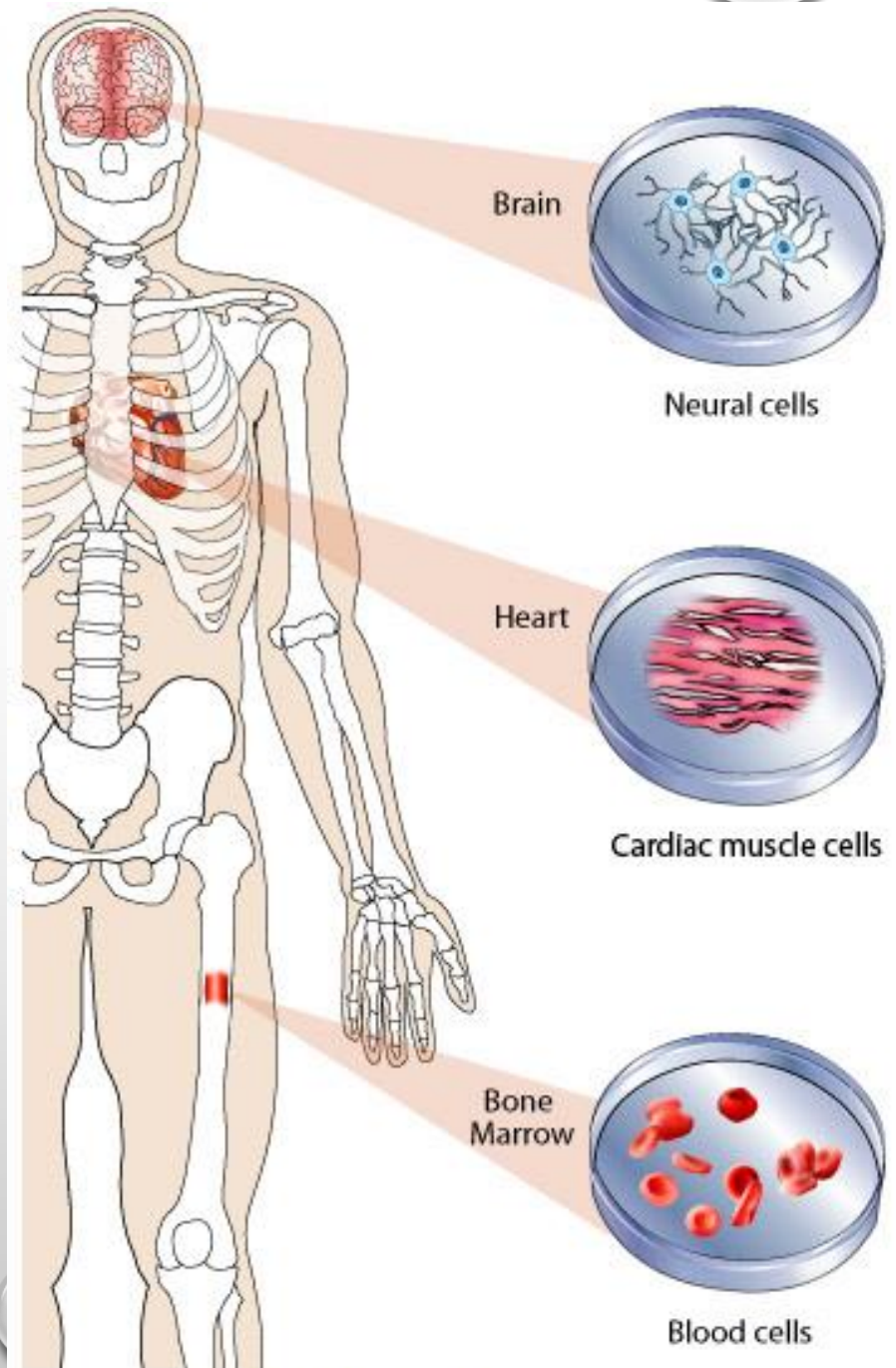






# SPECIALIZED CELLS

- 50 – 75 TRILLION CELLS IN YOUR BODY
- 220 SPECIALIZED CELLS
  - HEART
  - NERVE
  - BLOOD
  - SPERM
  - ETC.
- WHY DIFFERENT?






# SPECIALIZED CELL

- A CELL THAT HAS A PARTICULAR STRUCTURE AND PERFORMS A SPECIFIC FUNCTION
- EACH TYPE HAS UNIQUE SHAPE, SIZE AND FEATURES ALLOWING IT TO DO ITS JOB ACCURATELY





**Ciliated cells** line the windpipe. Cilia are rows of fine hair which sway to and fro. They sweep a covering layer of mucus which traps bacteria, viruses and other particles, into the back of the mouth



**Skin cells** cover the body and help to protect internal organs from damage



**Fat cells** store fat which insulate the body and is also a source of energy



The **female sex cell**, called the ovum (egg) is fertilised when a sperm fuses with it



**Nerve cells** transmit messages in the form of nerve impulses



**Bone cells** produce bone which supports the body and helps to protect internal organs from damage



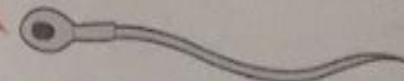
**White blood cells** help to protect the body against disease



**Red blood cells** transport oxygen around the body

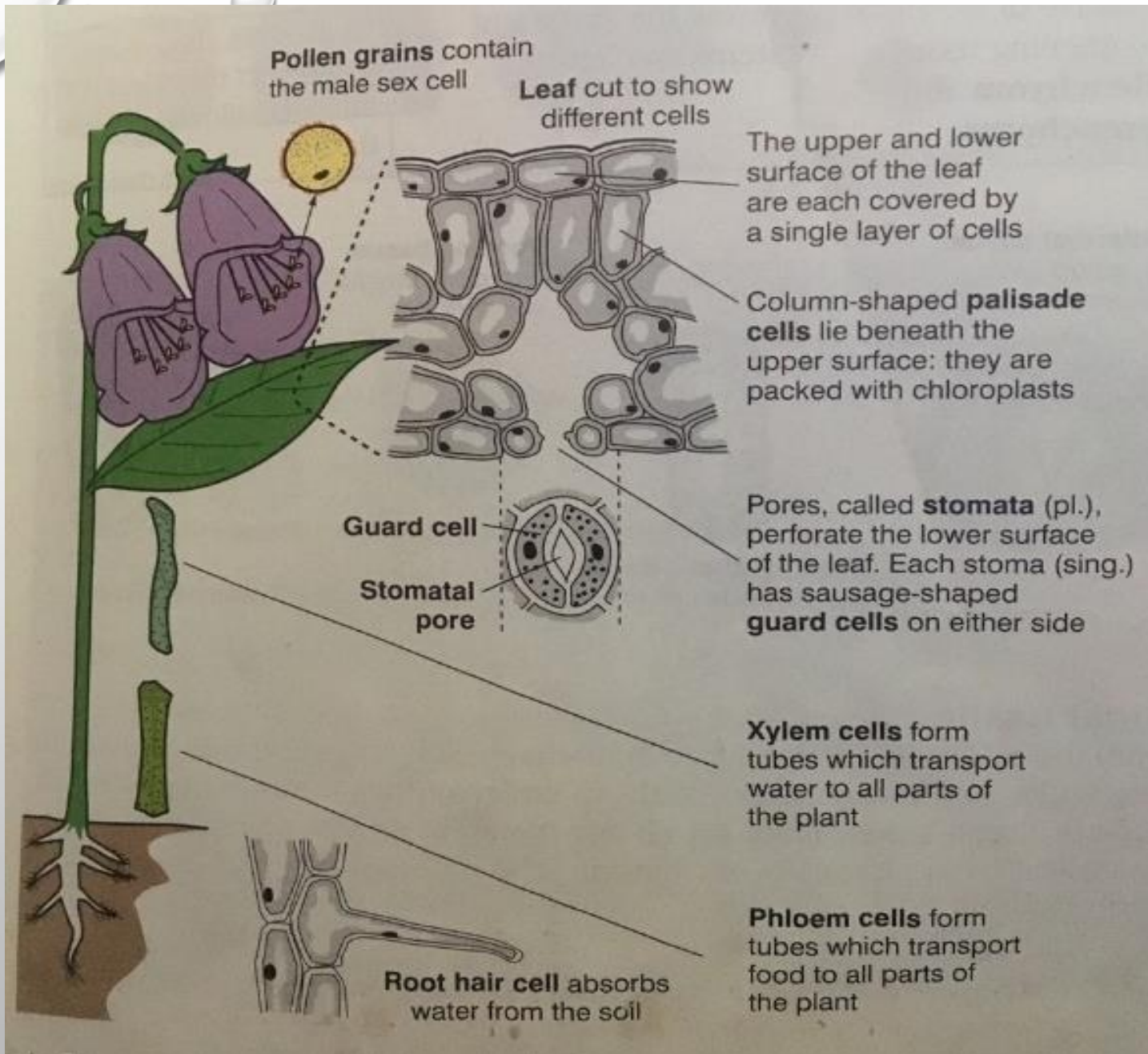


**Smooth muscle cells** contract rhythmically, helping to move blood through blood vessels, e.g. arteries

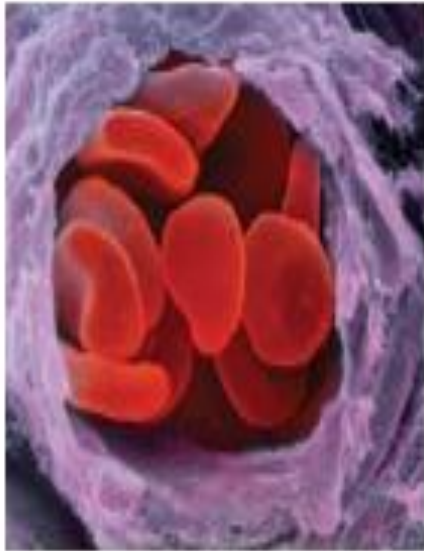


The **male sex cells**, called sperm, swim to the egg where one of them fertilises it





- THE CELLS IN ANIMALS ARE NOT ALL IDENTICAL.
- THEY PERFORM SPECIFIC FUNCTIONS, SUCH AS DELIVERING OXYGEN AND FIGHTING DISEASE, MOVING THE SKELETON, STORING ENERGY OR COORDINATING THE WHOLE BODY.



Red blood cells contain hemoglobin that carries oxygen in blood. The cells are smooth so that they can easily pass through the blood vessels.



Muscle cells are arranged in bundles called muscle fibres. Muscle cells can contract, which makes the fibre shorter and causes bones to move.



Fat cells have a large vacuole in which to store fat molecules. This is how the cell stores chemical energy.



Nerve cells are long, thin, and have many branches. They conduct electrical impulses to coordinate body activity.

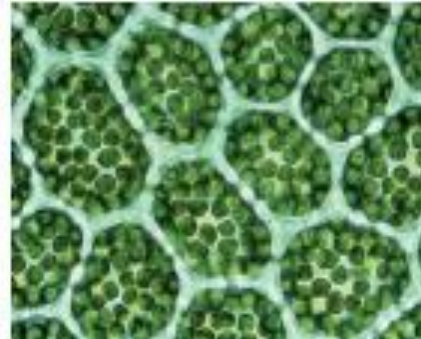
- PLANT CELLS ALSO HAVE A VARIETY OF SPECIALIZED CELLS. CELLS IN THE LEAF OF A TREE HAVE A DIFFERENT STRUCTURE AND FUNCTION FROM THE CELLS IN THE TRUNK.



Epidermal cells on young roots have hairs that absorb water from the soil.



Some plant cells transport water and dissolved minerals throughout the plant.



Photosynthetic cells contain many chloroplasts to collect energy from sunlight to make sugar for the plant.



Other cells transport dissolved sugars around the plant.



**EXAMPLE:**  
**TRACHEA CILIA**  
(DON'T COPY INTO NOTES)



- **SPECIALIZED CELLS** HAVE PHYSICAL AND CHEMICAL DIFFERENCES THAT ALLOW EACH TYPE TO PERFORM ONE JOB VERY WELL.
- THESE CELLS HELP KEEP DIRT OUT OF THE LUNGS.
  - THE ORANGE GOBLET CELLS SECRETE MUCUS
  - THE HAIR-LIKE EXTENSIONS (CALLED CILIA) MOVE THE MUCUS ALONG THE TRACHEA TO REMOVE INHALED DUST AND DIRT.



# EXAMPLES:

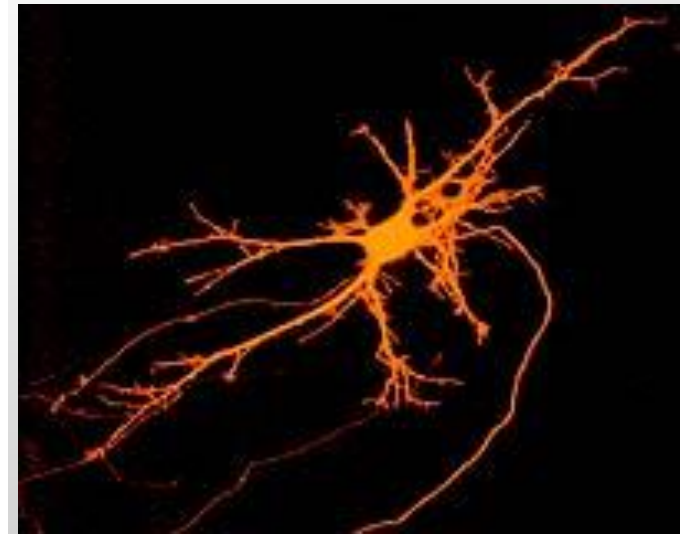
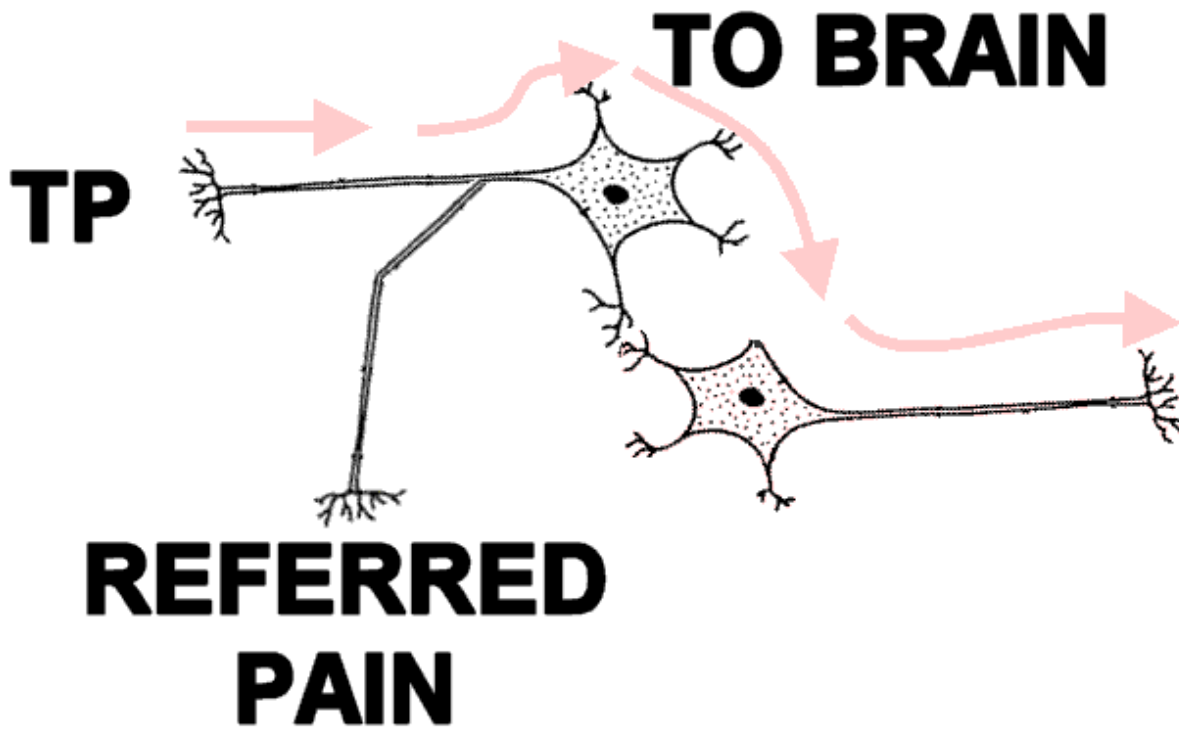
## 1. RED BLOOD CELL

- ROUND EDGES TO TRAVEL IN BLOOD VESSELS EASIER
- NO NUCLEUS = MORE ROOM TO CARRY O<sub>2</sub> AND CO<sub>2</sub>



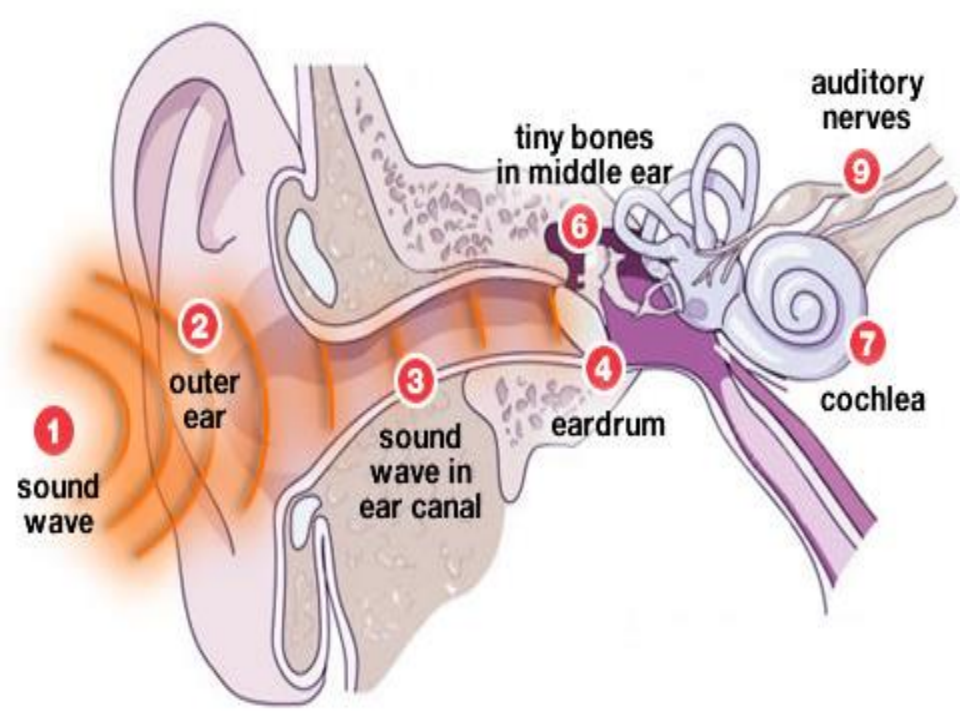
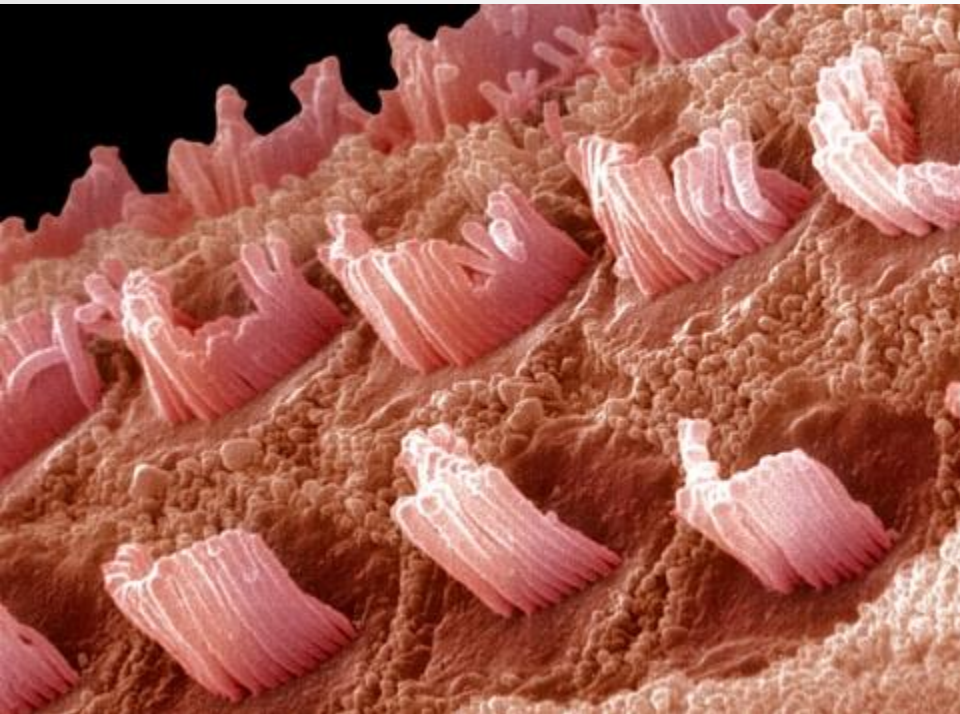
## 2. NERVE CELL

– LONG, SKINNY ARMS TO SEND MESSAGES QUICKLY OVER LONG DISTANCES



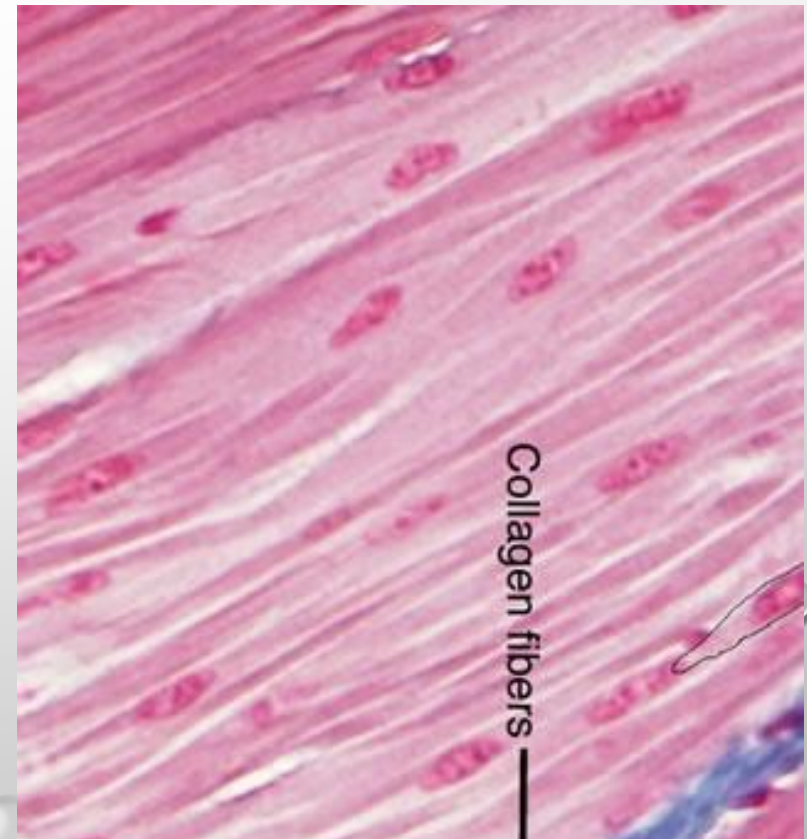
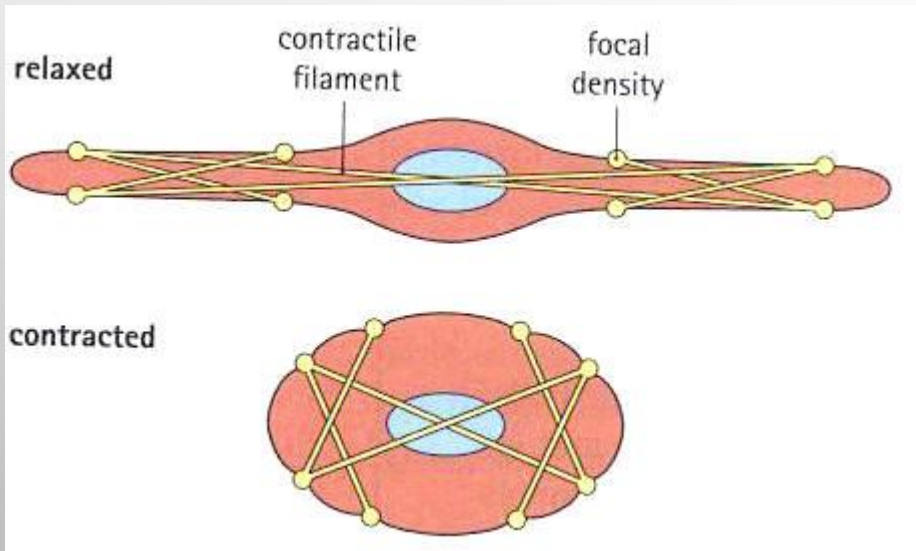
### 3. EAR CELLS

- HAVE CILIA – TINY HAIRS ON INNER EAR CELLS THAT PICK UP VIBRATIONS IN THE AIR AND SEND SIGNAL TO BRAIN.



## 4. MUSCLE CELL

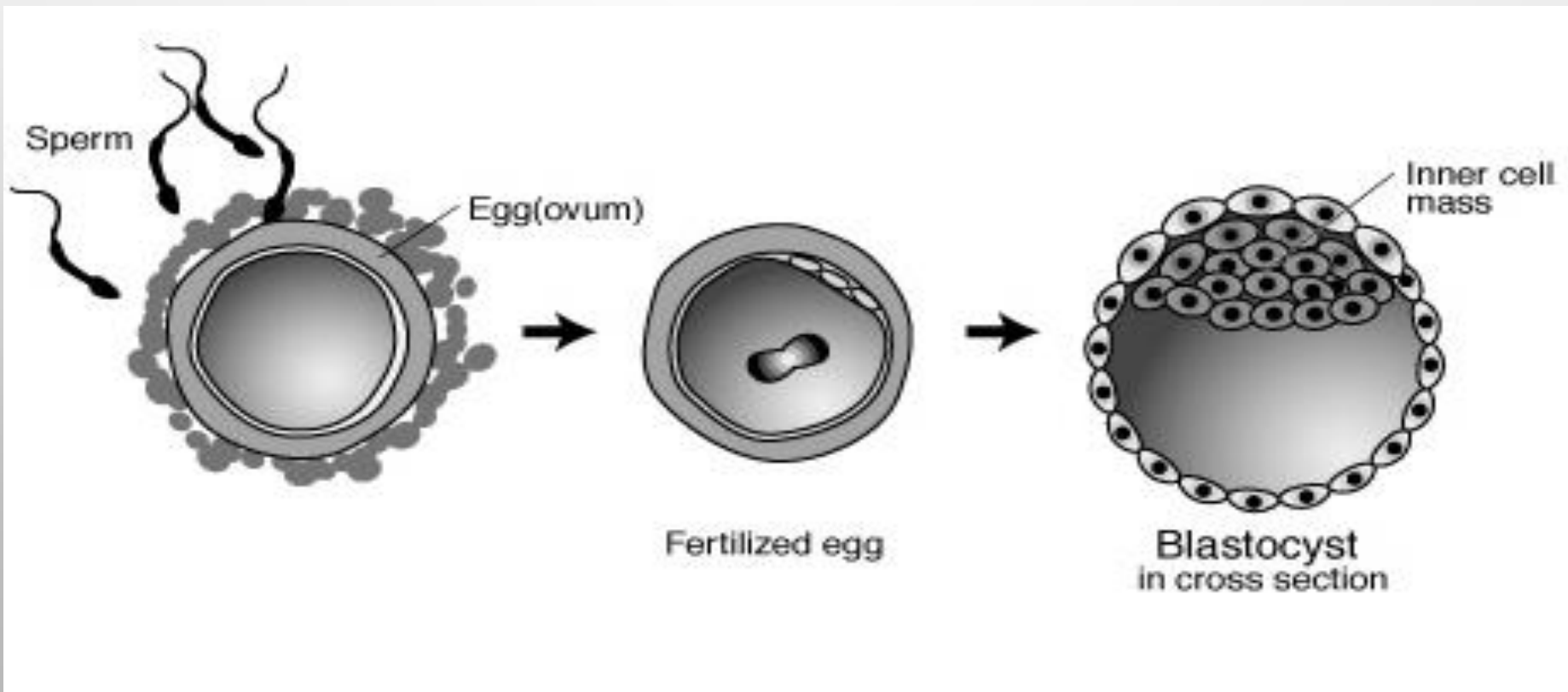
– LONG, SKINNY CELLS THAT LENGTHEN AND SHORTEN TO MOVE MUSCLES





# STEM CELLS

- UNSPECIALIZED CELLS THAT DIVIDE QUICKLY AND DO NOT HAVE A PARTICULAR FUNCTION YET.

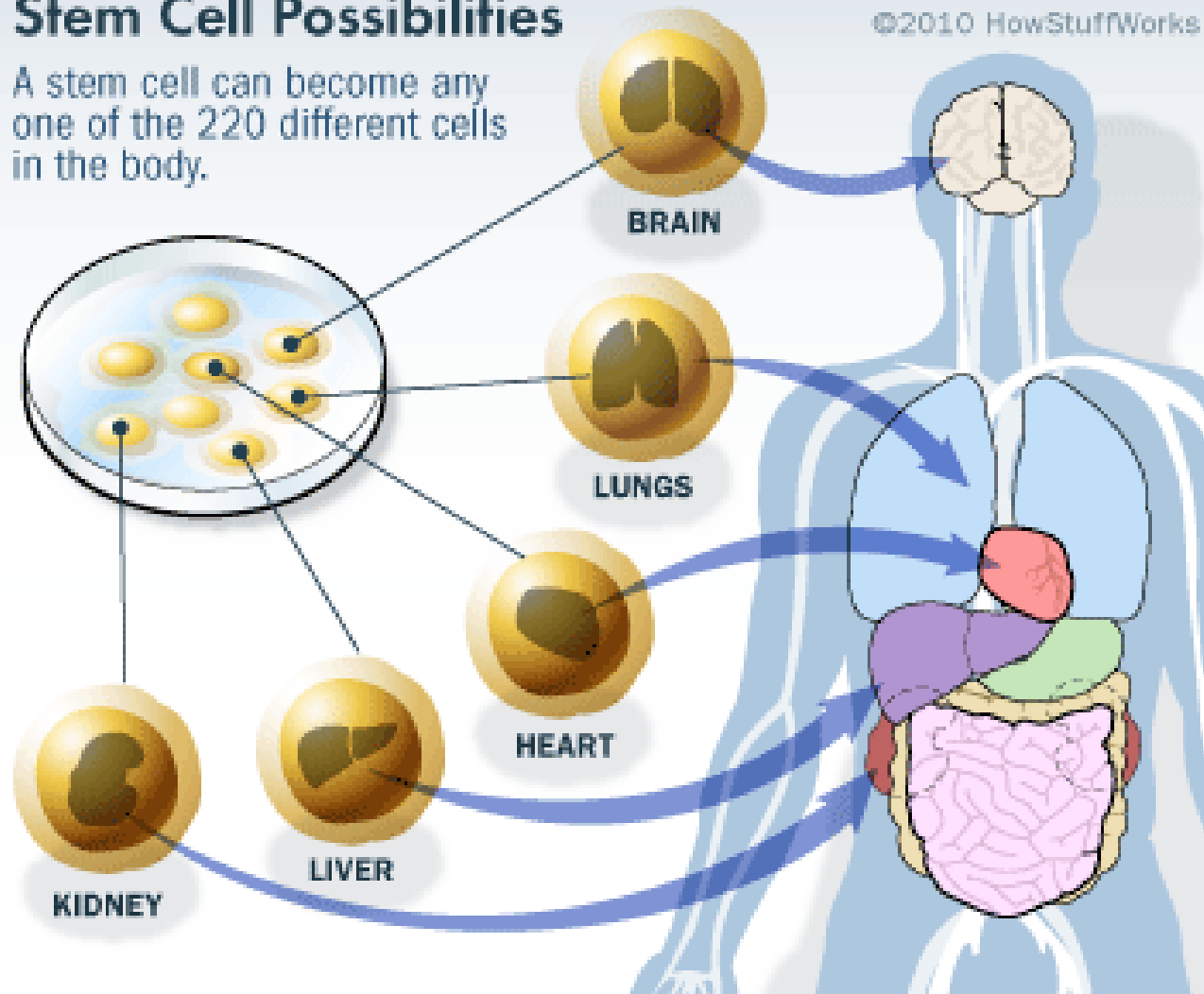


# SPECIALIZED CELLS

## Stem Cell Possibilities

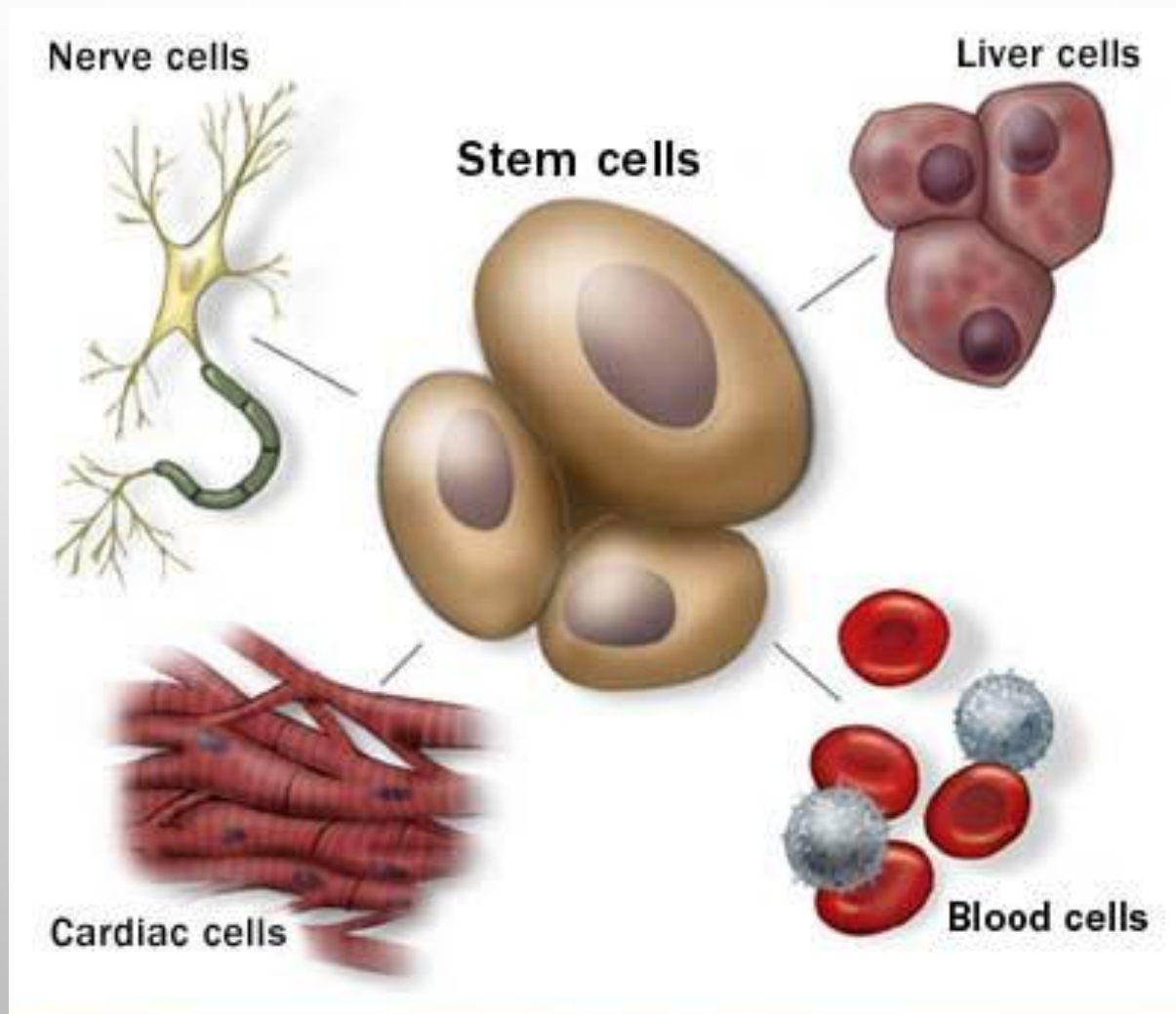
©2010 HowStuffWorks

A stem cell can become any one of the 220 different cells in the body.



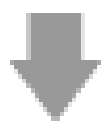


- ONLY STEM CELLS CAN DIFFERENTIATE INTO MANY CELL TYPES.

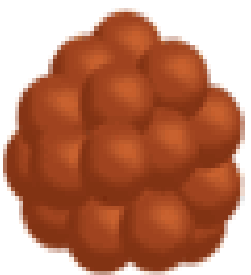


# WHERE ARE STEM CELLS?

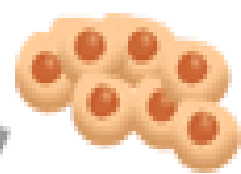
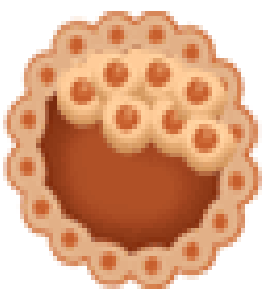
Fertilised egg



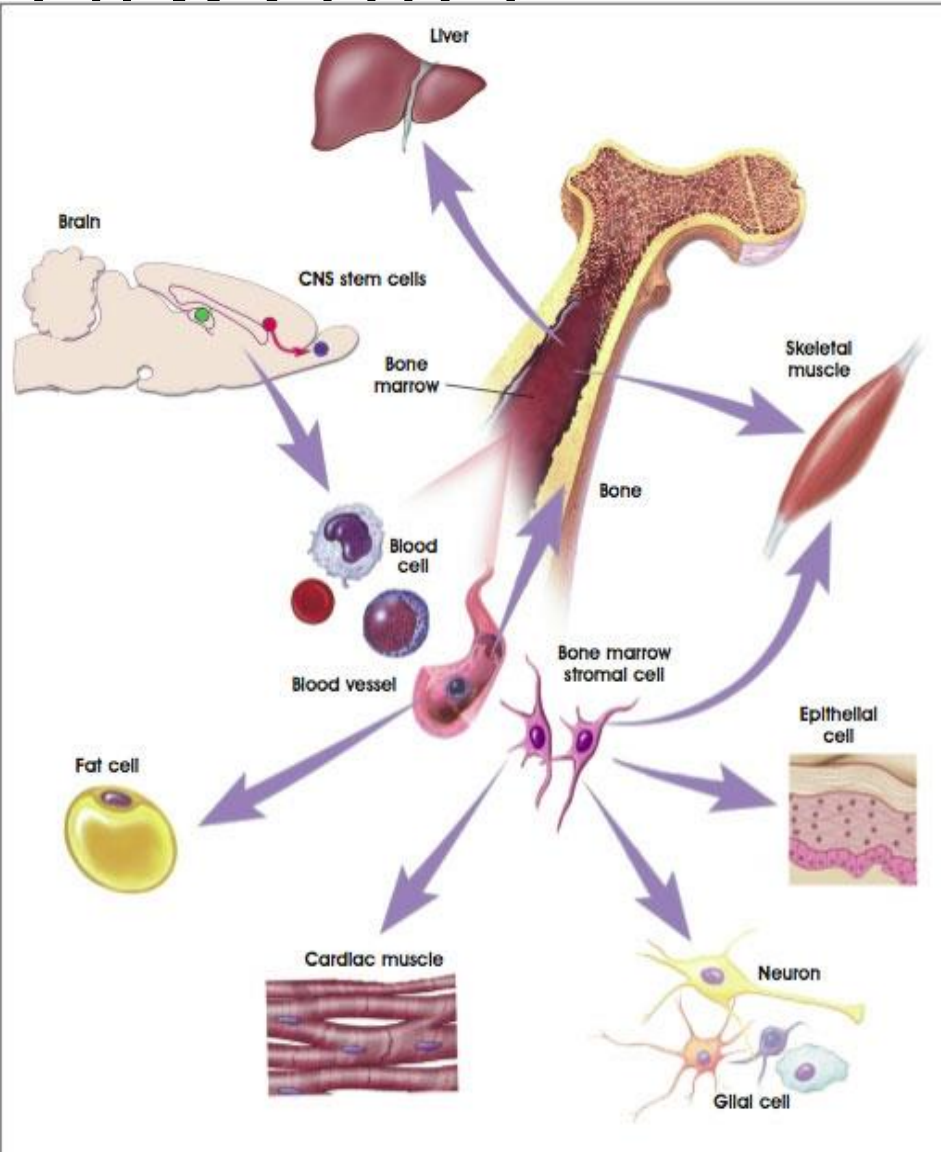
Blastocyst (5 days old)



Inner cell mass



Stem cells



# CORD BLOOD CELL BANKING?

- THE BLOOD FOUND IN AN UMBILICAL CORD IMMEDIATELY AFTER THE BIRTH OF A CHILD IS A RICH SOURCE OF STEM CELLS.
- THESE STEM CELLS CAN DEVELOP INTO VARIOUS KINDS OF BLOOD CELLS.
- THE BLOOD COLLECTED FROM THE CORD CAN BE BANKED (OR STORED) IN THE EVENT IT IS NEEDED LATER IN THE CHILD'S OR A SIBLING'S LIFE.



PHOTO : ISTOCKPHOTO.COM / KENNETH C. ZIRHEL

# HOW CAN STEM CELLS BE USED?



- FOR DISEASES SUCH AS LEUKEMIA, STEM CELLS COLLECTED FROM HEALTHY BLOOD CAN BE INJECTED INTO A PATIENT'S BLOOD AFTER THE DISEASED CELLS HAVE BEEN KILLED.
- THE HEALTHY CELLS THEN GROW IN THE PATIENT'S BONE MARROW AND PRODUCE HEALTHY, CANCER-FREE BLOOD CELLS.

- <http://www.dnalc.org/resources/animations/stemcells.html>
- <http://youtu.be/O5r-T6ANKto>

**Dallas Weins lost his face when he walked into power lines. He is the first person in America to receive a full face transplant.**

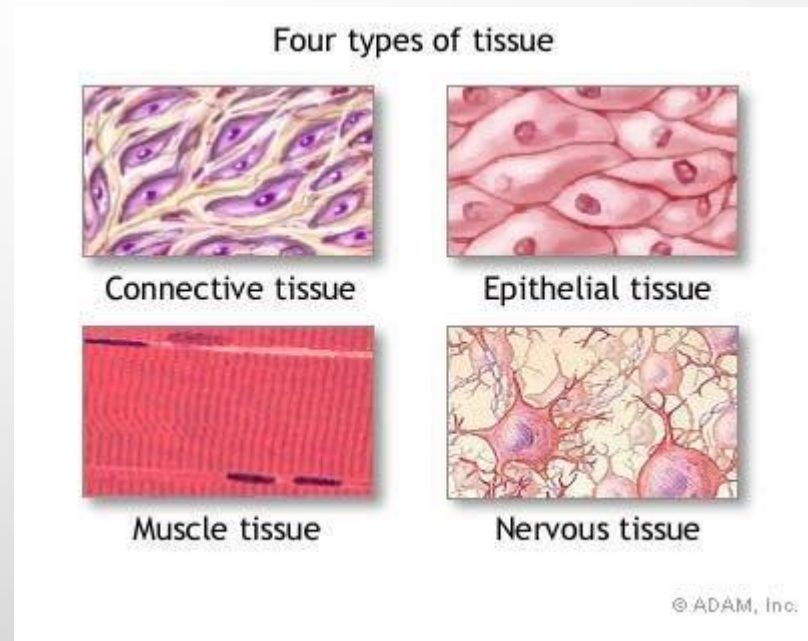


[face transplant](#)



WHEN CELLS GROUP TOGETHER TO PERFORM A FUNCTION THEY FORM A?

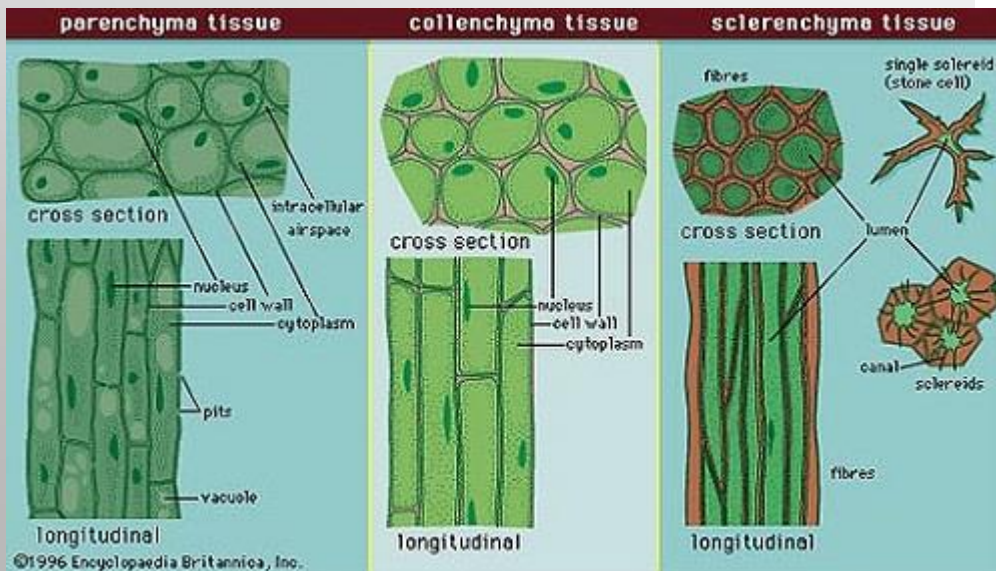
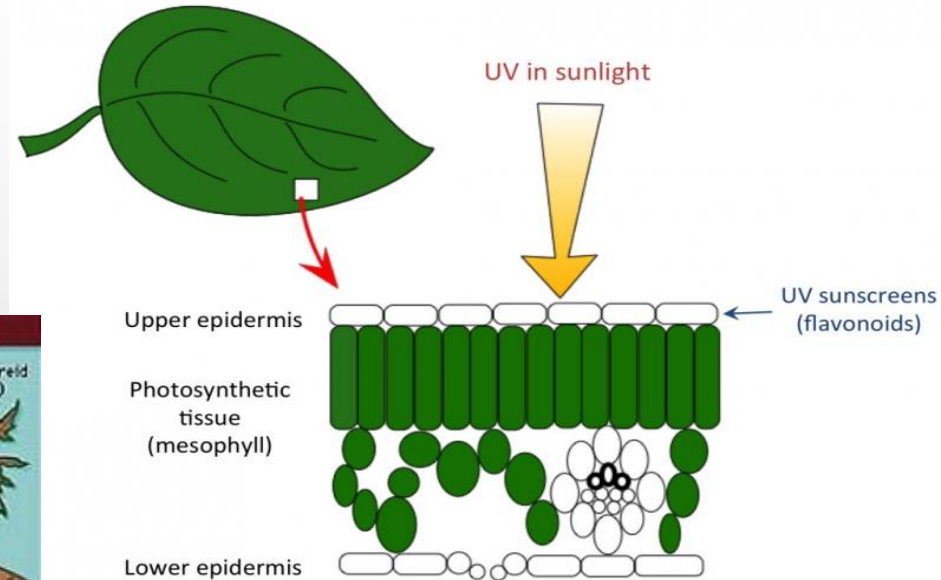
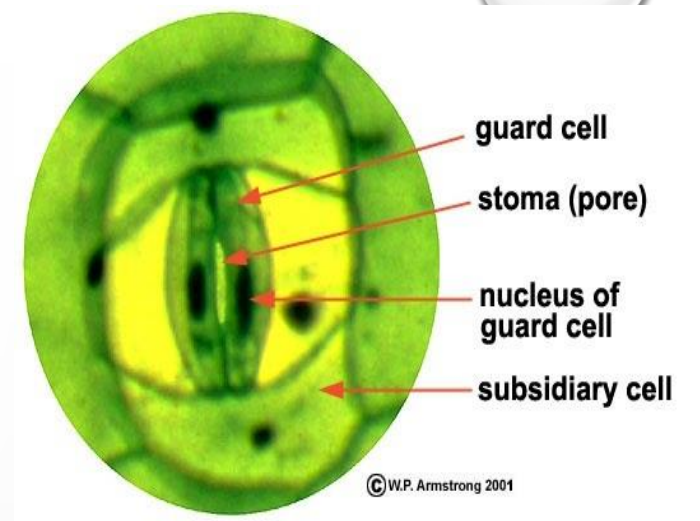
• **TISSUE**



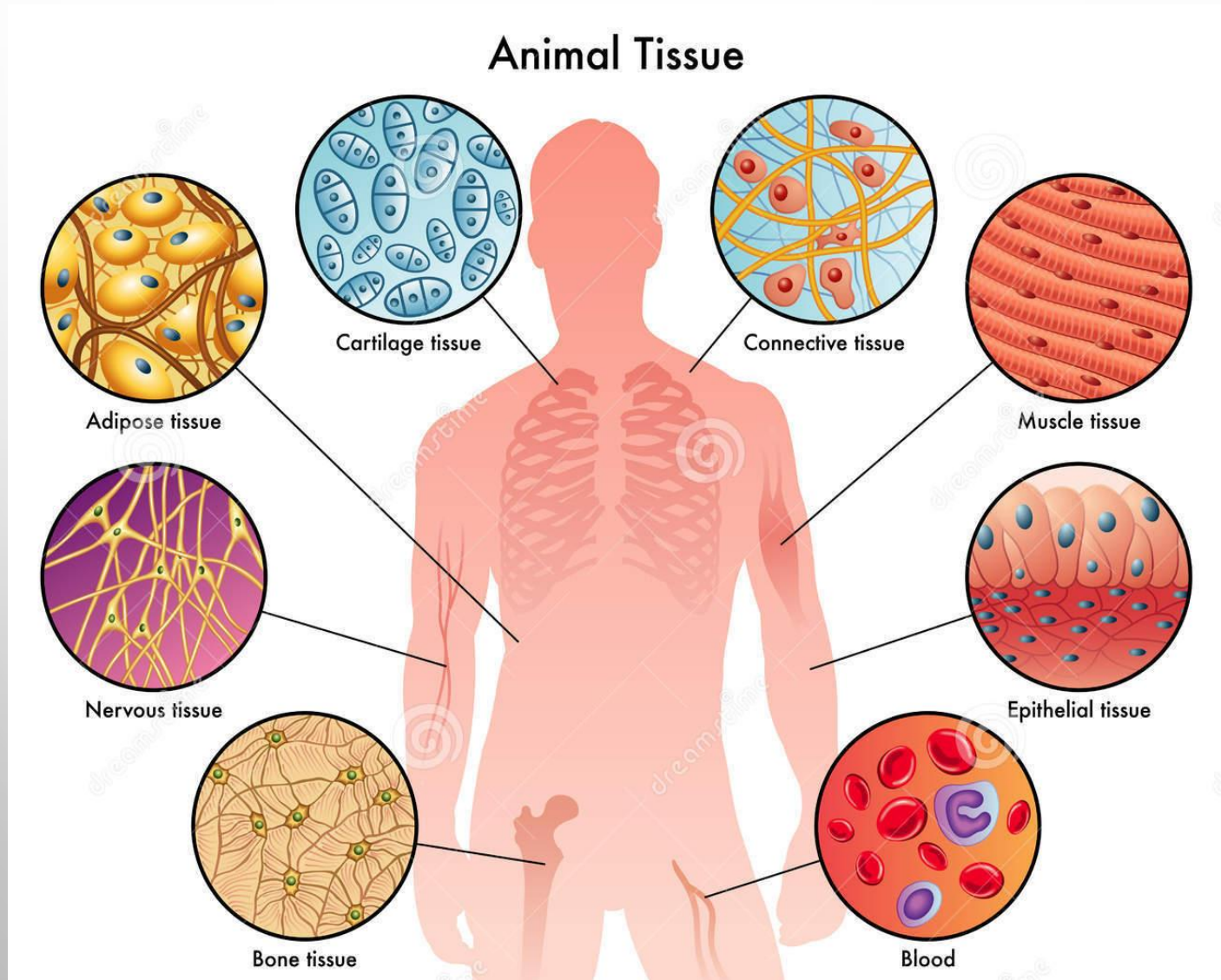


# PLANT TISSUE

- EPIDERMAL TISSUE
- PHOTOSYNTHETIC TISSUE
- PACKING TISSUE (PARENCHYMA CELLS)
- TRANSPORT/ VASCULAR TISSUE ( XYLEM AND PHLOEM)
- SUPPPORTIVE OR STRENGTHENTING TISSUE ( COLLENCHYMA AND SCLERENCYMA



# ANIMAL TISSUE



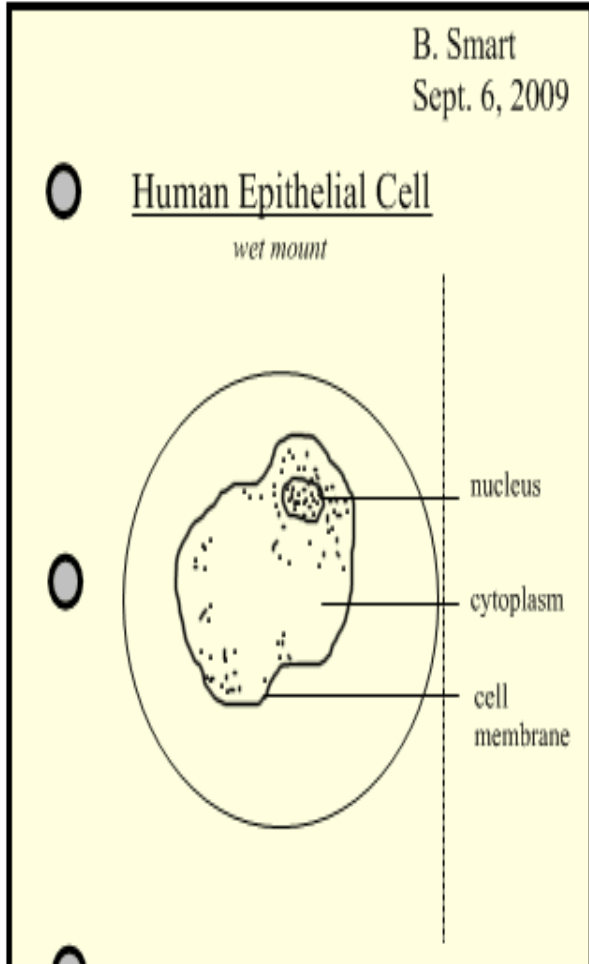
# CLOSURE

- 1. BONE IS A TYPE OF \_\_\_\_\_
- 2. TENDONS AND LIGAMENTS ARE EXAMPLES OF \_\_\_\_\_
- 3. THE HEART IS MADE OF \_\_\_\_\_
- 4. \_\_\_\_\_ IS THE ONLY TISSUE THAT IS IN A LIQUID FORM
- 5. \_\_\_\_\_ TISSUE FORMS PROTECTIVE LAYER AROUND YOUR LIVER AND ORGANS.
- 6. ARE SUPPORTIVE AND STRENGTHENING TISSUE IN PLANTS \_\_\_\_\_ AND \_\_\_\_\_.
- 7. GUARD CELLS ARE PART OF AN \_\_\_\_\_ TISSUE.

# TO DO NOW:

- DRAW 2 DIFFERENT TYPES OF CELLS THAT YOU FIND UNDER THE MICROSCOPE.

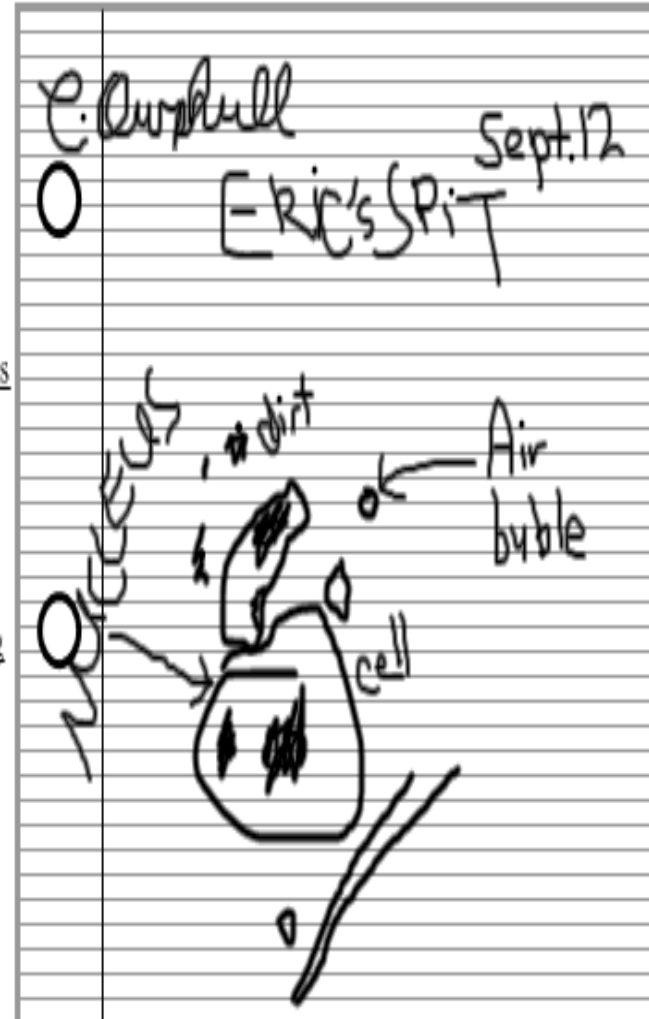
# DO:



- ✓ Name and Date  
upper right corner
- ✓ Underlined Title  
name of specimen  
type of preparation
- ✓ Unlined white paper
- ✓ Labels  
neat column to the right  
straight horizontal lines  
lowercase letters
- ✓ Drawing  
neat, large  
pencil only  
stipple dark areas

# DON'T:

- ✗ lined paper  
sloppy writing
- ✗ Poor Title  
inappropriate  
not underlined
- ✗ Incorrect Labels  
misspelled  
insignificant  
arrows used
- ✗ Messy Drawing  
shaded  
inked



## TO DO NOW:

- DRAW 2 DIFFERENT TYPES OF CELLS THAT YOU FIND UNDER THE MICROSCOPE.

### TO FOCUS MICROSCOPE:

- START ON SMALLEST POWER LENS, FOCUS IN ON CELL.
- GO TO MEDIUM POWER AND FOCUS
- GO TO HIGH POWER AND FOCUS IF POSSIBLE.