

# Unit 4: Cells, Tissues, Organs & Systems

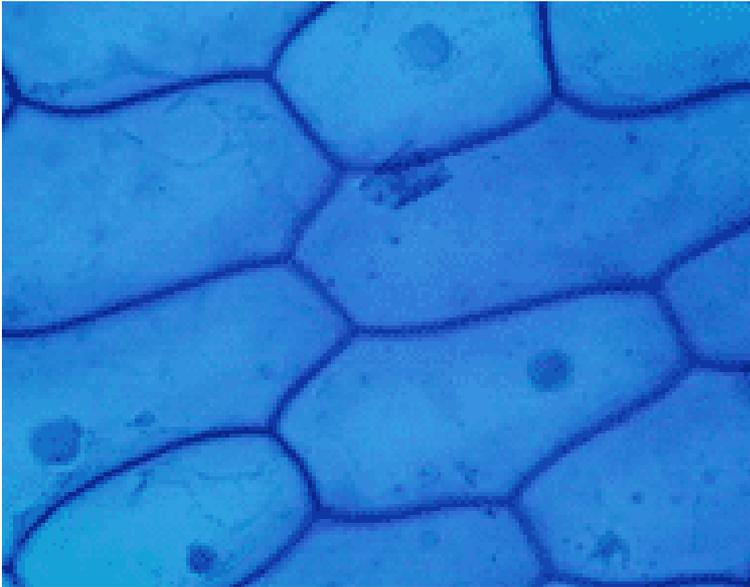
Chapter 10: ***“The cell is  
the basic unit of life.”***

# Cells & Living Things

What are living things made of?

**Early idea:** all living things are made of air, fire and water

**Now:** all living things are  
made of cells (cell theory)



**Cell:** *the  
basic,  
functional  
unit of life*

# Characteristics of Living Things

All living things...

1. Grow
2. Move
3. Respond to stimuli
4. Reproduce

# Growth

- A result of the cells in your body increasing in number
- New cells will grow to replace old cells that die.

# Movement

- A change in position, shape or **location (locomotion)**



# Respond to Stimuli

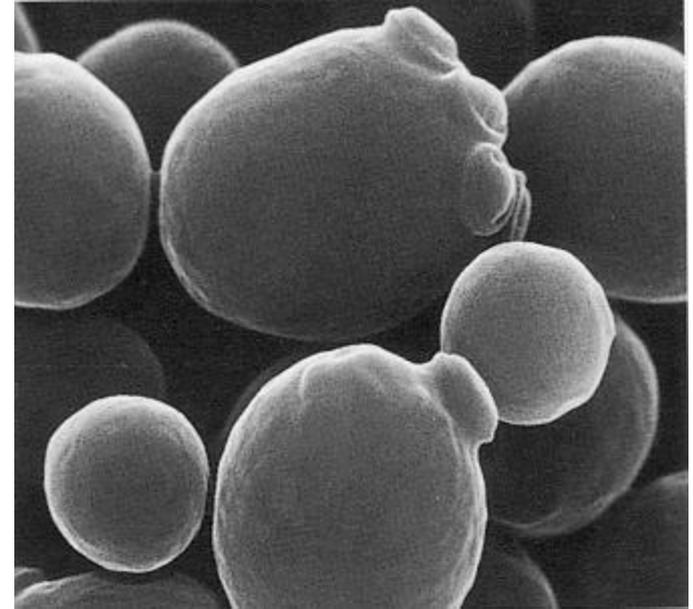
- **Stimulus**: anything that causes an organism to react.
- Maybe external or internal



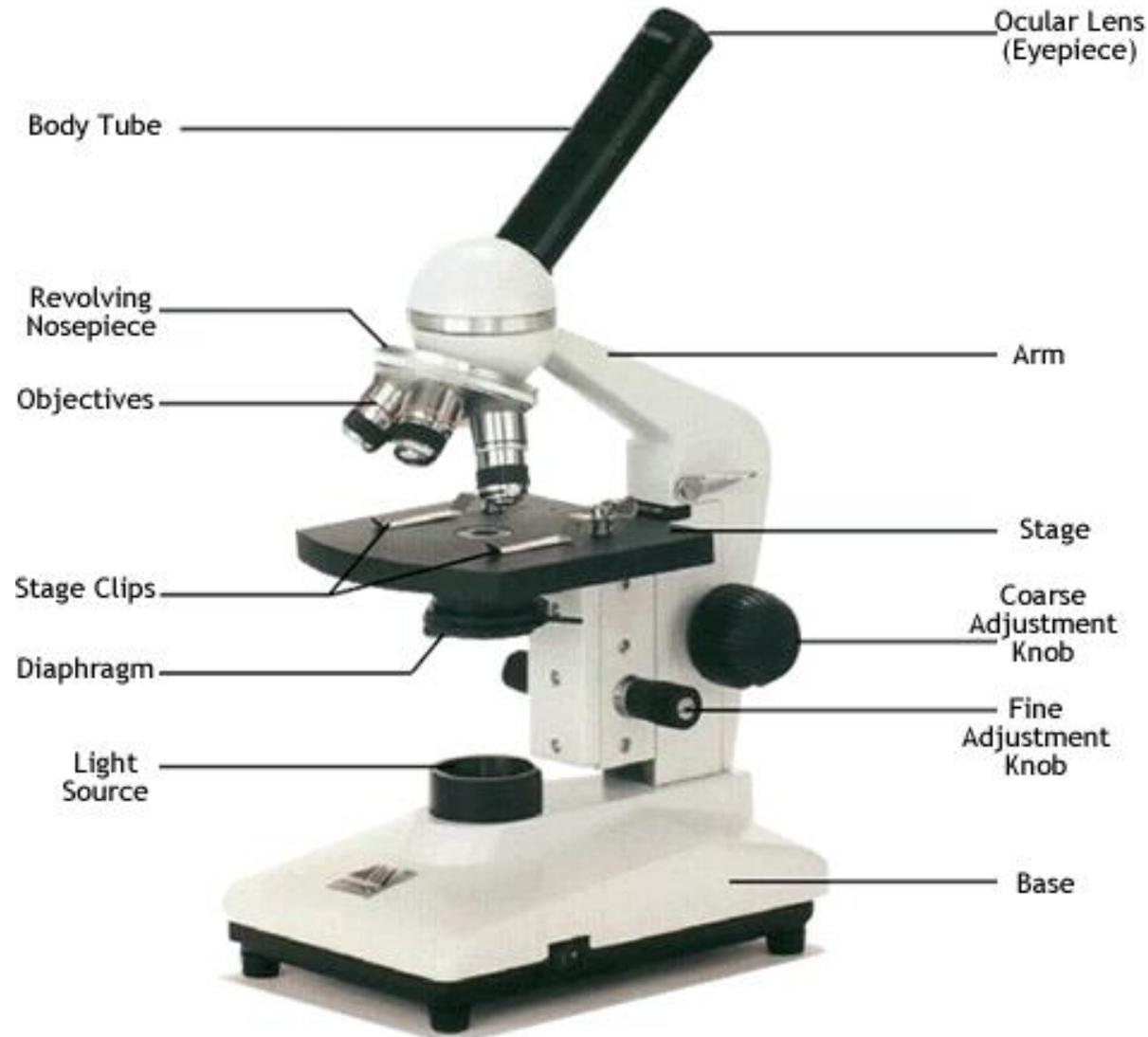
*Identify the stimulus & response*

# Reproduction

- Producing more of the same kind (offspring)



# The Compound Light Microscope



1.

2.

3.

4.

5.

6.

7.

8.

9.

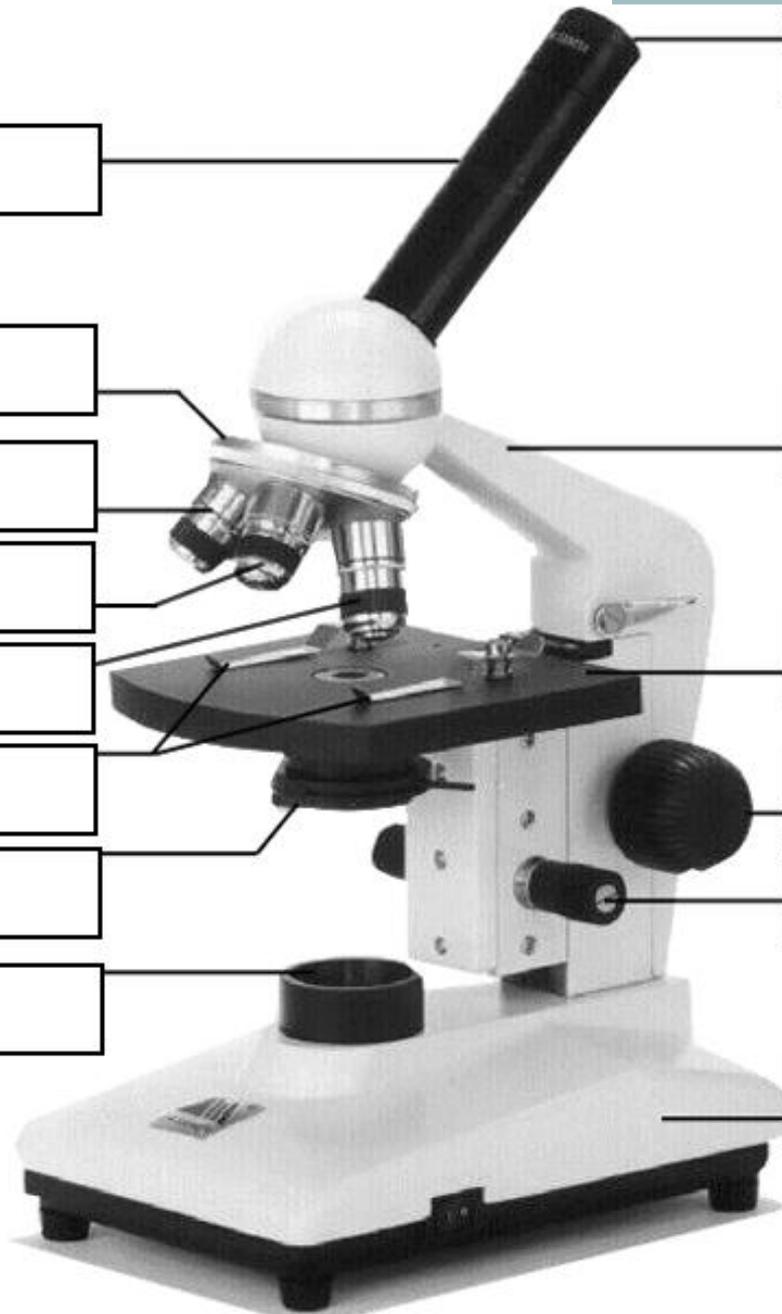
10.

11.

12.

13.

14.



## The Compound Light Microscope

PART	FUNCTION
Eyepiece	
Body tube (barrel)	
Coarse adjustment knob	
Fine adjustment knob	
Objective lenses	
Revolving nosepiece	
Stage	
Iris diaphragm	
Light source	
Base	
Arm	

# Total Magnification...

power of objective lens



power of eyepiece lens

# Core Lab Activity 10-1A

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*Setting Up and  
Using a Microscope*

Pg.384-5

# The Cell Theory states:

- The cell is the basic unit of life.
- All living things are made of one or more cells.
- All cells come from other living cells.

# Cell Organelles...

## Cell membrane:

- Found in both plant and animal cells
- Surrounds and protects the contents of the cell
- Controls the movement of materials in and out of the cell

## Cytoplasm:

- Found in both plant and animal cells
- Jell-like fluid that in which the organelles float
- Helps to move materials like food to different parts of the cell

## Cell wall:

- Found only in plant cells
- Tough, rigid structure that give plant cells their box-like shape
- Made mostly of cellulose

# Nucleus:

- Found in both plant and animal cells
- Large round structure often visible
- Contains the chromosomes
- The “control centre” of the cell

## Vacuole:

- Balloon-like spaces in the cytoplasm
- Store materials that can not be used right away
- Found in both plant and animal cells (smaller and more numerous in animal cells)

## Mitochondrion:

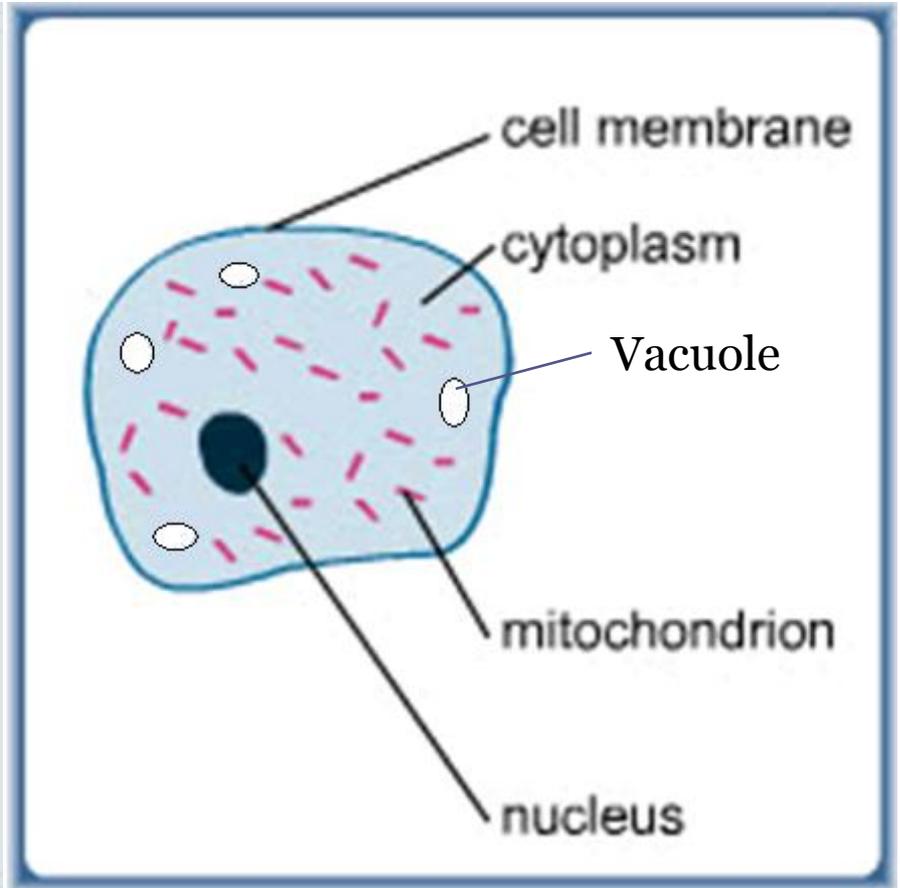
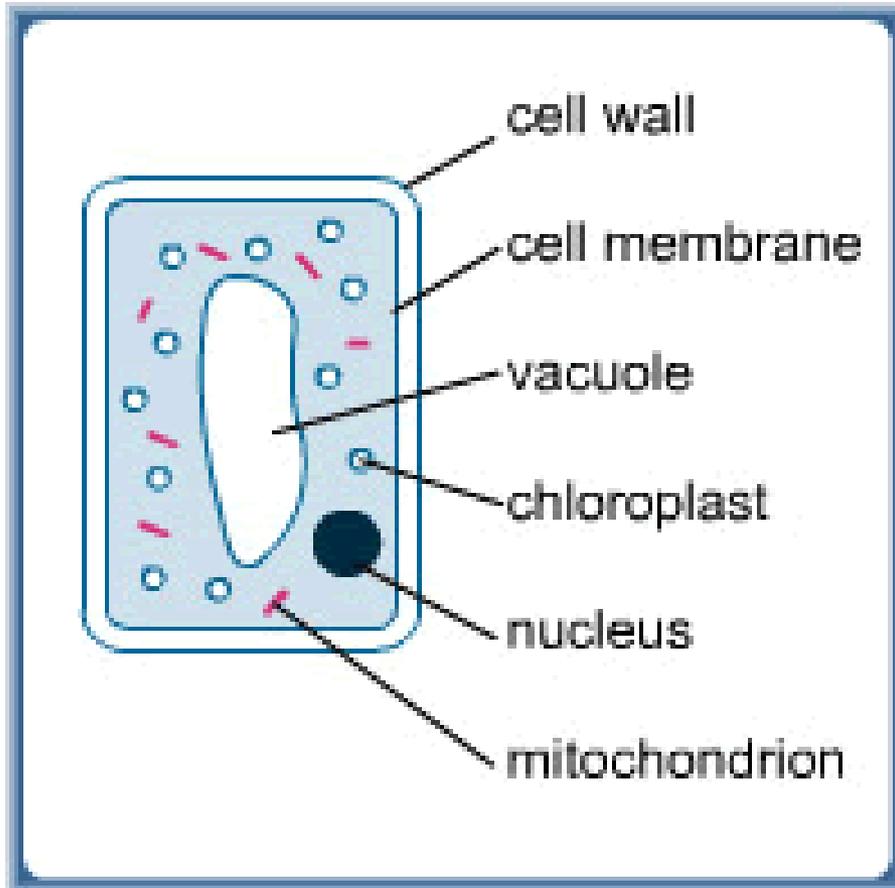
- Oval, bean-like structures
- Produces energy by breaking down food particles
- Found in both plant and animal cells

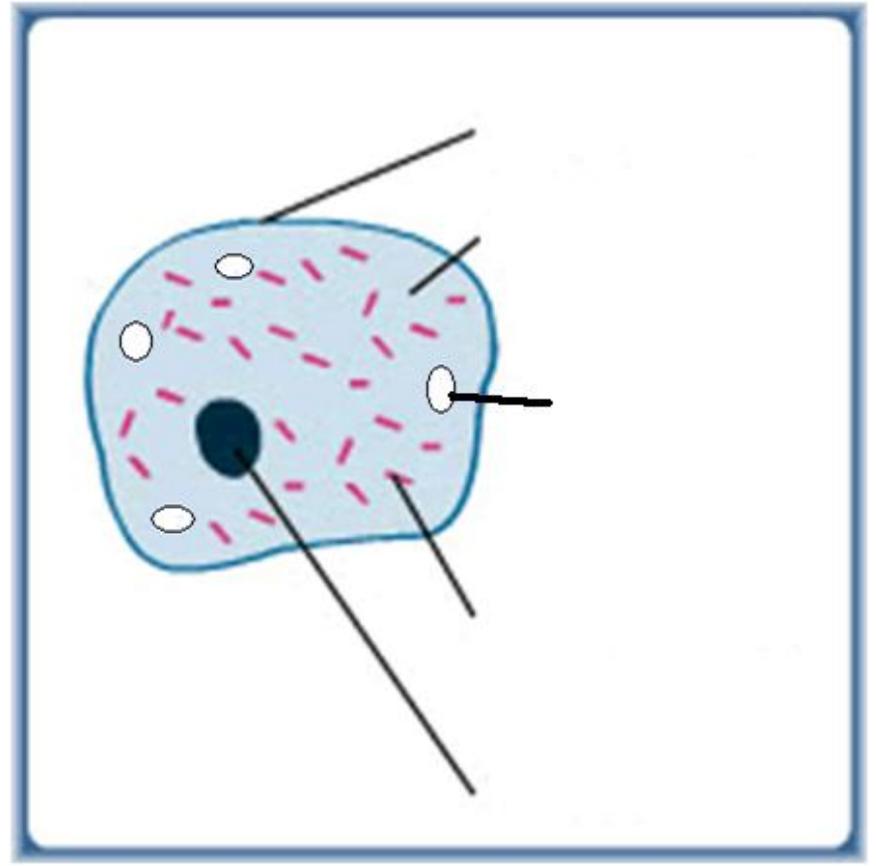
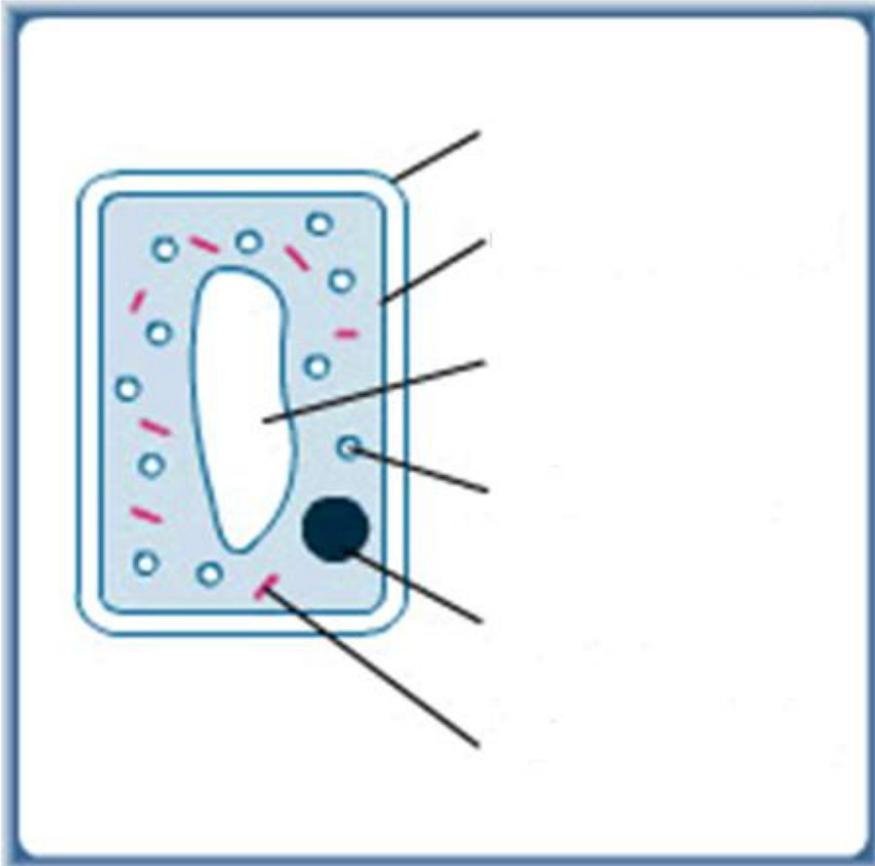
# Chloroplast:

- Green structures that contain chlorophyll
- Capture the sun's energy for photosynthesis
- Found only in plant cells

	PLANT	ANIMAL
Cell membrane		
Cytoplasm		
Cell wall	 Brick shape	Round shape
Nucleus		
Vacuole	 Large & few	 Small & many
Mitochondrion		
Chloroplast		

# Plant vs. Animal Cells





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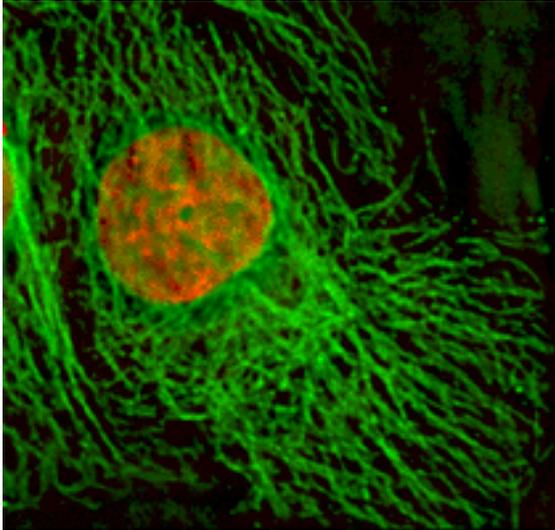
# Dividing Cells

- Necessary for growth and reproduction
- Will replace cells that are dead or in need of repair
- How does this happen?

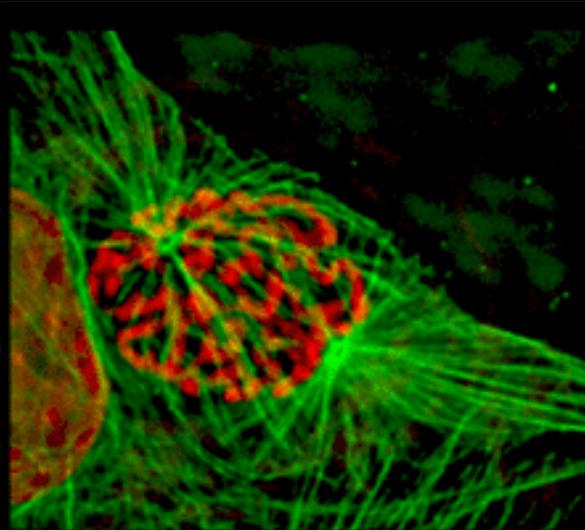
# Mitosis

- Occurs in body cells (**somatic** cells) not in sex cells (egg and sperm cells)
- Bacteria cells reproduce in this manner

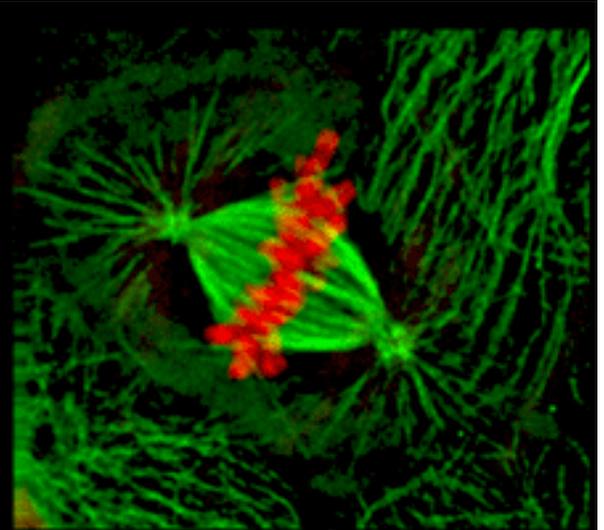




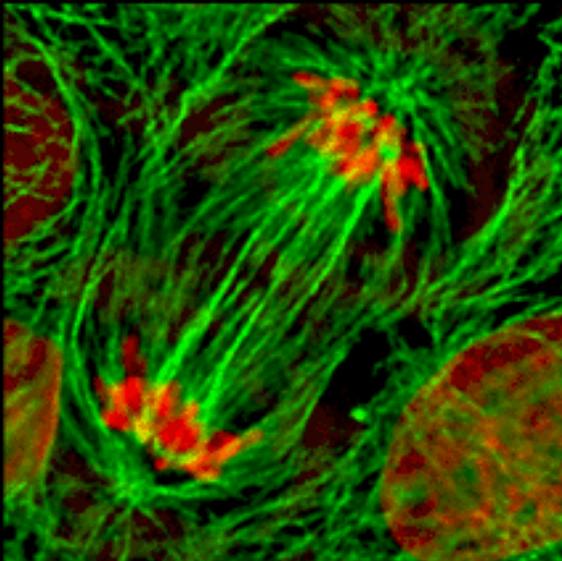
*interphase*



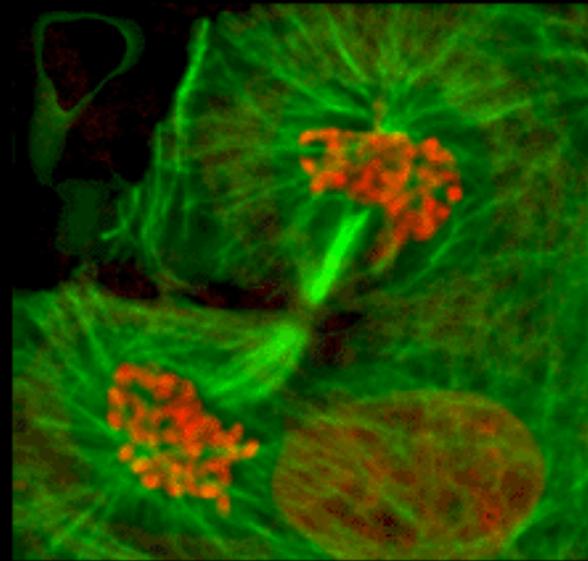
*prophase*



*metaphase*



*anaphase*



*cytokinesis*

# Energy for Cells

- Cells need energy for all life processes.
- Energy is stored in food called **glucose** (a type of sugar)

- To release energy cells must carry out **cellular respiration**. Here the energy is converted to another form of energy.
- Takes place in the **mitochondrion**.

- Most energy is released as heat.
- **Oxygen** is necessary for cellular respiration.
- **Carbon dioxide** and **water vapour** are waste gases produced. These are removed from the cell.