

CELLS

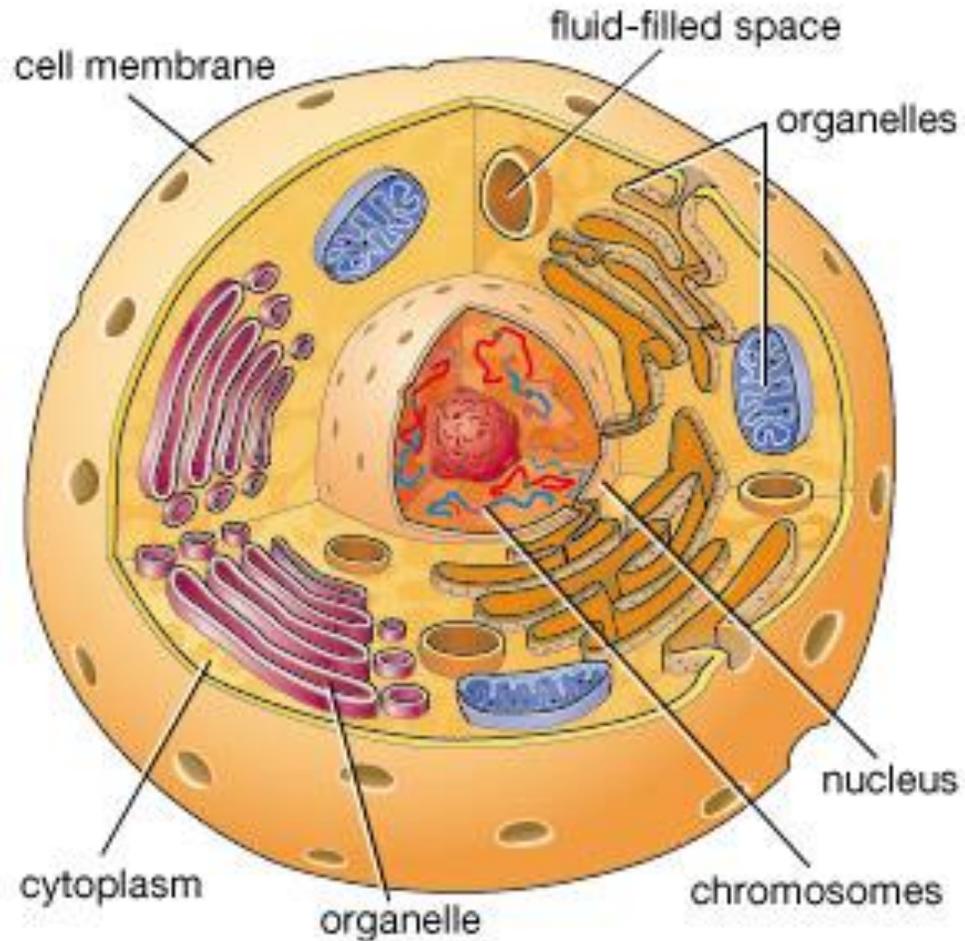
What do you remember about cells?

- **Individually**: Take 5 minutes and write down (or draw!) what you remember about the cell
- Some things to think about:
 - Definition
 - Size
 - Types
 - Growth
 - Parts
 - Functions
 - Importance
 - Defining characteristics

Cells

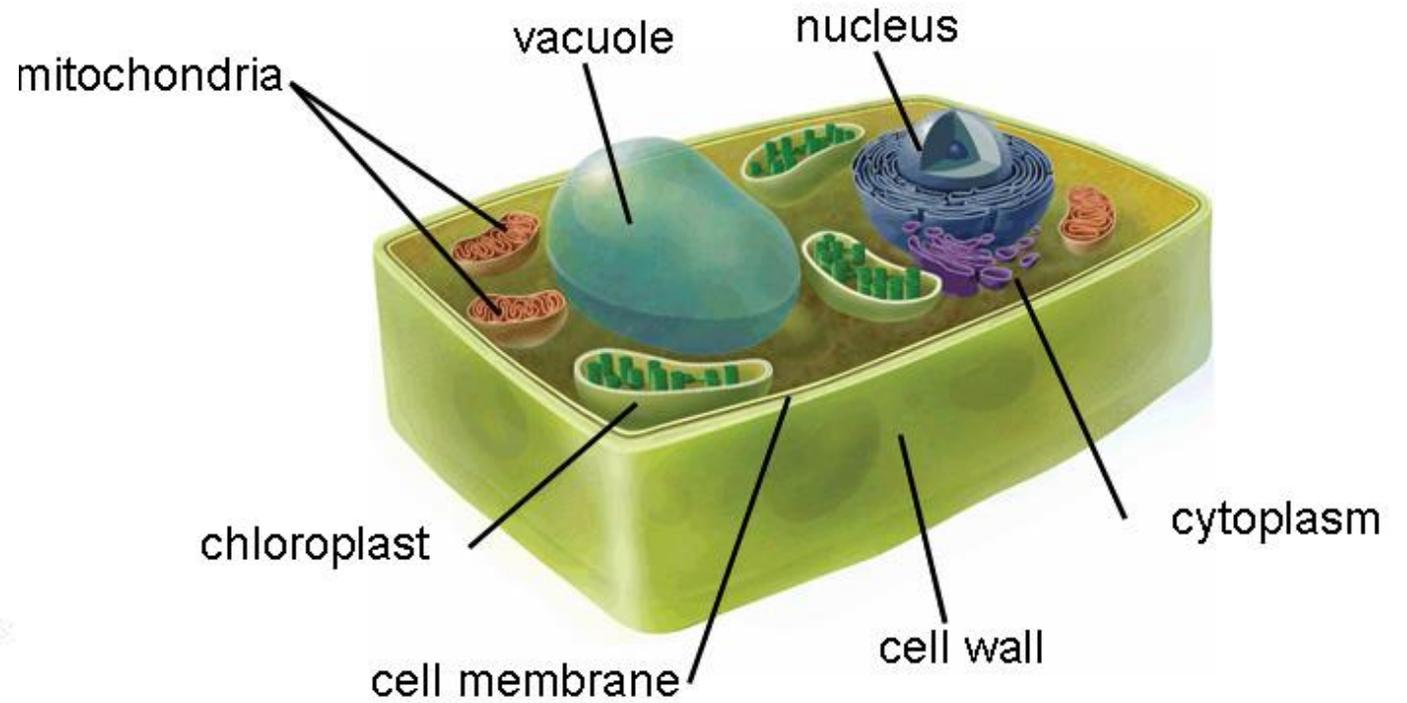
- The cell is the **building block of all living organisms.**
 - It is the **smallest unit of life**
- We are made of about 10,000 billion cells.
- At the beginning **all cells are the same**, but as they **develop** they become **specialized**.
- There are about 200 types of cells that **vary in function**

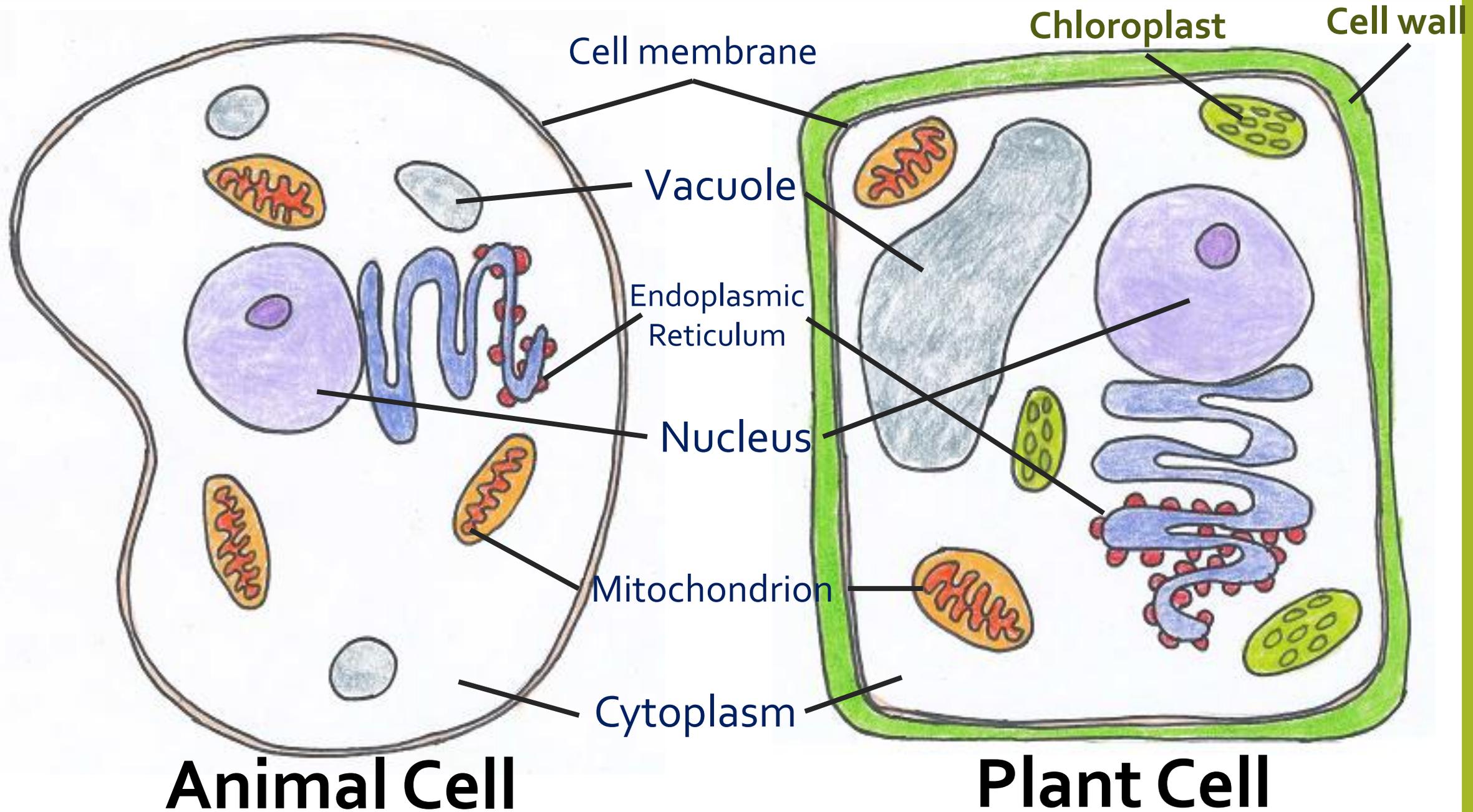
Animal Cell



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Plant Cell





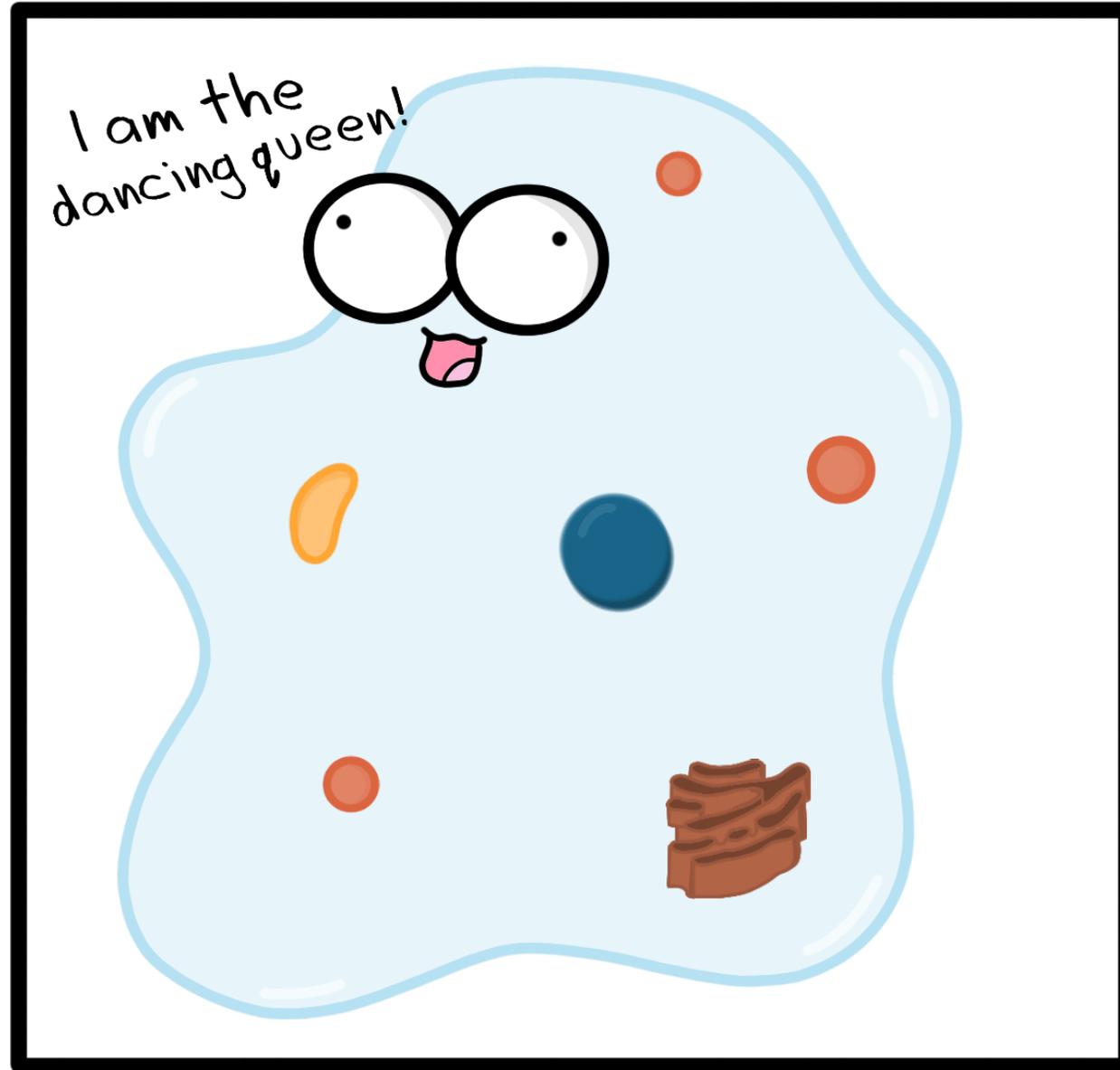
Review of Cells

- Structures inside the cell:
 - **Cell Membrane:**
 - flexible barrier which protects the cell, and controls what can enter and exit the cell.
 - **Cytoplasm:**
 - fluid inside the cell membrane which allows substances to circulate in the cell

Amoeba Sisters

Cytoplasm

#AmoebaGIFs

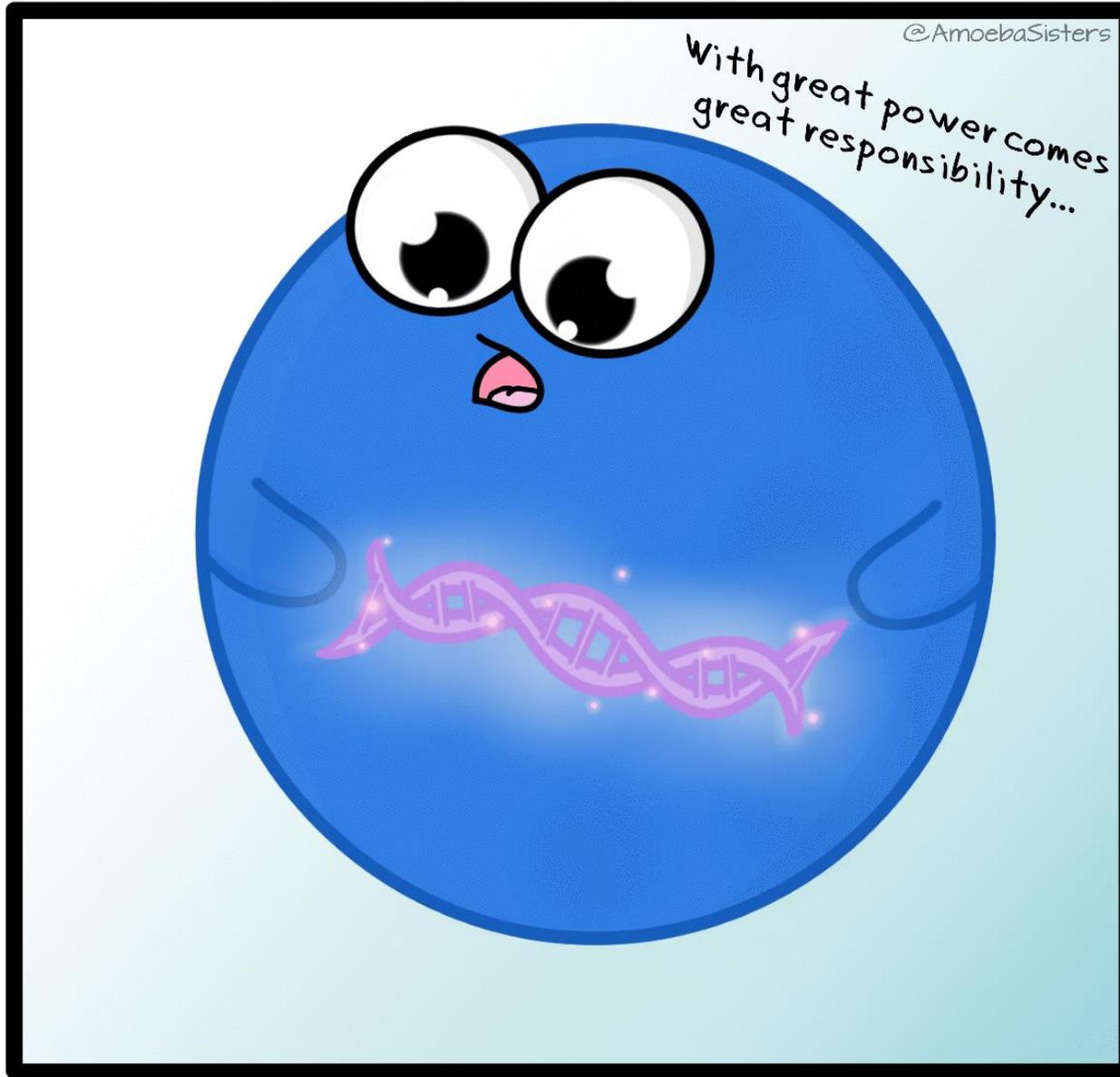


Thick jelly-like substance of the cell

Review of Cells

- Structures inside the cell:
 - **Nucleus:**
 - Controls cells activities (growth and reproduction) and contains DNA

Nucleus



@AmoebaSisters

With great power comes
great responsibility...

Genetic information bearer of the cell

Review of Cells

- Structures inside the cell:
 - **Nucleus:**
 - Controls cells activities (growth and reproduction) and contains DNA
 - **Nuclear Membrane:**
 - protects the nucleus and controls exchanges between nucleus and the rest of the cell

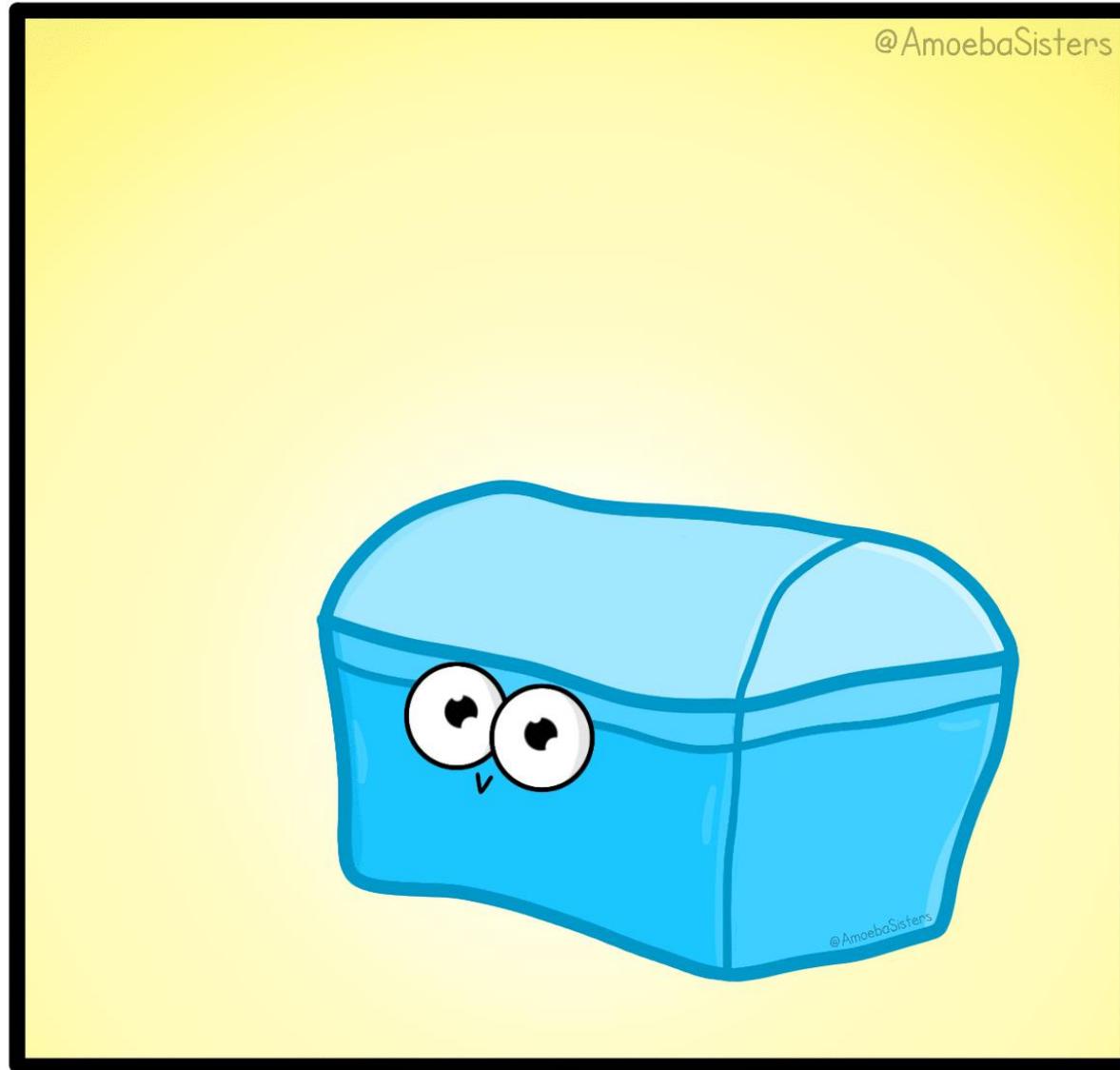
Review of Cells

- Structures inside the cell:

- **Vacuole**

- **Stores nutrients and cell wastes inside the cell**
(and **water** in plants)

Vacuole



Storage containers of the cell

Review of Cells

- Structures inside the cell:

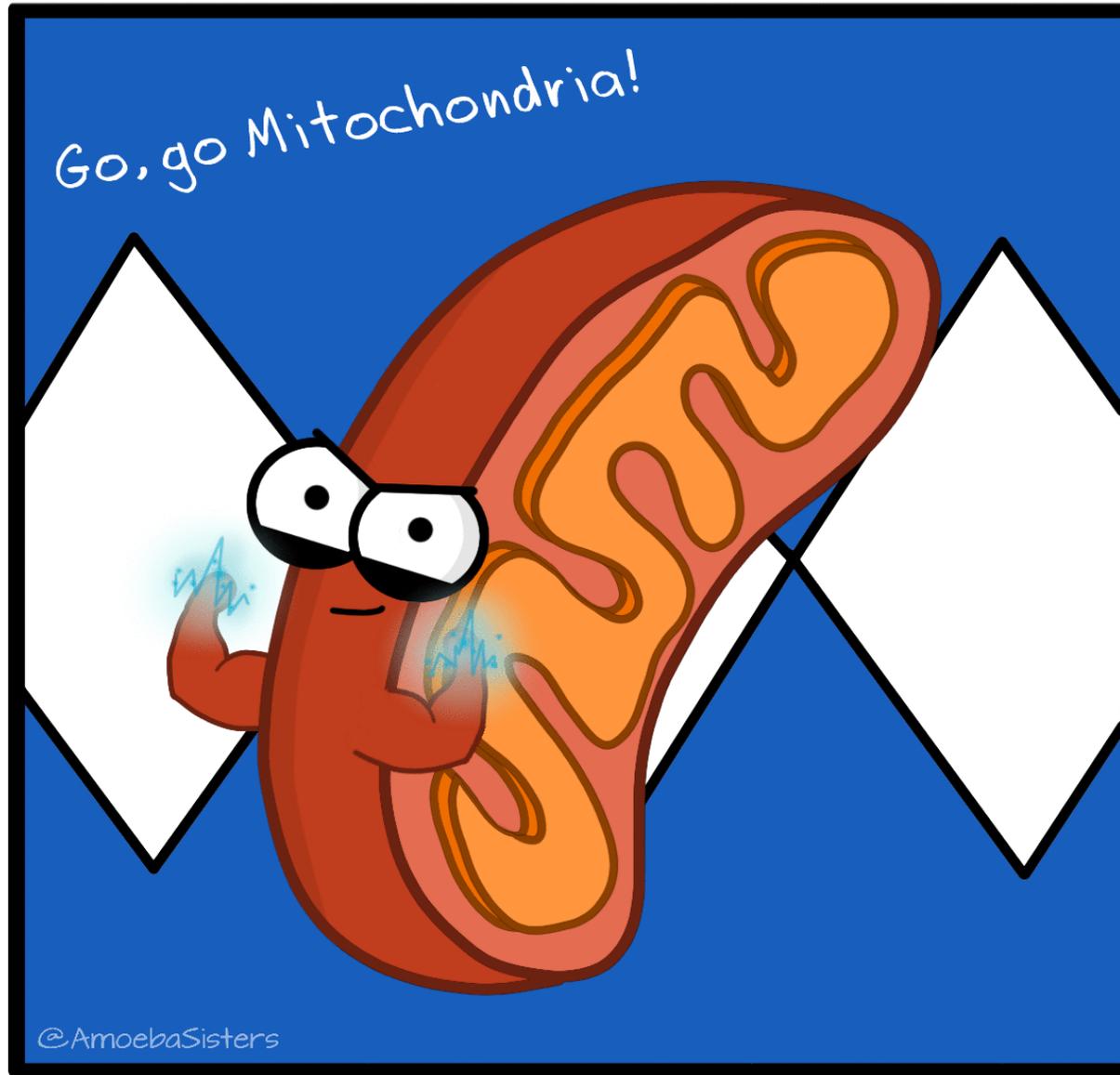
- **Vacuole**

- Stores nutrients and cell wastes inside the cell (and water in plants)

- **Mitochondria**

- Where cellular respiration happens → produce energy

Mitochondrion



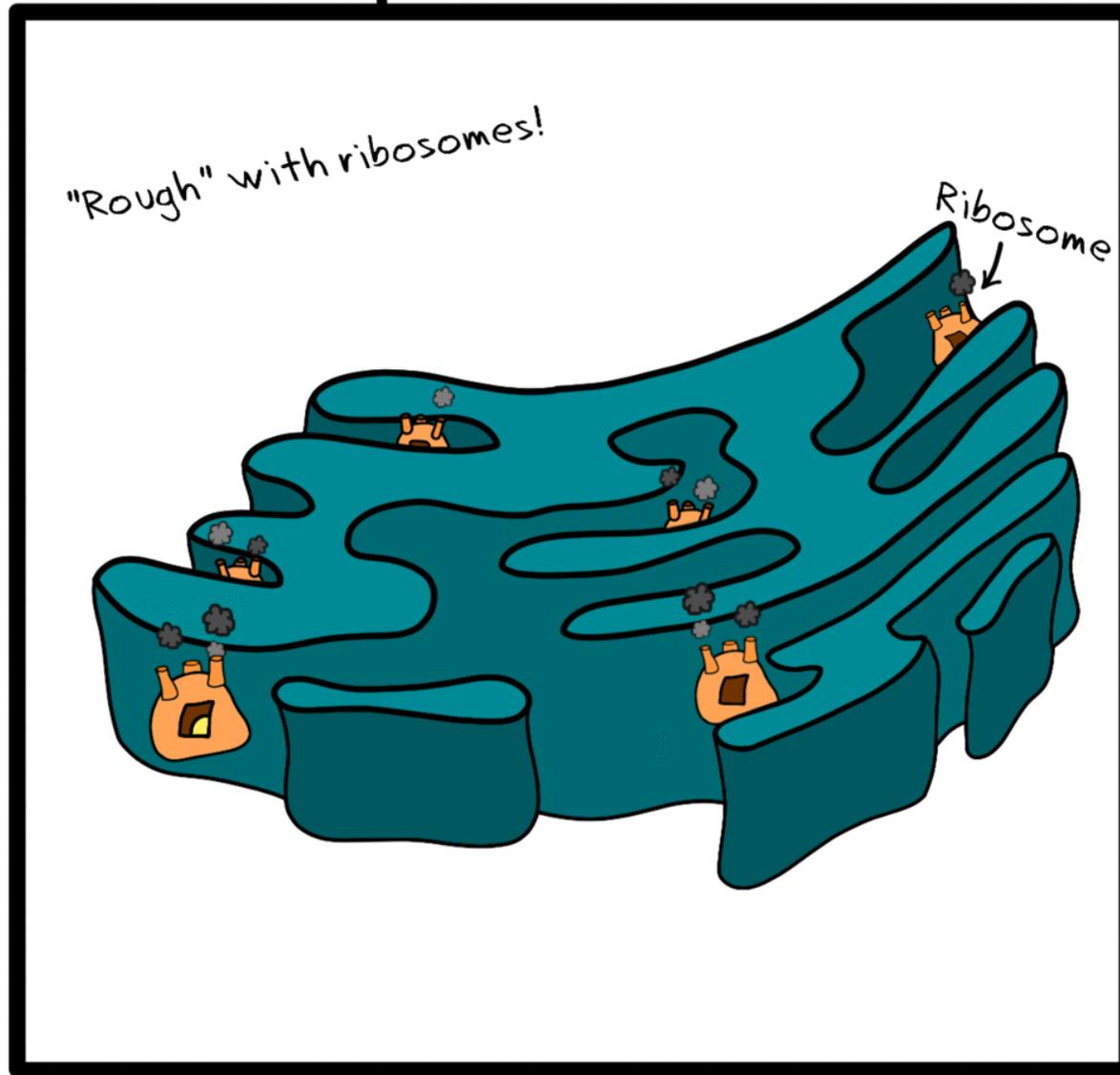
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Mighty energy producer of the cell

Review of Cells

- Structures inside the cell:
- **Endoplasmic Reticulum**
 - Folded network of canals that helps assemble (thanks to ribosomes) and transport proteins

Rough Endoplasmic Reticulum

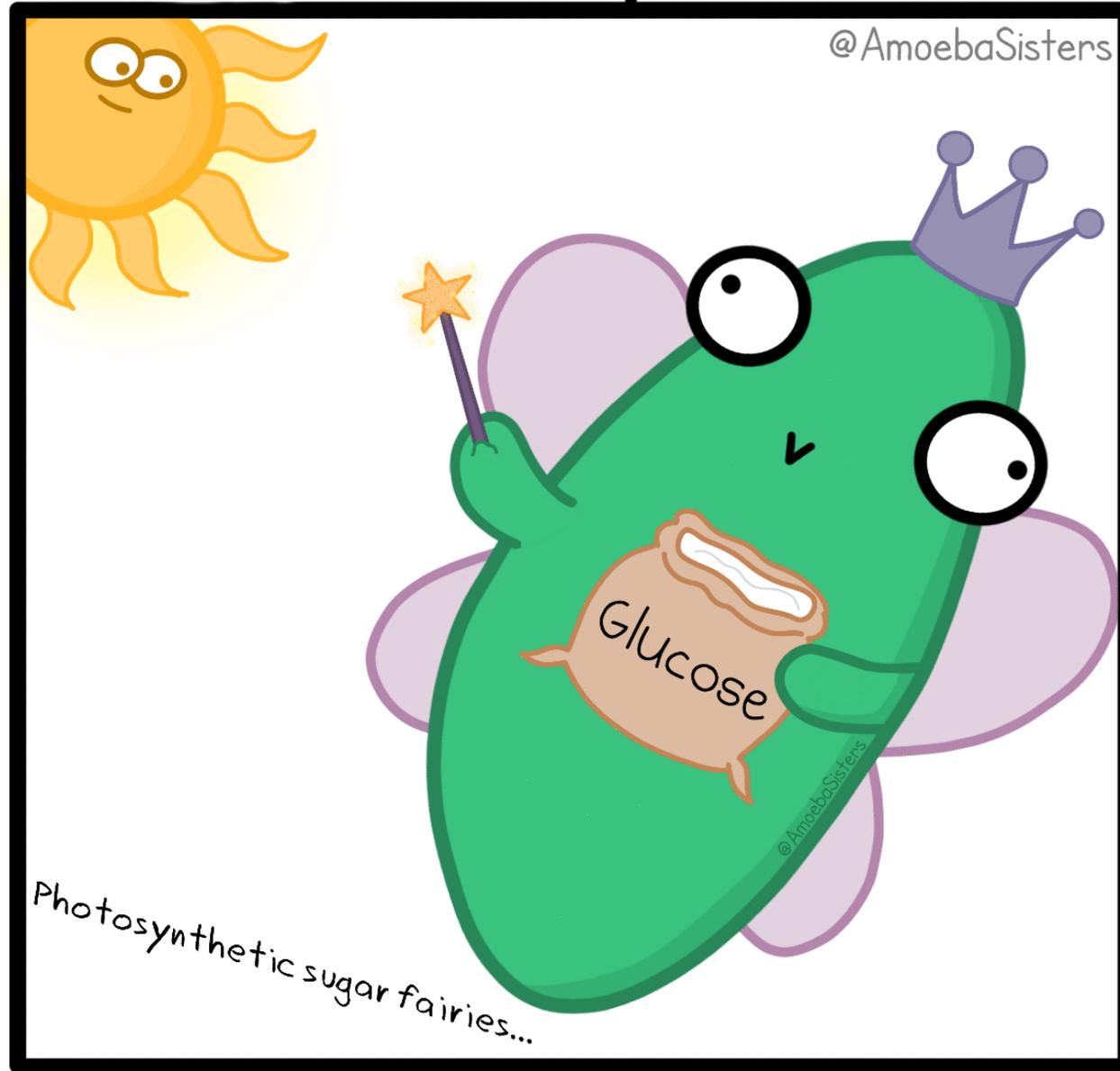


Protein assembly line of the cell

Review of Cells

- Structures inside the cell:
 - **Endoplasmic Reticulum**
 - Folded network of canals that helps assemble (thanks to ribosomes) and transport proteins
 - **Chloroplasts**
 - Where photosynthesis happens (only in plants)

Chloroplast



Photosynthetic sugar fairies...

Glucose synthesizers of the cell

Cellular Reproduction

- Our focus this year is primarily on animal cells
- In particular, we are interested in the different types of cells and how these are produced
 - We're going to start the year by discussing cellular reproduction

Cellular Reproduction

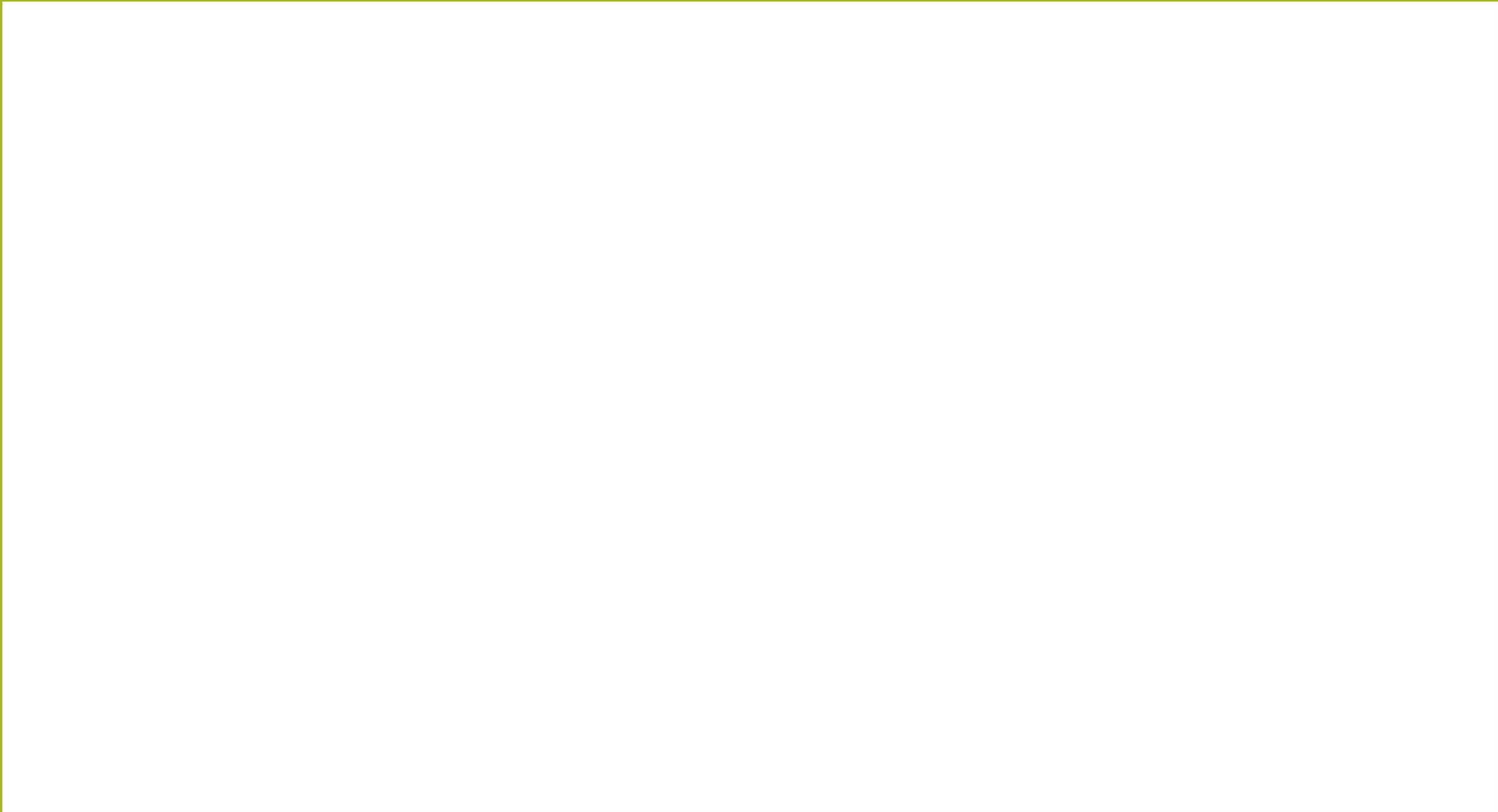
- The structures most essential for cellular reproduction are:
 - Cell membrane
 - Cytoplasm
 - Nucleus
 - Nuclear membrane

BUT FIRST....

What conditions were necessary for life to evolve on Earth?

- **In pairs:** Take 5 minutes and write down what conditions you think would have been required to make it possible for life to develop

How did cells come to exist?



LET'S SEE HOW YOU DID...

Conditions Essential for Life

- The conditions essential for the emergence of life on earth are the conditions that made it possible for the synthesis of the first organic molecules and their development into living cells
- These conditions are:
 - Presence of essential chemical elements
 - Presence of an energy source
 - Presence of liquid water
 - A very long period of time

Conditions Essential for Life

	Essential Chemicals	Energy Source	Liquid Water	Time
Description	Carbon, Oxygen, Hydrogen & Nitrogen	The synthesis of complex molecules requires a high amount of energy	Water provides the essential elements hydrogen and oxygen as well as provides a medium (location) for reactions to take place	Based on fossil evidence, the first living cells appeared between 3.8 and 3.5 billion years ago
Source(s)	Early Earth's atmosphere	-UV rays from the sun, -Electrical discharges by lightning, -Heat released from volcanoes	???? Yet unknown?????	
Other	The presence of the required elements in the atmosphere would allow for the first complex organic molecules		Very strong evolutionary evidence to support the emergence of the first living organisms occurring in water	Probability of the right combinations of factors to produce life: 1 in 1 000 000 000