

PROKARYOTIC AND EUKARYOTIC CELLS

Come in all shapes and sizes

Prokaryotes

- **no nucleus or membrane-bound organelles**
- **have cell membrane**
- **have DNA (not in nucleus)**

Ex. bacteria

Eukaryotes

- **have nucleus with DNA inside nuclear envelope**
- **larger and more complex**
- **contain membrane bound organelles (structures within the cell)**
- **are highly specialized**

Ex. animals, plants, fungi, protists

Both

- **are surrounded by cell membrane**
- **contain DNA**

Eukaryotic Cell

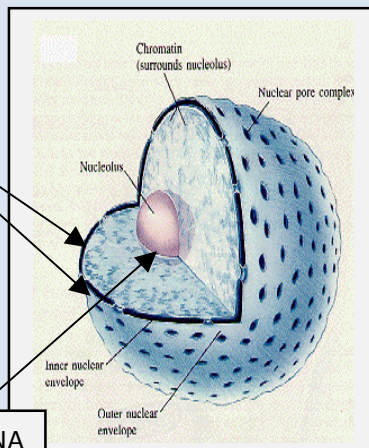
Nucleus

Function: controls all activities

In middle of cell, largest, most important, contains DNA

Nuclear envelope

- ✓ composed of **2 membranes**
- ✓ surrounds nucleus
- ✓ dotted with **nuclear pores** which allow materials in and out of the nucleus



Nucleolus

- ✓ Makes **ribosomes** for RNA

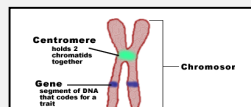
Chromatin

- ✓ granular material
- ✓ DNA bound to protein
- ✓ **condenses** (coils up) when a cell divides to form **chromosomes**
- ✓ looks like spaghetti



Chromosomes

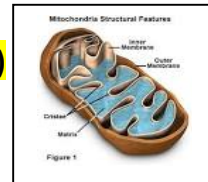
- ✓ contain **DNA** which is passed on to next generation
- ✓ humans have **46** chromosomes (23 Pair) in each cell
- ✓ **genes** are a part of chromosomes



Mitochondria

Function: make energy or ATP (powerhouse of the cell)

- ✓ kidney bean shaped with a **double membrane**
- ✓ site of **cellular respiration**
glucose + oxygen = ATP (energy)
 - **ATP** is molecule most cells use as their **energy source**
 - **ATP drives** most chemical reactions
- Ex. muscle cells contain many mitochondria, liver cells may contain 2,500 to carry out biochemical activities
- ✓ **enclosed by 2 membranes (outer + inner)**
 - **outer membrane** is boundary between mitochondrion and the cytosol
 - **inner membrane** has long folds called **crisatæ** which enlarges surface area of membrane to provide more space for reactions
- ✓ **have their own DNA**
- ✓ **new mitochondria arise when existing ones grow and divide**



Endosymbiotic Theory

Mitochondria developed from **prokaryotic cells** that lived **inside** eukaryotic cells. The prokaryotes may have gained protection by living inside the eukaryotes which converted energy for them. This explains the 2 membranes around **mitochondria** and **chloroplasts**.