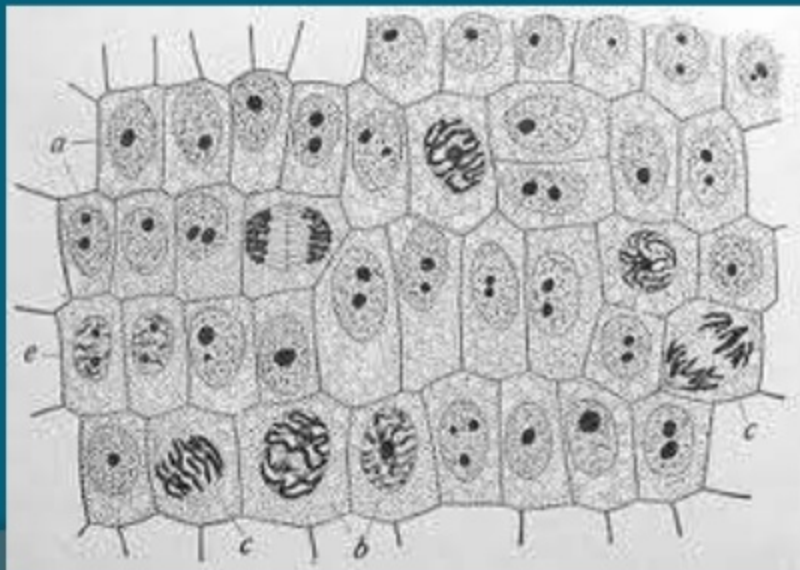


CELLS AND TISSUES

# CHAPTER 3

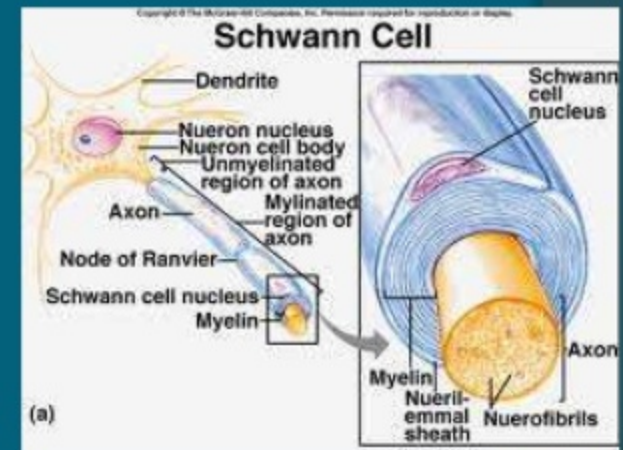
# Cells – Cell Theory

- In 1665, an English scientist named Robert Hooke looked at empty cork cells and identified the first cells
- he used the word cell to describe the empty spaces in the cork



# Cells – Cell Theory

- Robert Brown was the first person to discover the nucleus: the cell part that controls most of the cell's activities
- Two German biologists Mathias Schleiden and Theodor Schwann formed the theory that all plants and animals are made up of cells



# Cells – Cell Theory

- ⦿ All these ideas combined into the modern Cell Theory:
- ⦿ 1. All living things are made of one or more cells
- ⦿ 2. Cells are the basic units of structure and function
- ⦿ 3. All cells come from existing cells



# Cells – The basics

- All cells are primarily made of four elements: Carbon, Oxygen, Hydrogen, Nitrogen
- Living cells are about 60% water

# Cells – Interstitial Fluid

- In addition to large amounts of water, the body cells are constantly covered in a dilute saltwater solution called interstitial fluid
- This fluid is derived from blood

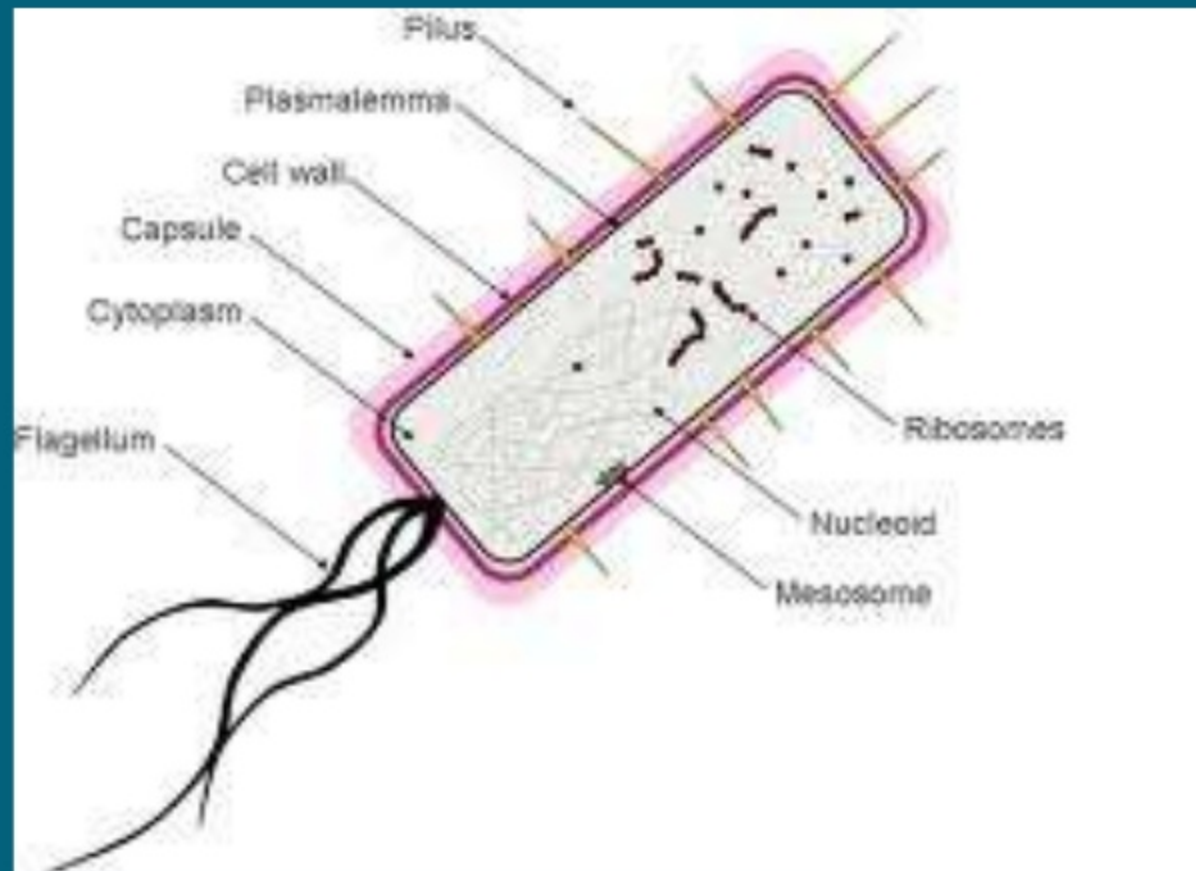
# Two main types of cells

- “pro” means before
- More primitive
- Lack a nucleus
- DNA is free floating
- “eu” means true
- More complex
- Have a nucleus that contain DNA
- Have organelles (“tiny organs”)

**Prokaryotic Cells**

**Eukaryotic Cells**

# What type of cell is this?





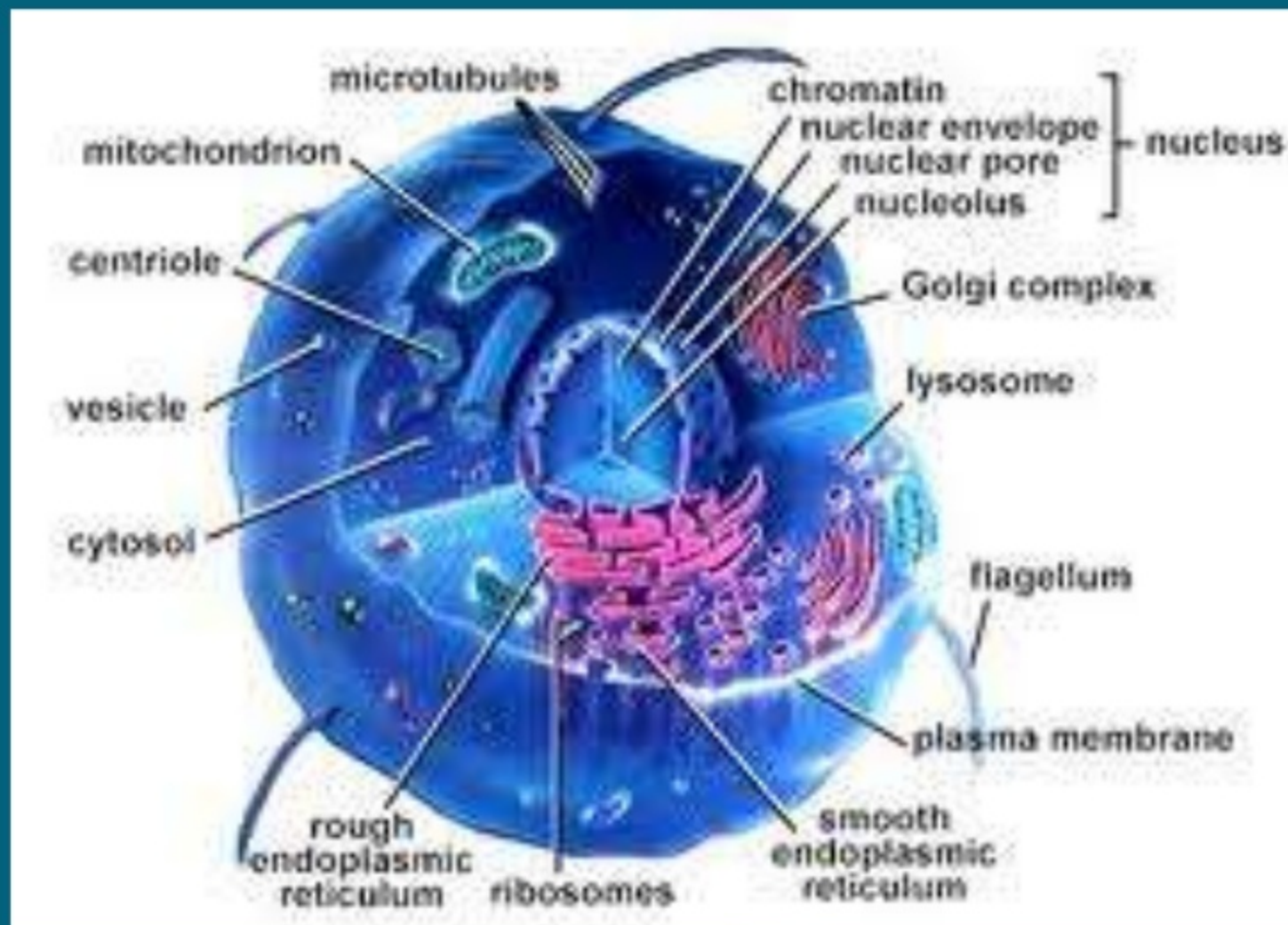
# What about this one?



# Cells – The generalized cell

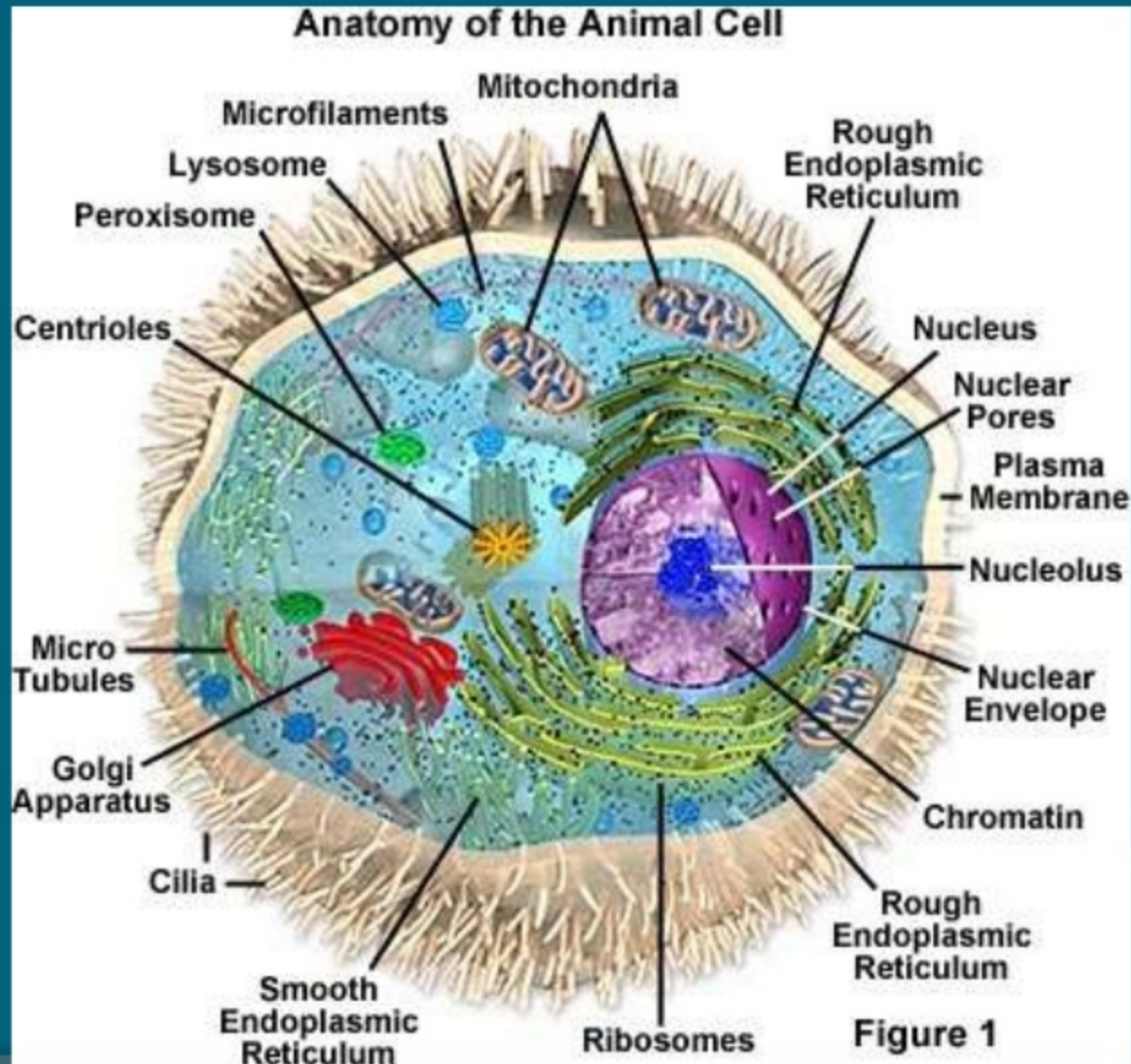
- No one cell type is exactly like another
- Most *do* have the same parts
- Let's talk about a generalized cell: a basic cell used to demonstrate most cell features

# Cells – The generalized cell





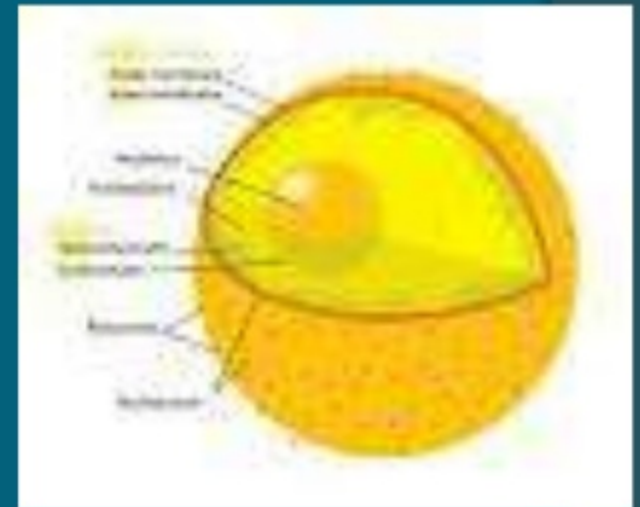
# Cells – The generalized cell





# The cell – The nucleus

- Nucleus: controls all of the cell's activities
- Contains DNA
- The “boss” of the cell
- Determines how and when proteins are made
- Controls cell reproduction
- The nucleus usually conforms to the shape of the cell

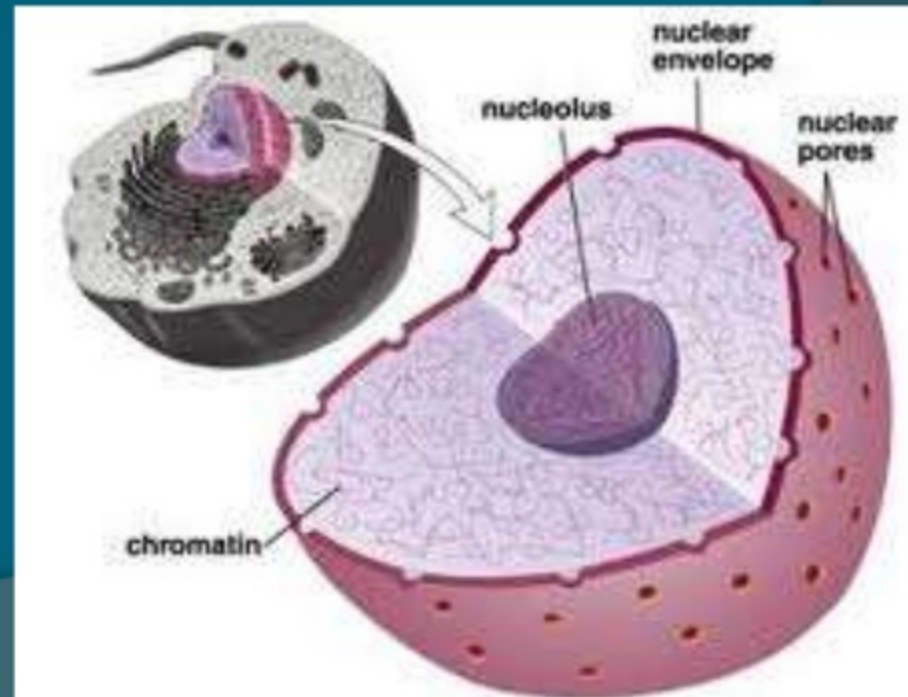


# The cell – the nucleus

- Is enclosed by a nuclear membrane (or nuclear envelope)
- Nuclear membrane: structure that surrounds the nucleus and separates it from the rest of the cell
- Nuclear pores: openings in the nuclear membrane that allows molecules to pass
- Nucleoplasm: the jelly-like fluid between the two layers of the nuclear membrane

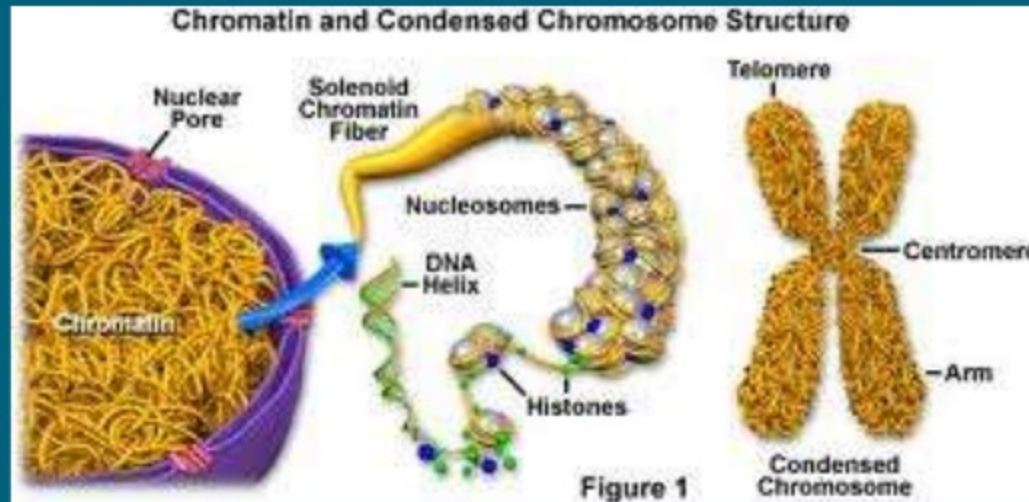
# The cell – the nucleus

- Nucleolus: the center of the nucleus
- Some cells contain multiple nucleoli
- Contains the DNA
- Helps makes ribosomes
- Contains chromatin





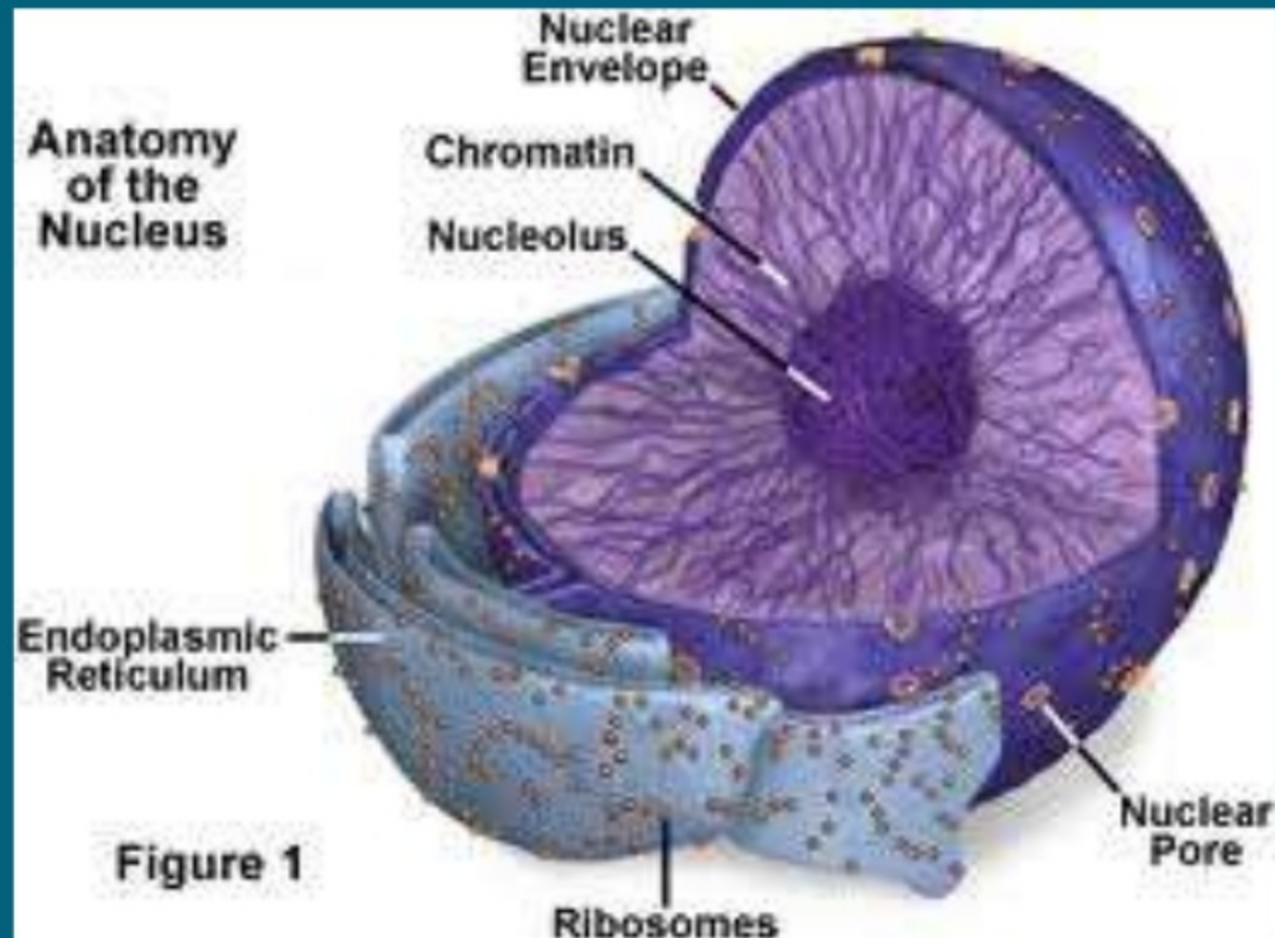
# The cell – the nucleus



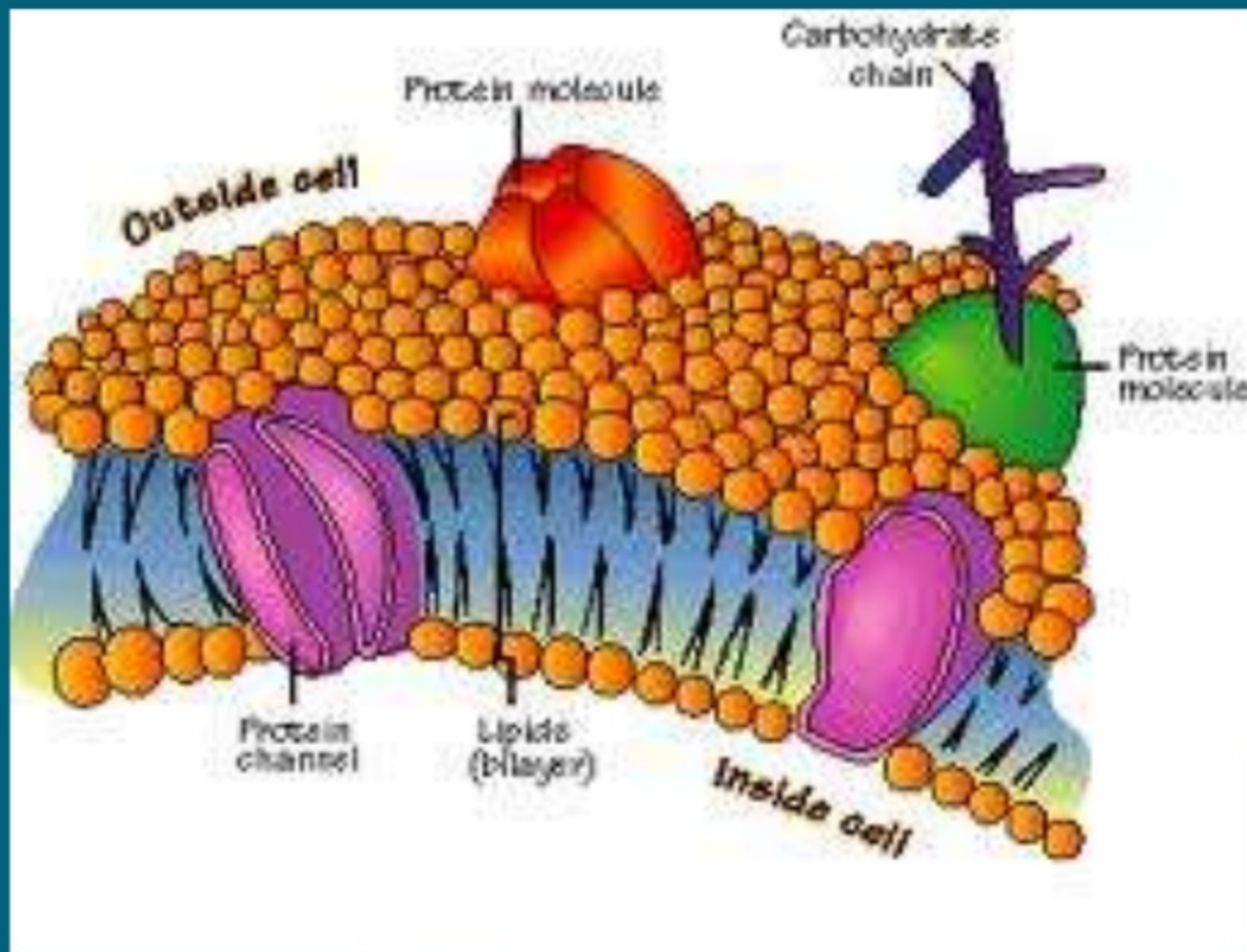
- Chromatin: a loose network of DNA combined with protein scattered throughout the nucleus
- When a cell is dividing, the Chromatin condenses and coils to form chromosomes
- Chromosomes: threadlike structures with information that determines traits a living thing will have



# The cell – the nucleus

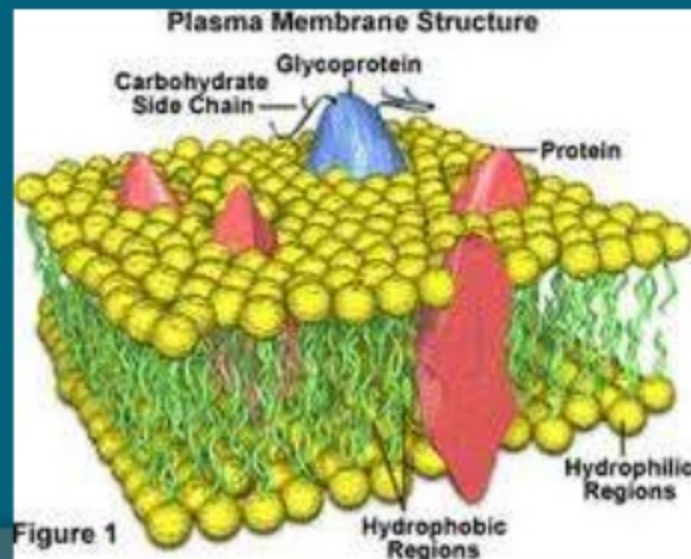


# The cell – the plasma membrane



# The cell – the plasma membrane

- Plasma membrane: a fragile, transparent barrier that contains the cell contents and separates them from the surrounding environment
- It is semi-permeable or selectively permeable which means it allows some things to pass while blocking others





# The cell – the plasma membrane

- The plasma membrane is a phospholipid bilayer
- This means it has two layers of fats that line up tail to tail

