-Biology is a science which attempts to describe and understand the unity and the diversity of the life on earth (the study of living organisms and their interactions with one another and their environments).

-Human biology : is the study of the anatomy and all the human activities such as growth , nutrition , reproduction , digestion , excretion and secretion.

-Biology is divided into two sub sciences , these are :-

Zoology : deals with the study of animals .

Botany :deals with the study of plants.

-Both Zoology and botany are branched into :-

Morphology : علم الشكل **the study of form and its development includes :-**

Cytology : علم الخلية **the study of cell structure.**

Histology : علم الانسجة **the study of tissue structure.**

Anatomy : علم التشريح **the study of cross structure.**

Embryology : علم الاجنة **the study of formation and development of embryos.**

Physiology : علم الوظائف **the study of lifes functions , how cells, organs or entire organisms function.**

Ecology : علم البيئة **the study of interactions of organisms with one another and with their physical environment.**

Geneties : علم الوراثة **the study of variation and heredity (**الوراثة**)**

Homoeostasis : is maintaining relatively stable the internal condition in organism.

All living things on earth (e.g . human being, plants, bacteria, insects, animals) are characterized by cellular organization , growth , homoestasis , reproduction and heredity, these characterized define the life.

cell: the smallest fundamental unit of structure and function in living things

organelle: a membrane-bound compartment or sac within a cell

tissue: a group of similar cells carrying out the same function

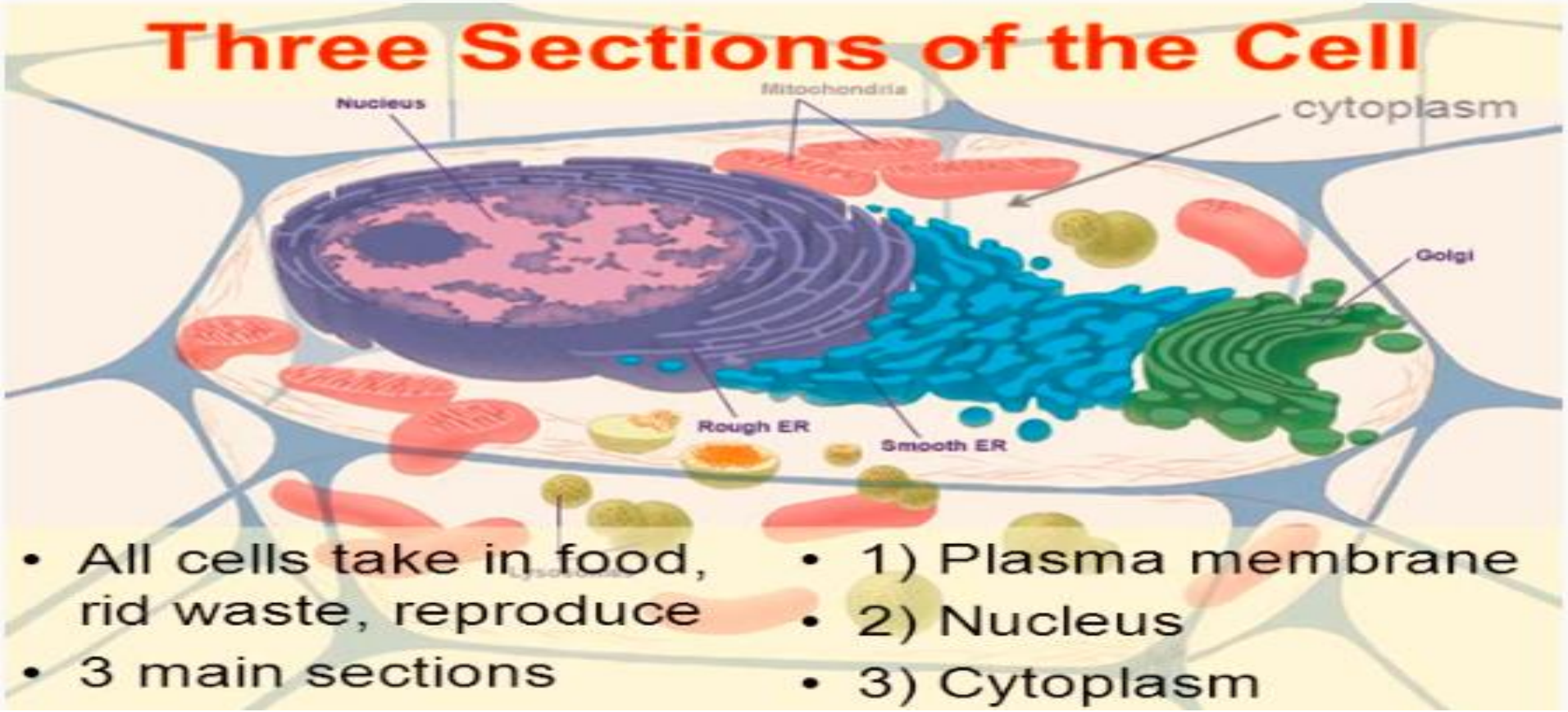
eukaryote: an organism with cells that have nuclei and membrane-bound organelles

prokaryote: a unicellular organism that lacks a nucleus or any other membrane-bound organelle

organ: a structure formed of tissues operating together to perform a common function

organ system: the higher level of organization that consists of functionally related organs

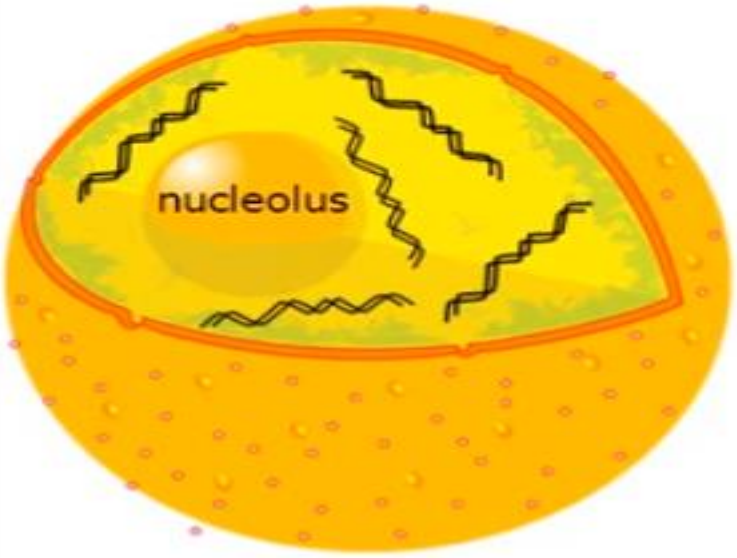
Three Sections of the Cell



- All cells take in food, rid waste, reproduce
- 3 main sections

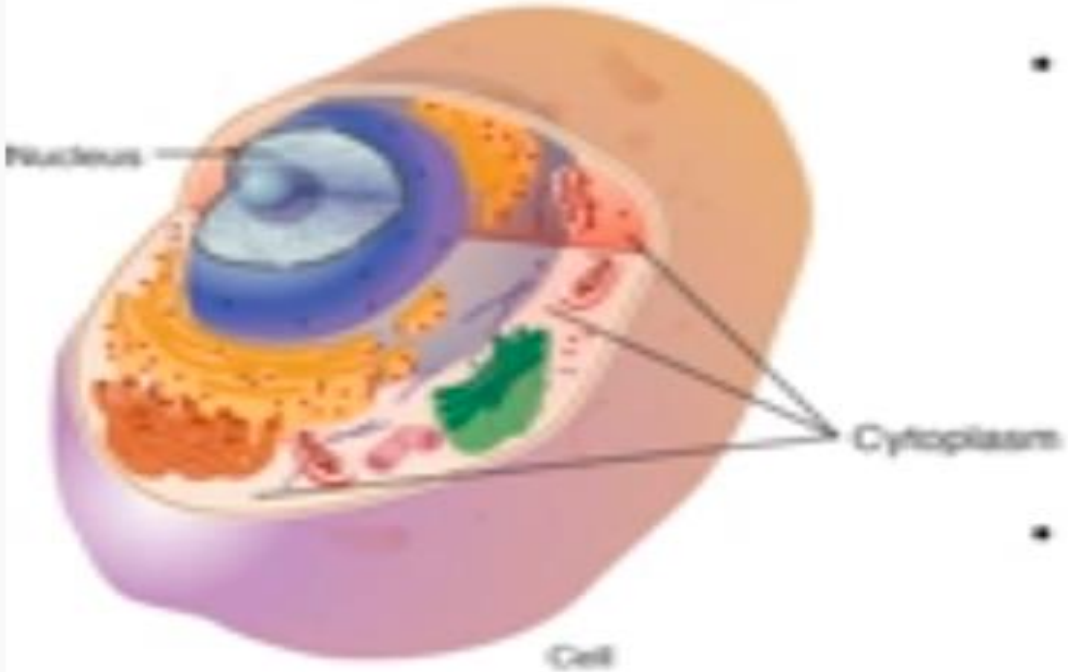
- 1) Plasma membrane
- 2) Nucleus
- 3) Cytoplasm

Nucleus



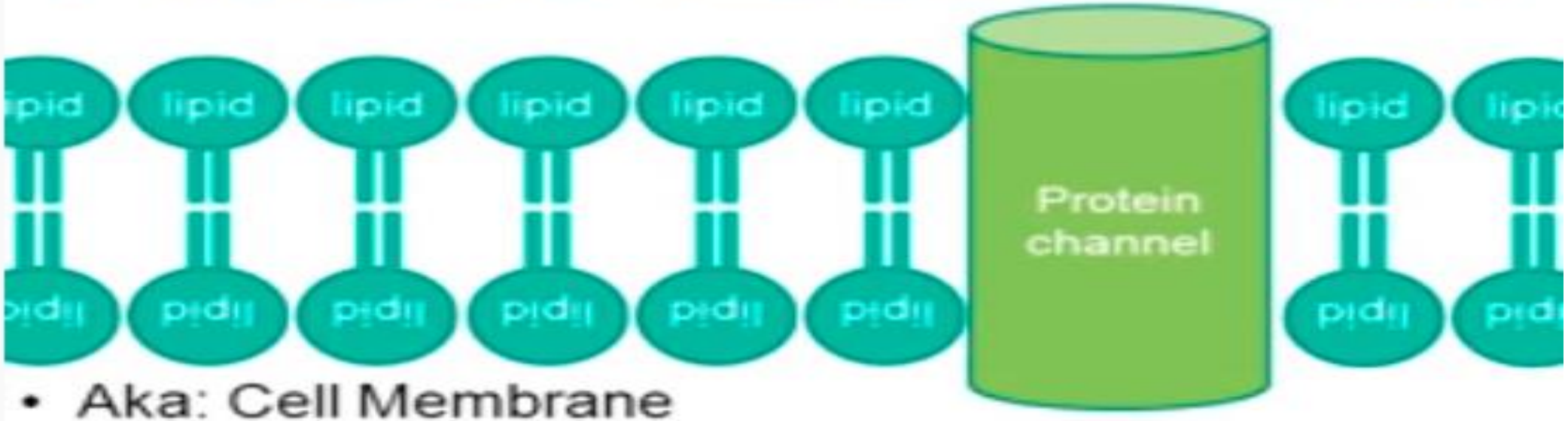
- **Job**: Controls cell activity
- Inside:
  1) Chromatin
     - long strands of DNA
     - holds info to make proteins
  2) Nucleolus: makes ribosomes

Cytoplasm



- Jelly-like material inside of the cell
- Most organelles float within
  - Nucleus
  - Ribosomes
  - Vacuoles
  - Mitochondria
  - Chloroplasts
  - ER
  - Golgi Body
  - Lysosomes
- **Job**: Help dissolve solutes & move materials around

Plasma Membrane

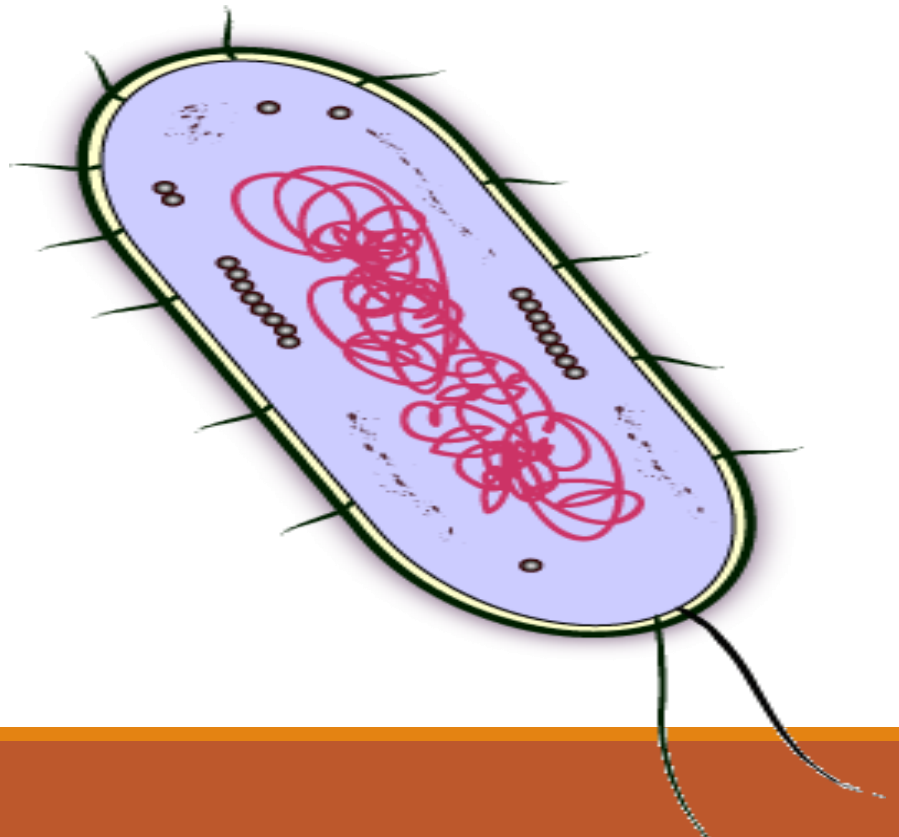


- Aka: Cell Membrane
- **Composition**: Bilayer of lipids & proteins
- **Job**: Allow materials to enter/exit
- **Semi-Permeable**: only specific materials may enter and exit through pores & protein channels

Prokaryotic Cells

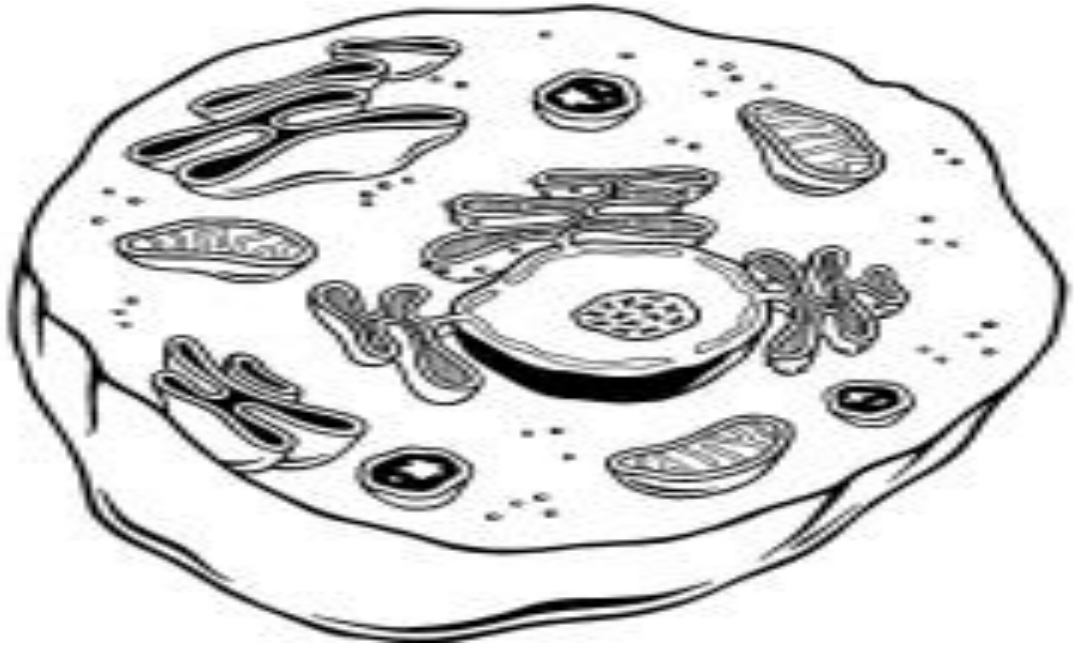
Cell do not have a nucleus.

Bacteria



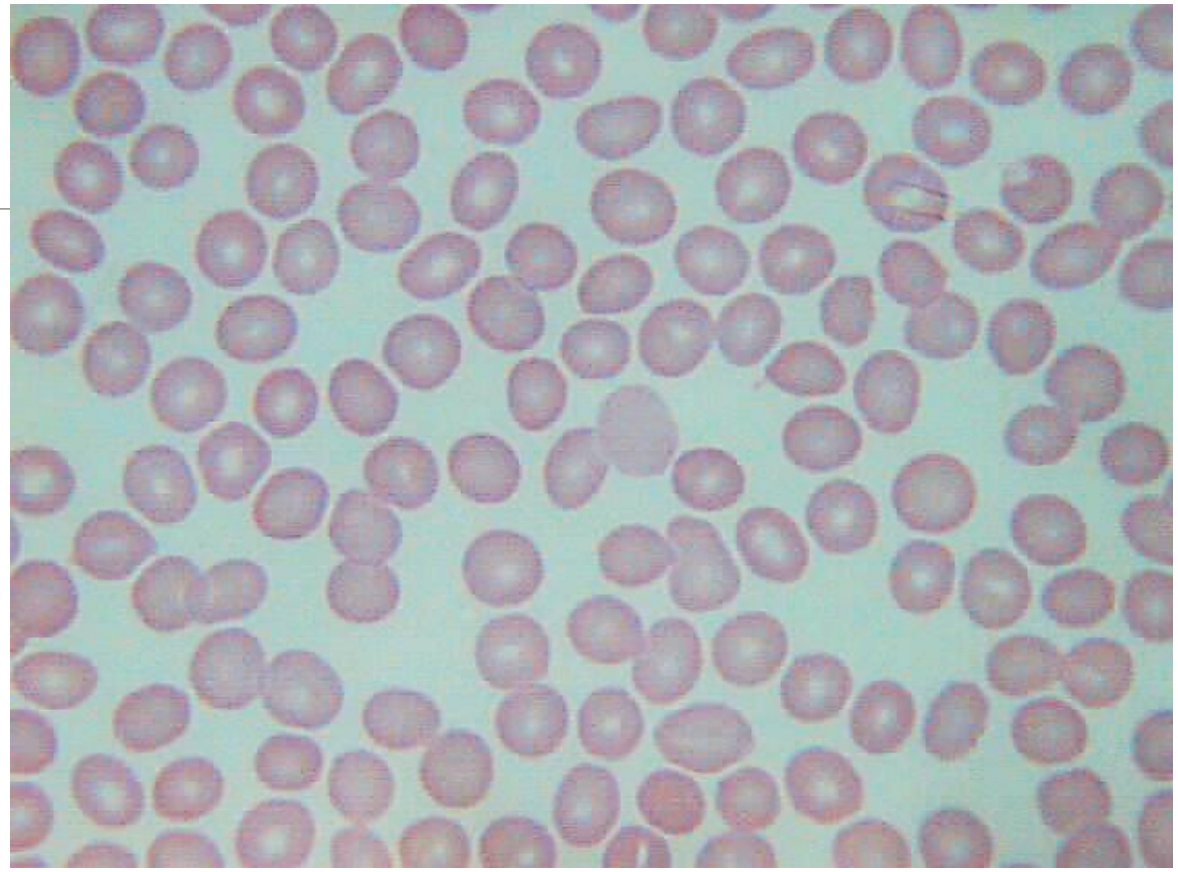
Eukaryotic Cells

- Cell having a nucleus.
- Human cell



Chick cells

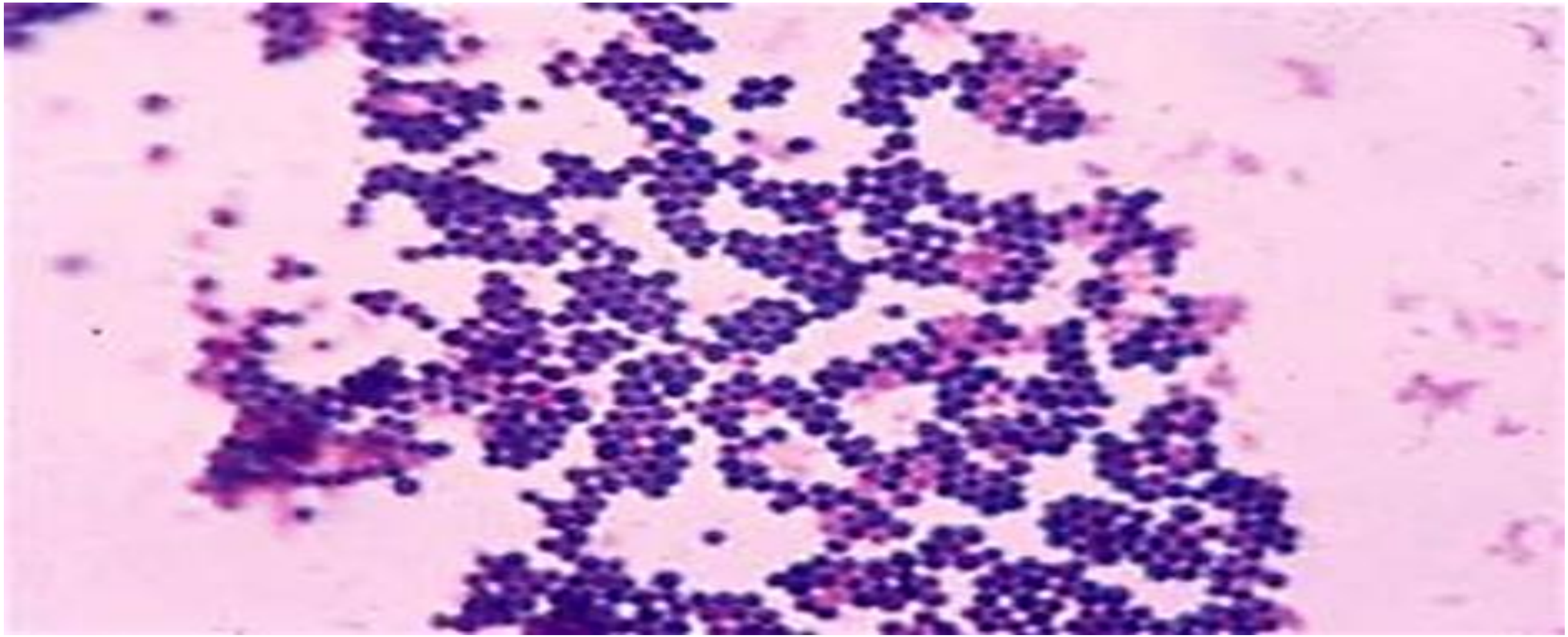
Red Blood Cells



Can you identify the parts of the cell?
- cell membrane, nucleus, cytoplasm

Prokaryotic Cells	Eukaryotic Cells
They are very minute in size.	They are comparatively larger in size.
Nuclear region (nucleoid) is not enveloped by a nuclear membrane.	Nucleus is surrounded by a double membrane layer.
Single chromosome present.	More than one chromosome present.
Nucleolus is absent.	Nucleolus is present.
Membrane bound organelles are absent.	Membrane bound organelles are present.
Cell division of cell is by fission or budding.	Cell division by mitosis or meiosis.
Cell wall present, which are chemically complex.	Cell wall seen only in plant cells, which are chemically simpler.
Cell type is usually unicellular.	Usually multicellular cells.
Cell size is 1-10µm	Cell size 10 - 100µm.
Example: Bacteria, archaea	Example: animal cells and plant cells.

Staphylococcus (Bacteria)



Microscopic appearance: Cocci in grape-like clusters

Streptococcus (Bacteria)

Microscopic appearance: Cocci in clusters, short chains, diplococci and single cocci

Compound microscope

A compound microscope is a microscope which uses a lens close to the object being viewed to collect light (called the objective lens) which focuses a real image of the object inside the microscope. That image is then magnified by a second lens or group of lenses (called the eyepiece) that gives the viewer and enlarged inverted virtual image of the object. The use of a compound objective/eyepiece combination allows for much higher magnification, reduced chromatic aberration and exchangeable objective lenses to adjust the magnification. A compound microscope also makes more advanced illumination setups, such as phase contrast possible.

Parts of the compound microscope :

1-Base or foot
2-Arm
3-Stage
4-Body tube
5-Rotting (or revolving)nose-piece
6-Objectives
7-Eye (or ocular)piece
8-Coarse adjustment
9-fine adjustment
10-Sub-stage condenser
11-Projection lens
12-Specimen holder movement

Components of microscope

Eyepiece (ocular lens) (1)

Objective turret, revolver, or revolving nose piece (to hold multiple objective lenses) (2)

Objective lenses (3)

Coarse adjustment (4)

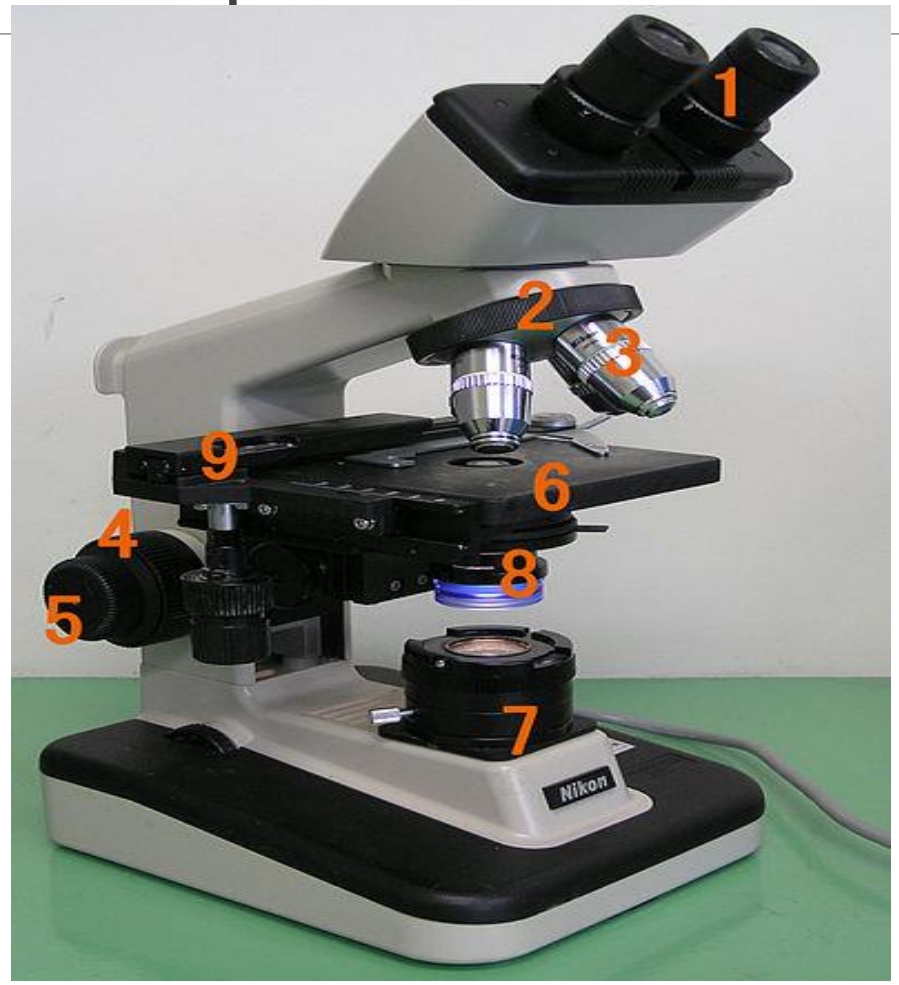
Fine adjustment (5)

Stage (to hold the specimen) (6)

Light source (a light or a mirror) (7)

Diaphragm and condenser (8)

Mechanical stage (9)



Components of a typical Eukaryotic cell (plant, animal and human)

1. Nucleolus
2. Nucleus
3. Ribosome (little dots)
4. Vesicle
5. Rough Endoplasmic Reticulum
6. Golgi Apparatus (or "Golgi body")
7. Cytoskeleton
8. Smooth Endoplasmic Reticulum
9. Mitochondrion
10. Vacuole
11. Lysosome
12. Centrosome
13. Cell membrane

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