

CHAPTER (1)

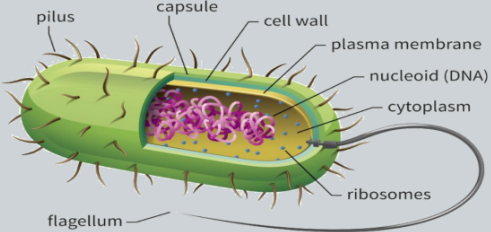
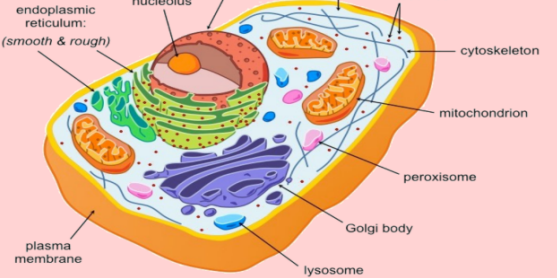
INTRODUCTION TO MICROORGANISMS

• Microorganisms are **generally unicellular** → the whole organism is **one cell** → in such cases, a single **microbial cell performs all the functions** required to maintain itself and propagate.

• **Microorganisms may be classified in the following large biological groups:**

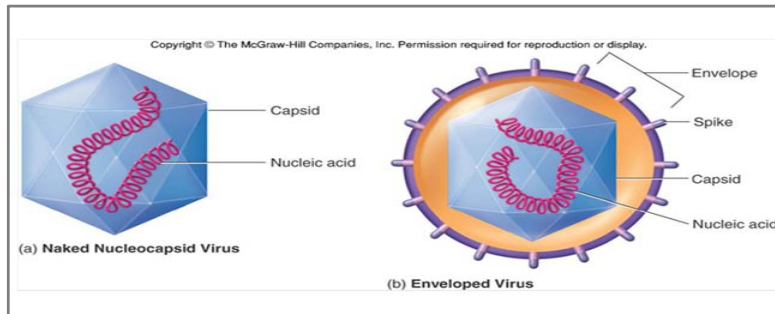
- ① Algae
- ② Protozoa
- ③ Slime moulds
- ④ Fungi
- ⑤ Bacteria
- ⑥ Archaeobacteria
- ⑦ Viruses
- ⑧ Prions

• **According to the type of cell, cellular microorganisms are either:**

	① Prokaryotes (pro = before)	② Eukaryotes (eu = true; karyote = nucleus)
Size & Development	Smaller with simpler form of cellular organization	Larger & more developed
Nucleus	Do not contain membrane-bound nucleus → but their hereditary material is suspended in the cytoplasm and called nucleoid or nuclear region	Characterized by presence of distinct nucleus → surrounded by nuclear membrane that separates it from the other contents of the cell
Organelles	They are also devoid of mitochondria and other membrane bound organelles	Contain mitochondria & other membrane bound organelles
Ribosome	70S	80S
Cell membrane	No sterols except in <i>Mycoplasma</i>	Contain sterols
Examples	Bacteria → including: <ul style="list-style-type: none"> ① Mycoplasma ② Rickettsia ③ Chlamydia ④ Blue-green algae ⑤ Archaeobacteria 	<ul style="list-style-type: none"> ① Algae (excluding the blue-green algae) ② Protozoa ③ Slime moulds ④ Fungi ⑤ Plants ⑥ Animals
	Prokaryotic cell 	Eukaryotic cell 

③ Viruses

- * One of the **smallest infective agents**
- * They have **no cell structure**
- * Viruses are **obligate intracellular parasites** → they require the **biological machinery** of a host cell for **reproduction & survival**



Even simpler forms are:

④ Viroids

Protein-free fragments of single-stranded circular RNA that cause disease in plants

⑤ Prions

Infectious proteins devoid of nucleic acid

- Since the **algae, slime moulds** and **archaeobacteria** are not thought to contain species of medical or veterinary importance → they will not be considered further

- **Blue-green algae do not cause infection**
→ but certain species **produce potent toxins** that may **affect people or animals** drinking polluted water

Test Yourself

1) Which of the following microorganisms has a nuclear membrane?

- Viruses
- Fungi
- Prions
- Bacteria
- Viroids

2) Viruses have all the following characteristics EXCEPT:

- They are one of the smallest infectious agents.
- They have no cell structure
- They are obligate intracellular parasites.
- They require the host biological machinery for their replication.
- They are prokaryotic.

3) Prions:

- Are single stranded circular RNA
- Are devoid of proteins
- Are infectious proteins devoid of nucleic acids
- Are prokaryotic cells
- Cause diseases in plants