

General Microbiology

Microbiology
Department

Purpose of the Lecture

- Systematics of the Bacteria
- General characteristics of the Bacteria

The structure of lecture

Giving the basic information about the course

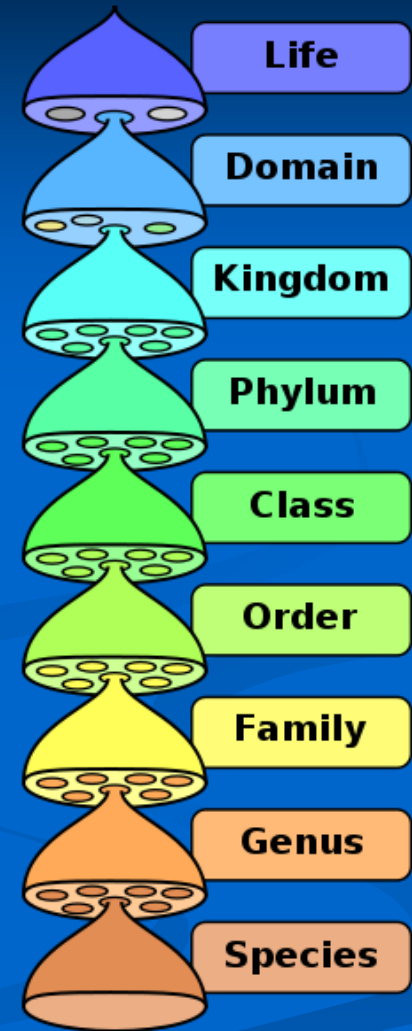
Discussion about the course

General subjects

Basic and Auxiliary Resources

- Turkish books and books written in foreign languages
- Course notes
- Scientific journals

The place of Bacteria in Life



Summary [\[edit \]](#)

A summary of the different kinds of proposed classification schemes presented in this article is summarized in the table below.

Linnaeus 1735 ^[30]	Haeckel 1866 ^[31]	Chatton 1925 ^{[32][33]}	Copeland 1938 ^{[34][35]}	Whittaker 1969 ^[36]	Woese <i>et al.</i> 1977 ^{[37][38]}	Woese <i>et al.</i> 1990 ^[39]	Cavalier-Smith 1993 ^{[40][41][42]}	Cavalier-Smith 1998 ^{[43][44][45]}	Cavalier-Smith <i>et al.</i> 2015 ^[46]
2 kingdoms	3 kingdoms	2 empires	4 kingdoms	5 kingdoms	6 kingdoms	3 domains	8 kingdoms	6 kingdoms	7 kingdoms
<i>(not treated)</i>	Protista	Prokaryota	Monera	Monera	Eubacteria	Bacteria	Eubacteria	Bacteria	Bacteria
					Archaeobacteria	Archaea	Archaeobacteria	Bacteria	Archaea
		Eukaryota	Protista	Protista	Protista	Eucarya	Archezoa	Protozoa	Protozoa
					Protozoa		Chromista	Chromista	Chromista
Vegetabilia	Plantae		Plantae	Plantae	Plantae		Plantae	Plantae	Plantae
				Fungi	Fungi		Fungi	Fungi	Fungi
Animalia	Animalia		Animalia	Animalia	Animalia	Animalia	Animalia	Animalia	Animalia

The kingdom-level classification of life is still widely employed as a useful way of grouping organisms.

- There is no current consensus on how many kingdoms are present in the Eukarya. In 2009, Andrew Roger and Alastair Simpson emphasized the need for diligence in analyzing new discoveries: "With the current pace of change in our understanding of the eukaryote tree of life, we should proceed with caution."^[47]

Classification of Microorganisms

1- Monera and Procaryotae Kingdom

Prokaryotes, Unicellular Microorganisms

2- Protista Kingdom

Generally, they are eukaryotic unicellulars but prokaryotic unicellular microorganisms can fit in this kingdom also. for example; Bacterias.

It is the most heterogeneous Kingdom where microorganisms doesn't fit in to *Animallia* , *Plantae* and *Fungi* kingdoms, are gathered here .

Protozoa: similar to animals, *Protophyta*: Similar to plants, *Protomycota*: primitive fungi(unicellular)

3- Mycobiota and Fungi (Funguses) Kingdom

Eukaryotes. The presence of multinucleated cells are the most prominent features .

3 main groups : *Zygomycota*, *Ascomycota* and *Basidiomycota* .

4- Animalia (Animals) Kingdom

Eukaryotes. Organisms formed by a plurality of eukaryotic cells that doesn't have cell walls .

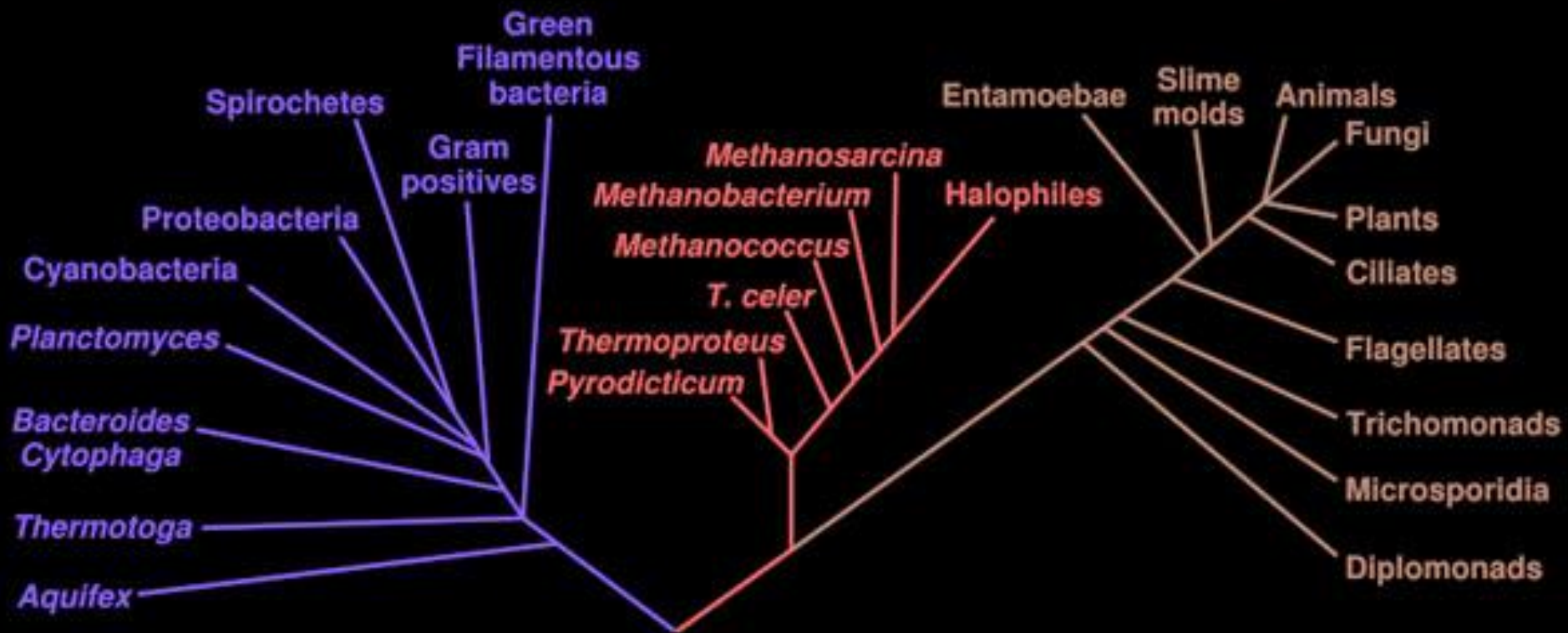
5- Plantae (Plants) Kingdom

Eukaryotes. They have a cell wall and characterized with the ability of photosynthesis.

Bacteria

Archaea

Eucaryota

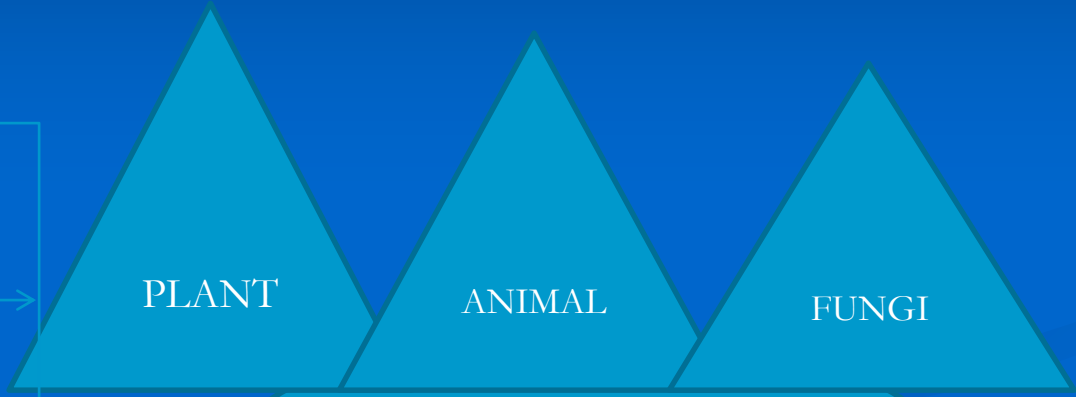


According to the cell structure, organisms are divided into two main groups. These are:

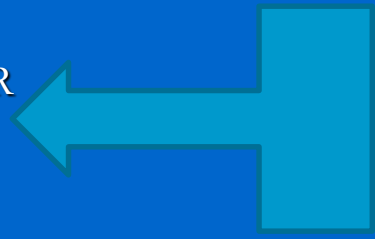
1- Prokaryotes

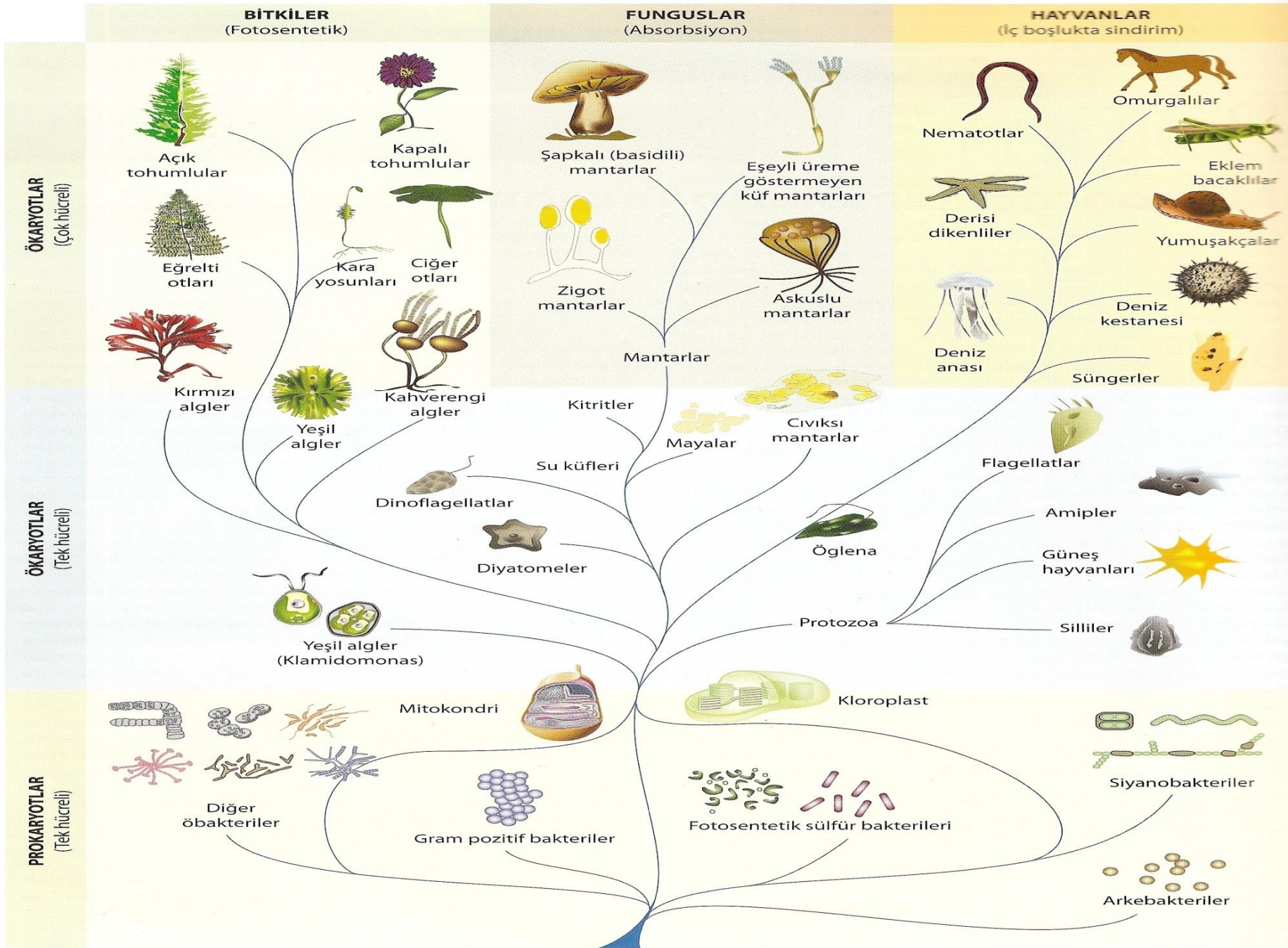
2- Eukaryotes

MULTICELLULAR
(Eukaryotes)



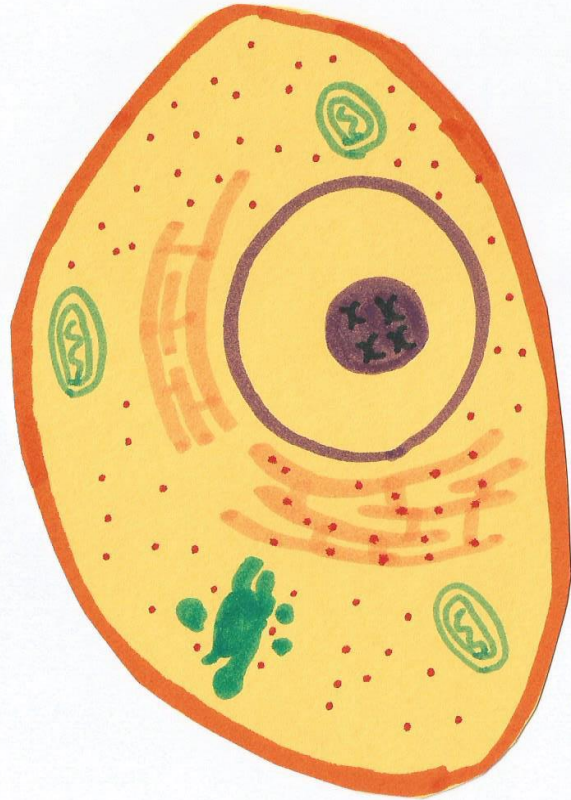
UNICELLULAR





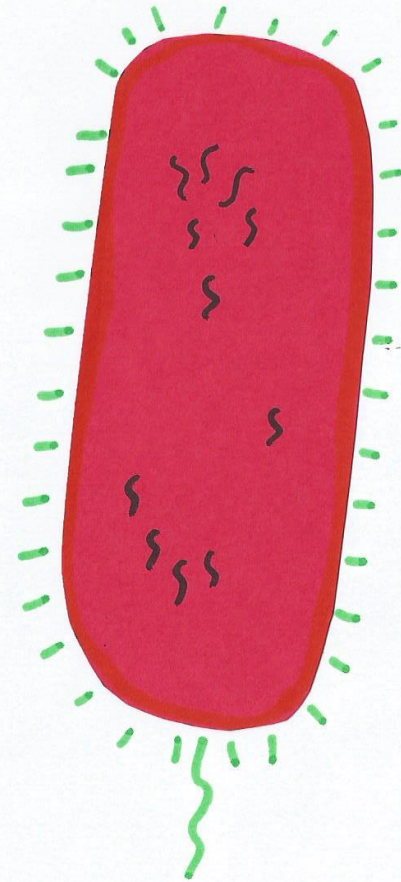
Şekil 3.1. Organizmaların beş alem sistemi. Şekil, D. Voet and Judith G. Voet, Biochemistry 2nd Ed. Copyright © 1995 John Wiley & Sons Inc., New York, NY'dan yayınevinin izniyle alınmış ve adapte edilmiştir.

EUKARYOTIC CELL



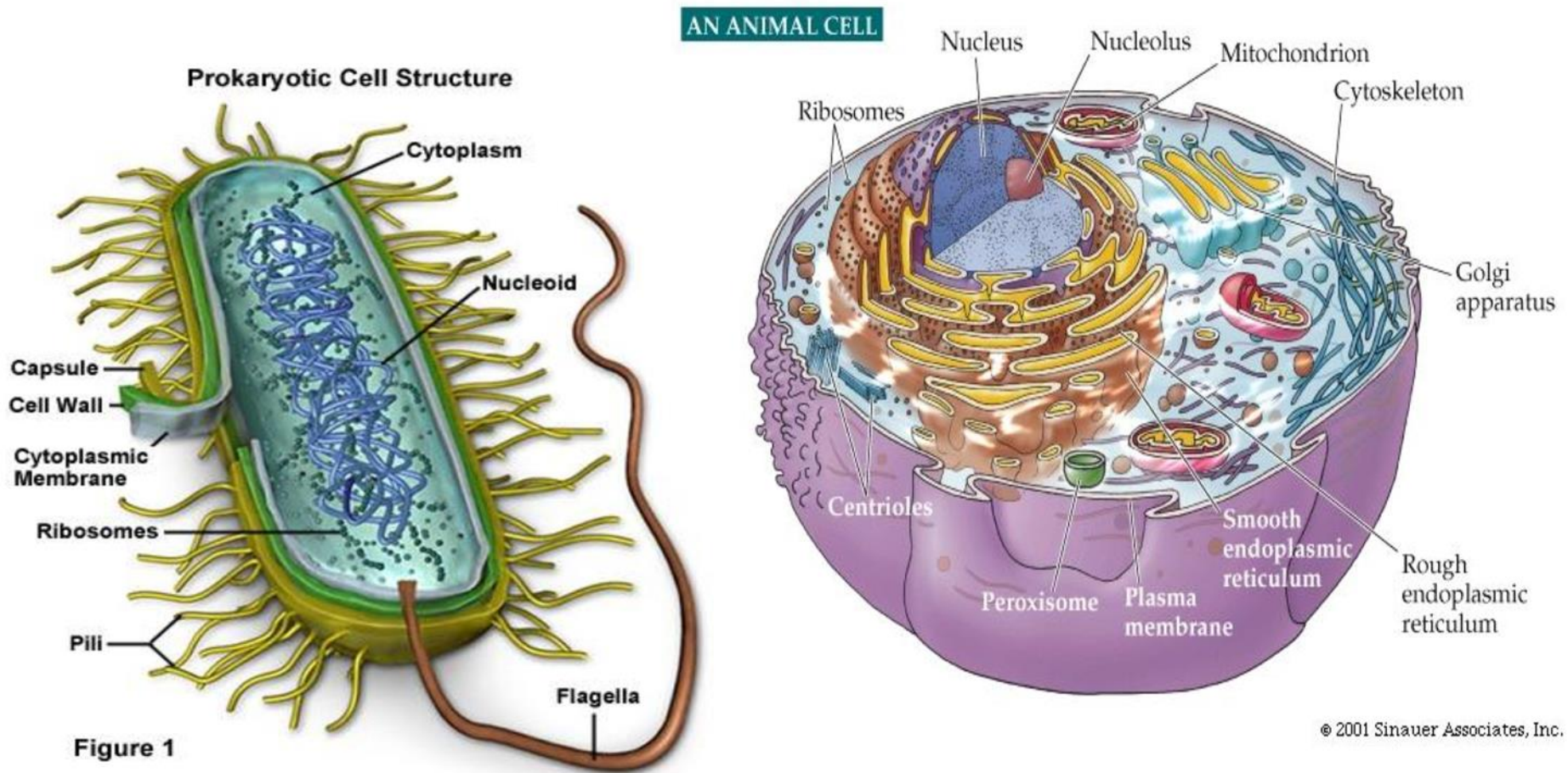
- Membrane bound organelles
- DNA in nucleus
- Active cytosol
- Double membrane mitochondria

PROKARYOTIC CELL



- DNA dispersed thru cell
- No organelles

Prokaryotic vs Eukaryotic Cells



Differences of Prokaryotic and Eukaryotic Cell

<u>Character</u>	<u>Prokaryotic C.</u>	<u>Eukaryotic C.</u>
The number of chromosomes	single	more than one
Nuclear membrane	No	Yes
Nucleus	No	Yes
Mitosis	No	Yes
Mitochondria	No	Yes
Centromere	No	Yes
Ribosome	70 S	80 S
Mesosome	Yes	No
Golgi	No	Yes
Endoplasmic reticulum	No	Yes
Peptidoglycan	Yes	No

	VIRUS	BACTERIA	FUNGUS	PROTOZOON
CELL	-	Unicellular	Unicellular or Multicellular	Unicellular
SIZE	0.02-0.2 nanometer(10⁻⁹ meter)	Micrometer (10⁻⁶ meter)	3-10 micrometer	15-25 micrometer
NUCLEIC ACID	DNA OR RNA	DNA+RNA	DNA+RNA	DNA+RNA
NUCLEAR TYPE	-	PROKARYOTIC	EUKARYOTIC	EUKARYOTIC
RIBOSOME	-	70S	80S	80S
MITOCHONDRIA	-	-	+	+
OUTER SURFACE STRUCTURE	Protein Capsids And Lipoprotein layer	Peptidoglycan	Chitin	Flexible Membrane
MOVEMENT	-	-/+	-	+
PROLIFERATION	Replicate	Divided into two	Sexual and asexual	Sexual and asexual