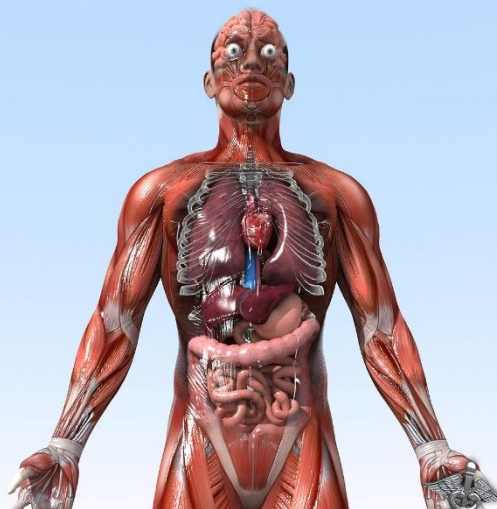
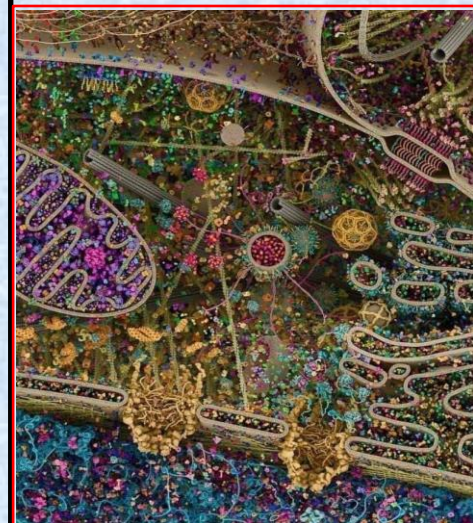


General Animal Biology

Zoo-109

علم الأحياء

109- حين



For Pre-Medical Students



Common First Year

السنة الأولى المشتركة - المسار الصحي

1444-H - 2023

Reference: Campbell, N. A. and Reece, J. B. (2014). *Biology (10th edition)*. Pearson Education. Inc. USA.

عمادة التعليم الإلكتروني والتعلم عن بعد
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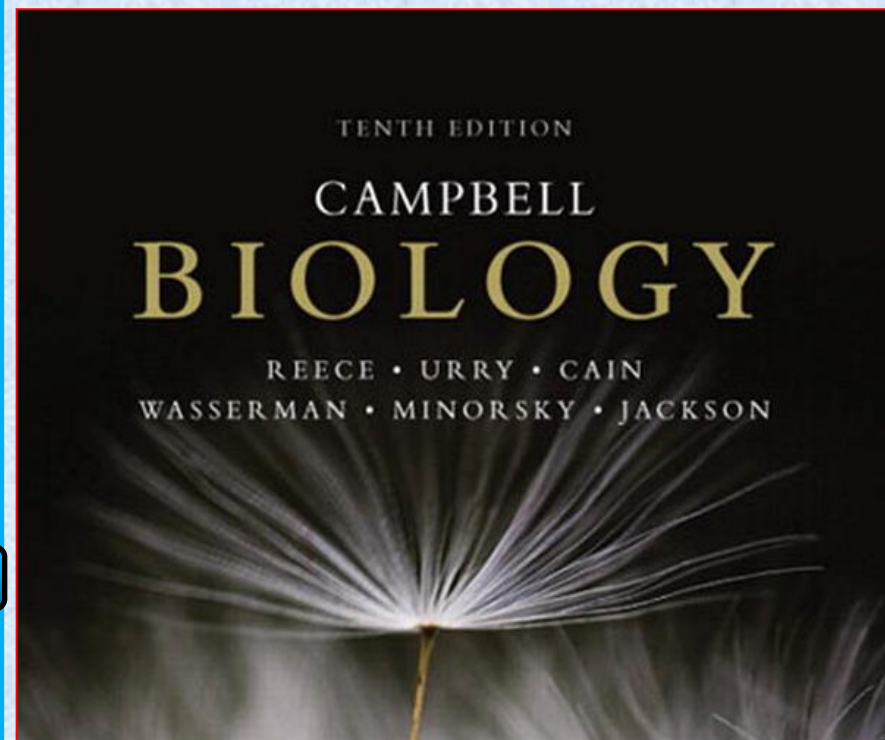
جامعة الملك سعود

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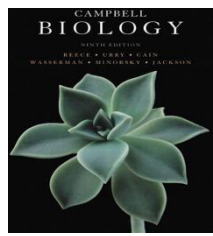
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The Cell



Objectives

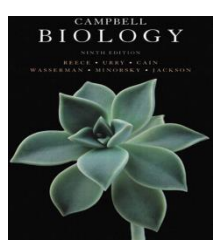


- The Cell: Discovery of the Cell
- The Cell Theory.
- Types of cells.
- The two main Domains of Living Organisms (**Prokaryotes** and **Eukaryotes**).
- Similarities between **Prokaryotic** and **Eukaryotic** Cells
- Differences between **Prokaryotic** and **Eukaryotic** Cells

The Cell: Discovery of the Cell

- The first person to see cells was Robert Hooke in 1665.
- He was looking at a thin slice of cork through a microscope
- He found what he described as "**tiny rooms**" that he called cells





The Cell Theory



- In 1838, the German botanist Matthias Schleiden concluded that all plants were composed of cells
- In 1839, Theodor Schwann concluded the same thing for animals
- In 1855, Rudolf Virchow noted that all cells come from other cells

The cell theory states that:

- 1) all living organisms are made of one or more cells,
- 2) cells are the basic units of structure and function, and
- 3) cells come only from pre-existing cells.

A cell is the smallest unit that can carry on all of the processes of life

Living Cells

Types of cells

بدائية النواة

Prokaryotic

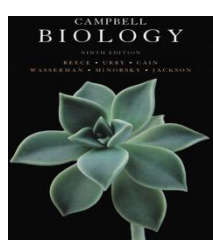
Bacteria and related
micro-organisms

البكتيريا وكائنات دقيقة شبيهة بها

حقيقية النواة

Eukaryotic

All other forms
of life



Domains of life

A)- Prokaryota بدائيات النواة

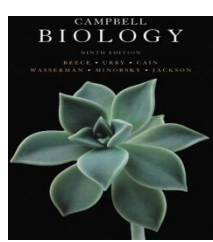
Contains 2 Kingdoms:

1. **Archaea**, مملكة البدائيات وتضم البكتيريا البدائية
2. **Bacteria** (Eubacteria), مملكة البكتيريا الحقيقية

B)- Eukaryota حقيقيات النواة

Contains 4 Kingdoms:

1. **Fungi** مملكة الفطريات
2. **Protista** مملكة الطلائعيات
3. **Plantae** مملكة النباتات
4. **Animalia** مملكة الحيوانات

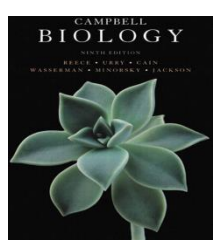


Prokaryotic and eukaryotic cells differ in size and complexity



Similarities أوجه التشابه

- All cells are surrounded by a **plasma membrane** غشاء بلازمي.
- The semi-fluid substance المادة شبه السائلة within the cell is called **“cytosol”**, السيتوبلازم containing the cell organelles عضيات الخلية.
- All cells contain chromosomes which have genes in the form of **DNA**.
- All cells have tiny organelles عضيات صغيرة called **“Ribosomes”** that make proteins.

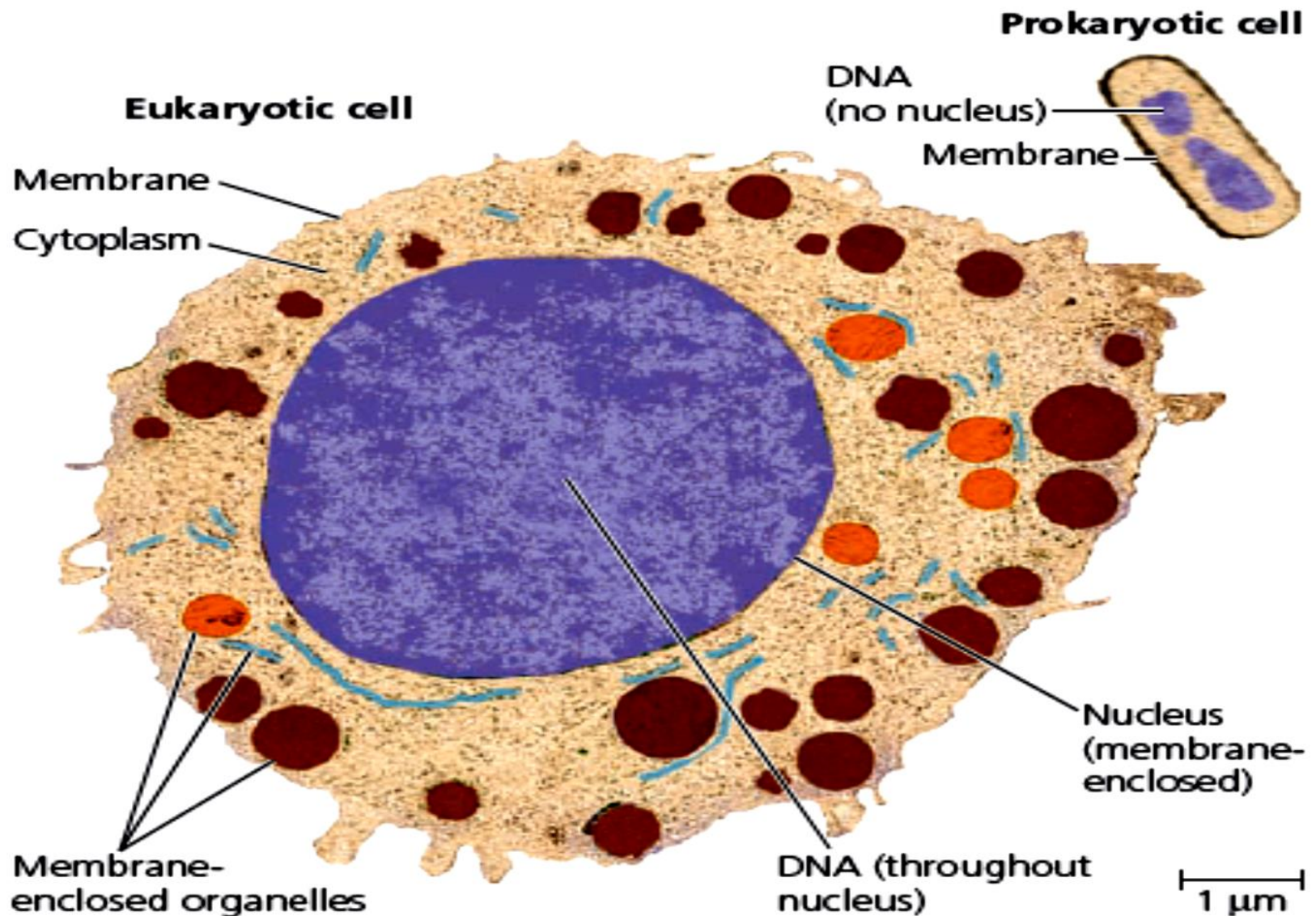


Prokaryotic and eukaryotic cells differ in size and complexity

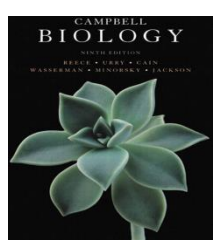


Differences أوجه الاختلاف

1. Eukaryotes have **a nucleus**, while prokaryotes **do not**.
2. Eukaryotes have **membrane-bound organelles**, while prokaryotes **do not**.
3. Eukaryotic cells are, on average, **ten times** the size of prokaryotic cells.
4. The **DNA** of eukaryotes is **much more complex** and therefore much more extensive than the DNA of prokaryotes.
5. The **DNA** of prokaryotes **floats freely** inside the cell; the **DNA** of eukaryotes **is held within its nucleus** and associated with histones (proteins)
6. Prokaryotes have a **cell wall composed of peptidoglycan**. Many types of eukaryotic cells also have cell walls, **but none made of peptidoglycan**.
7. Eukaryotes undergo **mitosis and meiosis**; while prokaryotes divide by **binary fission** (simple cell division)



▲ Figure 1.4 Contrasting eukaryotic and prokaryotic cells in size and complexity.



Comparison and Contrast

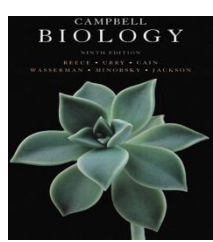


Prokaryotes

Eukaryotes

Plasma membrane
Ribosomes
Cytosol
Cell wall

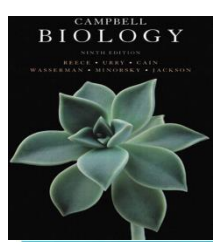
Nucleus
Endoplasmic reticulum
Golgi apparatus
Lysosomes
Vacuoles
Mitochondria
Cytoskeleton



A)- PROKARYOTES:

What are Prokaryotes?

- Prokaryotes are **single-celled** (Unicellular) organisms that do not have a membrane-bound true nucleus, and can live in nearly every environment on earth.
- Although tiny, prokaryotes differ greatly in their genetic traits, their modes of nutrition, however, their habitats are similar.
- Based on genetic differences, prokaryotes are grouped into two Major Domains: Domain Archaea and Domain Bacteria.



1. Domain: Archaea



- Archaea are extremophiles, “مُحب للظروف القاسية” of **extreme environments** and can be classified into:

a)- **Extreme halophiles** مُحب للملوحة:

- live in such saline places as the Great Salt Lake and the Dead Sea.
- Some species require an extremely salty شديدة الملوحة environment to grow.

b)- **Extreme thermophiles** مُحب للحرارة live in hot environments.

- The optimal temperatures for most thermophiles are 60 - 80°C.



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Thank you very much
شكرا جزيلاً

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