The background of the cover is a textured green. On the left, a large, oval-shaped petri dish contains a dense, grey, tree-like structure of microorganisms. To the right of this, there are three smaller circular insets: the top one shows a cross-section of a cell with orange and yellow internal structures; the middle one shows a small cluster of blue, rod-shaped bacteria; the bottom one shows a cluster of purple, spherical bacteria on a dark, textured surface.

# General introduction to MICROBIOLOGY

WILEY

# Historical background and Classification of Microorganisms

## WHAT IS MICROBES, OR MICROORGANISMS

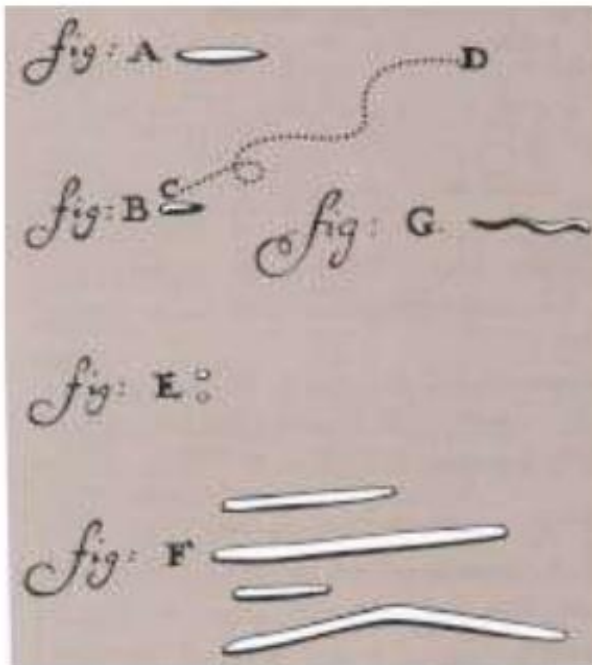
- Smaller than 0.1mm
- some examples of microbes:
  - Bacteria, fungi, protozoa, algae, viruses
- Some are **pathogenic**
- Many are **beneficial**

# Defining Microbiology

- The study of organisms too small to be seen with the naked eye
- These organisms include viruses, bacteria, algae, fungi, and protozoa
- Microbiologists are concerned with characteristics and functions such as morphology, cytology, physiology, ecology, taxonomy, genetics, and molecular biology

# History of microbiology

- **Anton van Leeuwenhoek (1632–1723):** was the first microbiologist and the first person to observe bacteria using a single-lens microscope of his own design



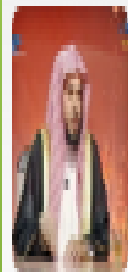
"wee animalcules"



荷兰人吕文虎克  
(Leeuwenhoek) 1632-1723

# Germ theory of disease Replaces Fate and Sins

- Many diseases are caused by the growth of microbes in the body and not by sins, bad character, or poverty



abdulaziztarefe

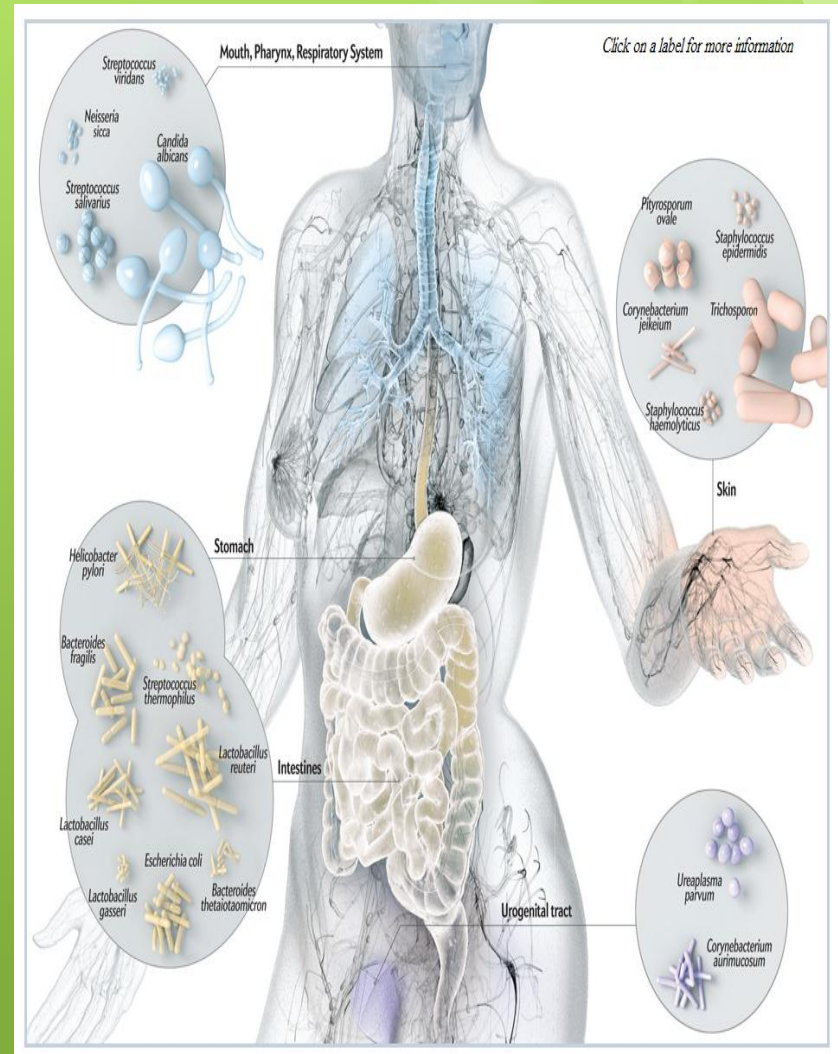


الأمن والأمل يُطغيان الإنسان ويُسيانهُ، فيَسلب الله أَمِن الإنسان بالخوف وأمله بالمرض حتى يعود فلا يستمر طغياناً وظلماً .



# Microbes make the Universe

- There are  $> 5 \times 10^{30}$  types of Microbes in the world
- Humans have intimate relation with Microbes > 90% of the cells in our Body are Microbes



# Classification of Microorganisms

## Three domains:

- Non-cellular organisms:

- Viruses

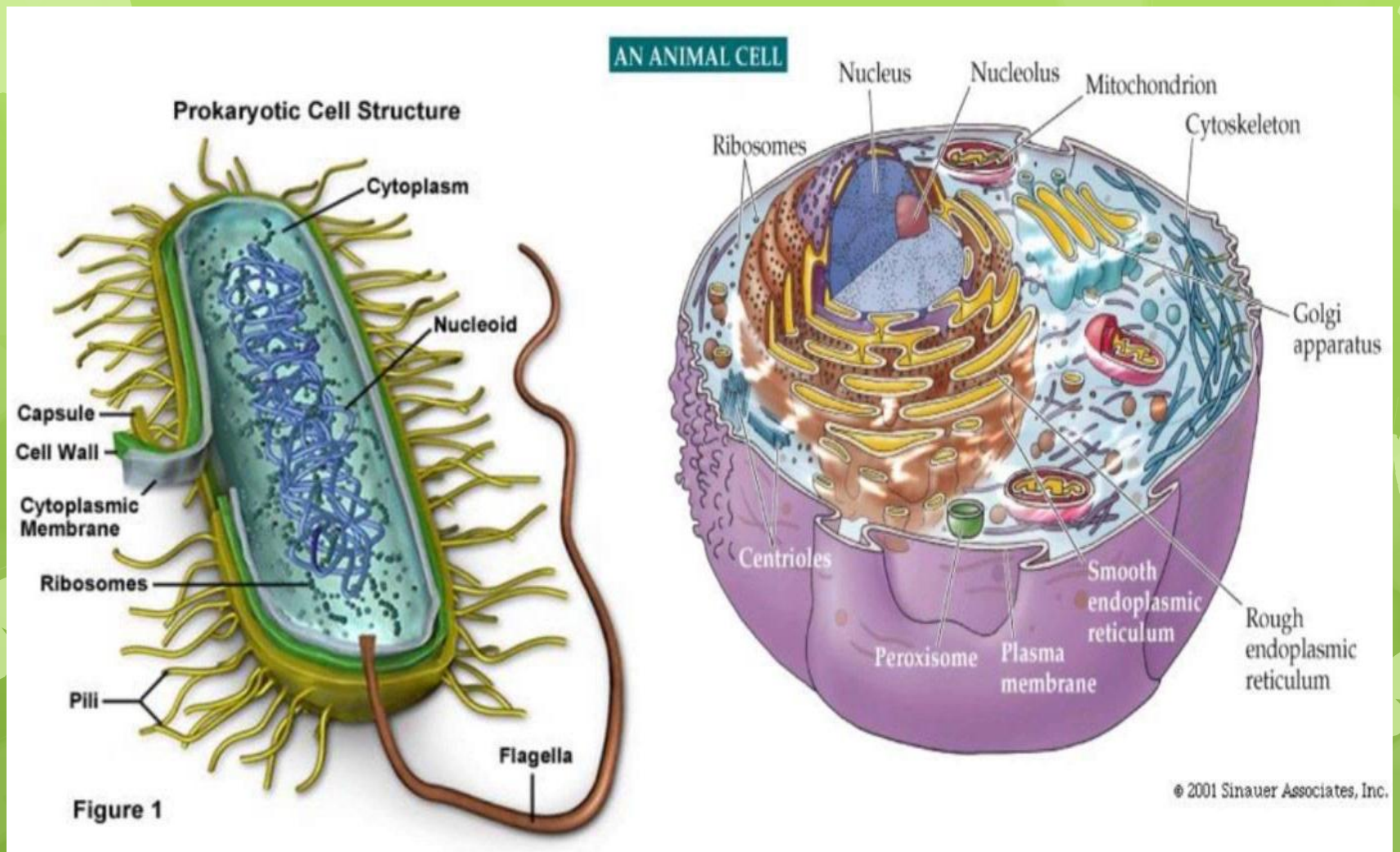
- Prokaryotic cells:

- Bacteria
  - Archaea

- Eukaryotic cells:

- Protists
  - Protozoa
  - Fungi
  - Plants
  - Animals

# Eukaryotic and Prokaryotic





# Scientific Nomenclature of Microorganisms

- Carolus Linnaeus (1735) established the system of scientific nomenclature
- Each organism has two names:
  - **The genus and specific epithet**
  - **Are italicized or underlined**
  - **The genus is capitalized and the specific epithet is lower case**
  - **For example**
    - **Kingdom: Bacteria**
    - **Phylum: Firmicutes**
    - **Class: Bacilli**
    - **Order: Lactobacillales**
    - **Family: Lactobacillaceae**
    - **Genus: Lactobacillus**
    - **Species: *L. delbrueckii***
    - **Subspecies: *L. d. bulgaricus***

# **Microbes are involved in**

- Nutrient production & energy flow
- Decomposition
- Production of foods, drugs & vaccines
- Bioremediation
- Causing disease

# **We must be familiar with Knowledge On...**

- Names of the Microbes
- Pathogenic Microbes
- Commensal Organisms
- Names of the diseases
- Mode of transmission
- Identify whether Bacteria, Virus, Parasite or Fungi (Lab diagnosis)
- Treating and Preventing

# **Branches of study within Microbiology**

- Immunology
- Public health microbiology & epidemiology
- Food, dairy and aquatic microbiology
- Biotechnology
- Genetic engineering & recombinant DNA technology