

# *Introduction To Microbiology*

*CLS 212*



# *What is microbiology?*

- the branch of biology that studies microorganisms and their effects on humans
- **Microorganisms**  
a collection of organisms that share the characteristic of being visible only with a microscope

Microorganisms - Microbes - Germs

# *Microbes & You*

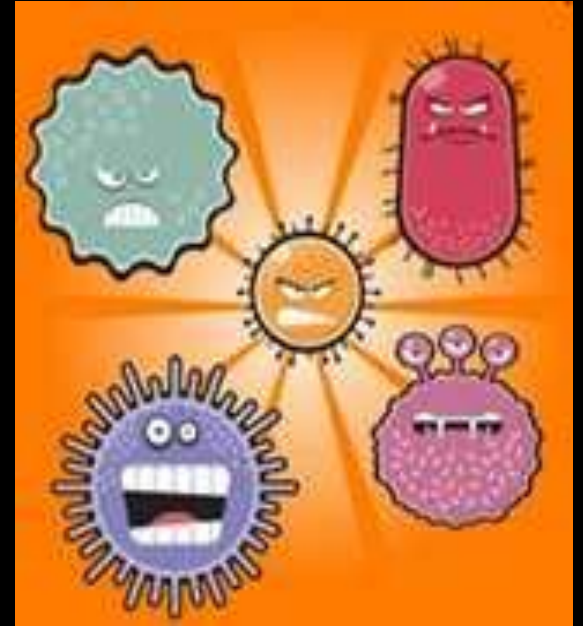
## Normal Flora

- *Q: Did you always have them?*
- *Q: Are they everywhere on your body?*
- *Q: Are normal flora ever harmful?*

## Pathogens

## Non pathogens

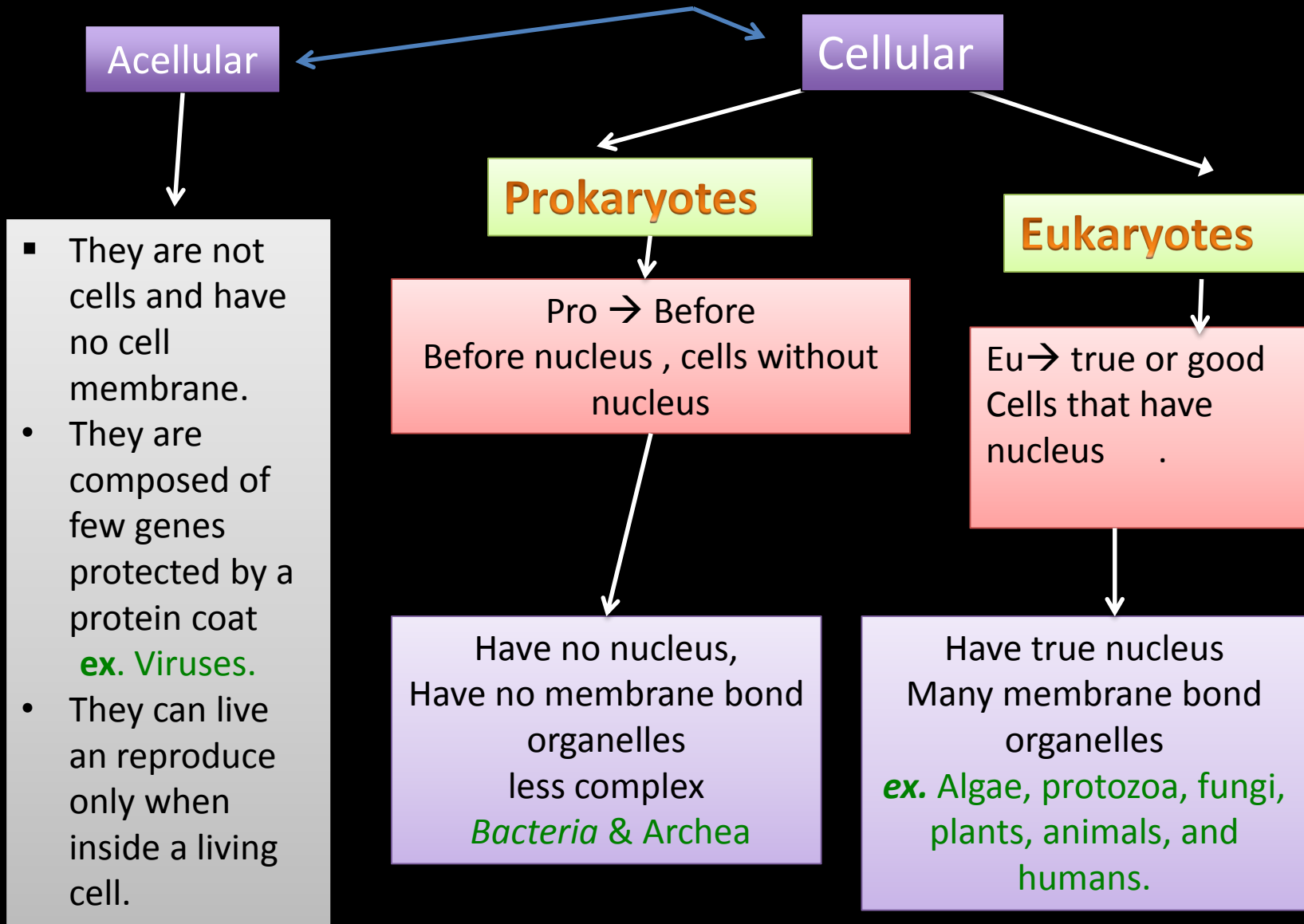
## Opportunistic Pathogens



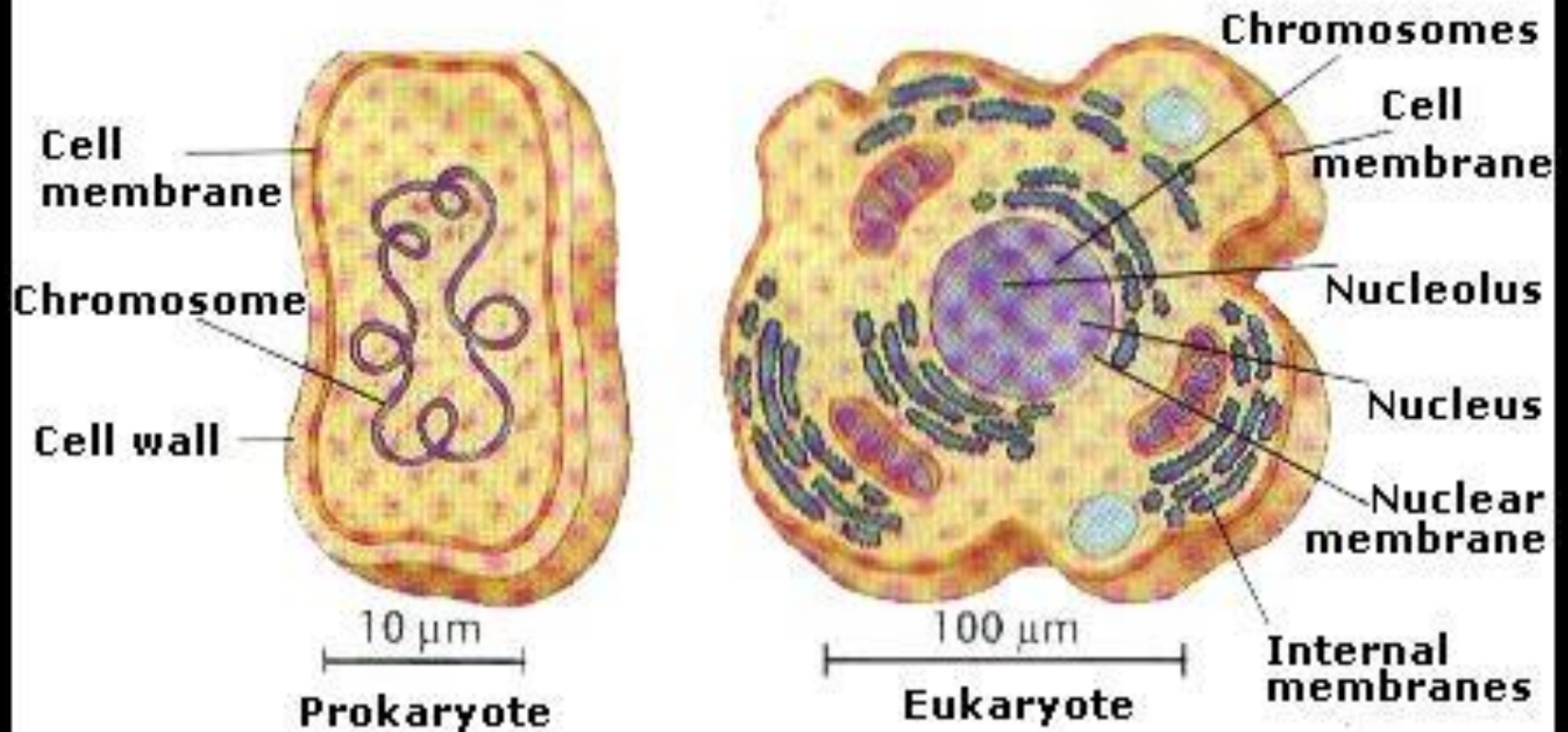
# *Organisms included in the study of Microbiology*

- 1. Bacteria
  - *Bacteriology*
- 2. Algae
  - *Phycology*
- 3. Parasites
  - *Parasitology*
- 4. Yeasts and Molds
  - Fungi
    - *Mycology*
- 5. Viruses
  - *Virology*

# Classification of Microorganism

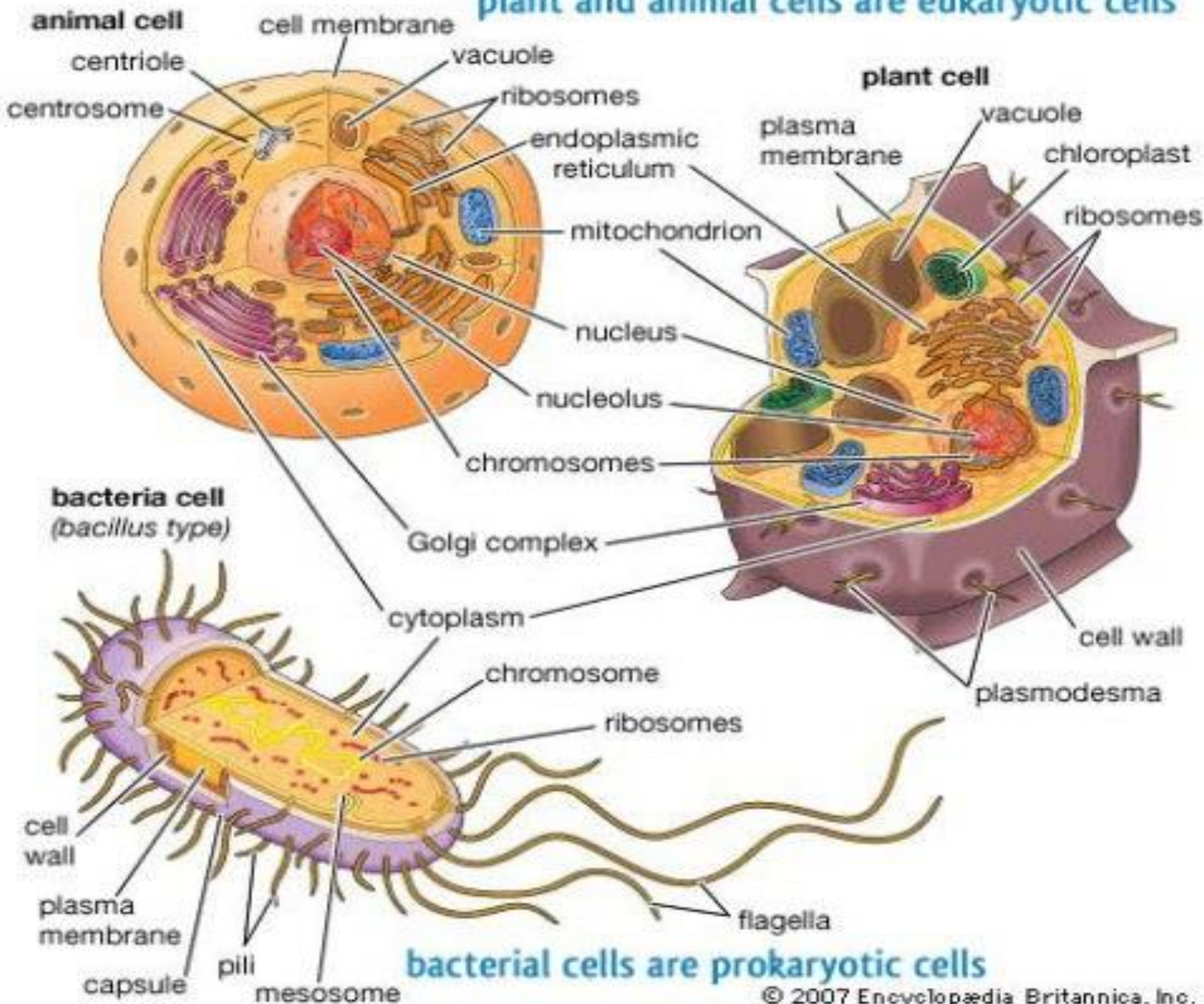


# Prokaryotic Cell & Eukaryotic Cell



## Some typical cells

plant and animal cells are eukaryotic cells

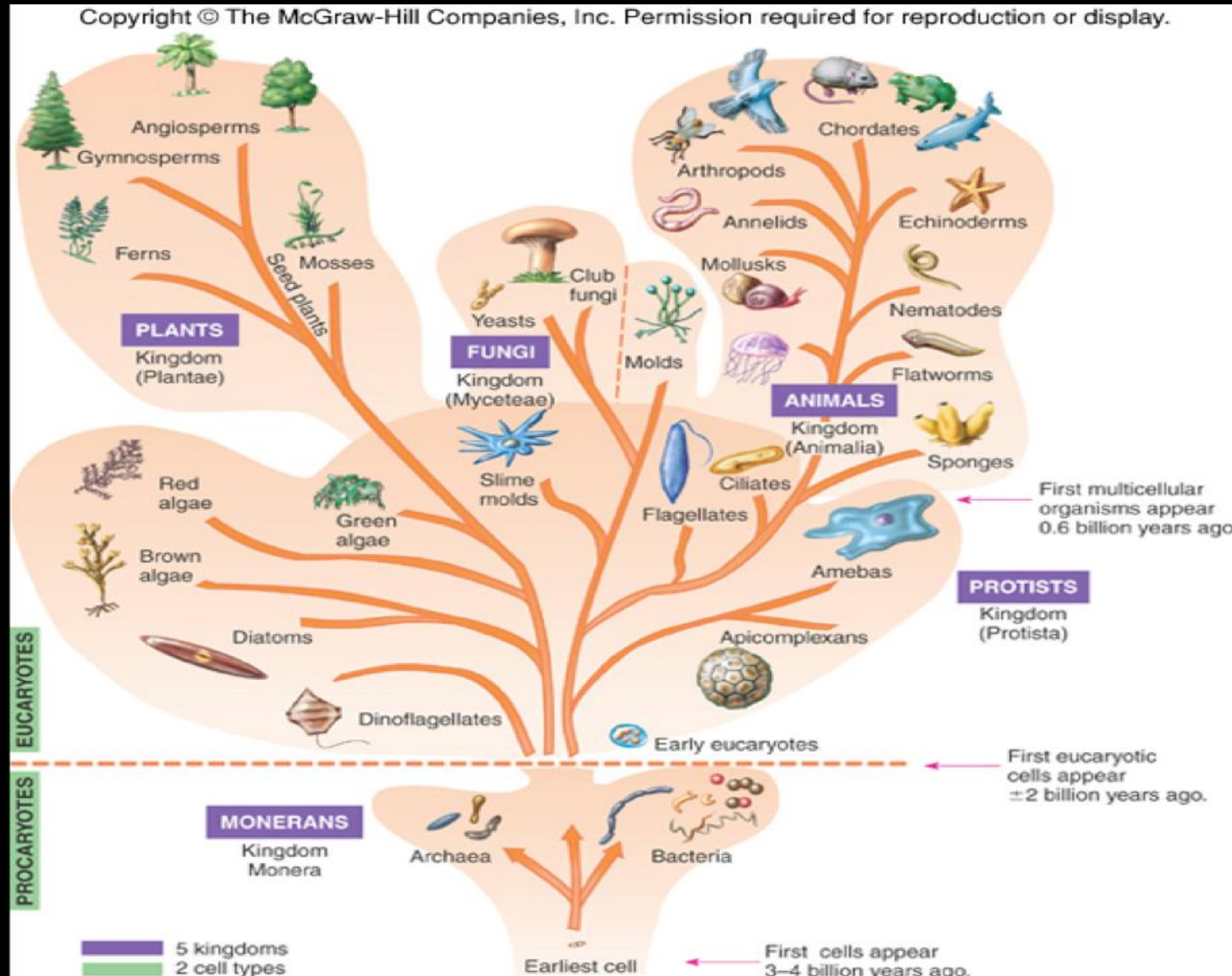


# *5 Kingdoms of Living Organisms*

- 1- Monera ( unicellular prokaryotes)
- 2- Protista
- 3- Fungi
- 4- Plantae
- 5- Animalia

# 5 Kingdoms of Living Organisms

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# *Taxonomic Classification*

## **Cat**

- Kingdom
  - Phylum
  - Class
  - Order
  - Family
  - Genus
  - species
- Animalia
  - Chordate
  - Mammalia
  - Carnivora
  - Felidae
  - Felis
  - domestica

# *Binomial System of Taxonomic Classification*

- Use only the Genus and species

*Haemophilus influenzae*

*Toxoplasma gondii*

*Escherichia coli*

- Genus and species are either underlined or *italicized*
- Genus is always capitilized
- species is never capitilized

# *Identification*



- Microbiologists determine the type of microorganism causing the disease and find a drug, usually an antibiotic, to inhibit the microorganism.
- Microbiologists continue to study the microorganisms through research to determine new antibiotics.

# *Microbes Benefit Humans*

- Bacteria in intestine help in digestion of food and production of some vitamins.
- essential in the field of genetic engineering
- Microbes produce various food products
  - cheese, pickles,, green olives
  - yogurt, soy sauce, vinegar, bread
  - Beer, Wine, Alcohol

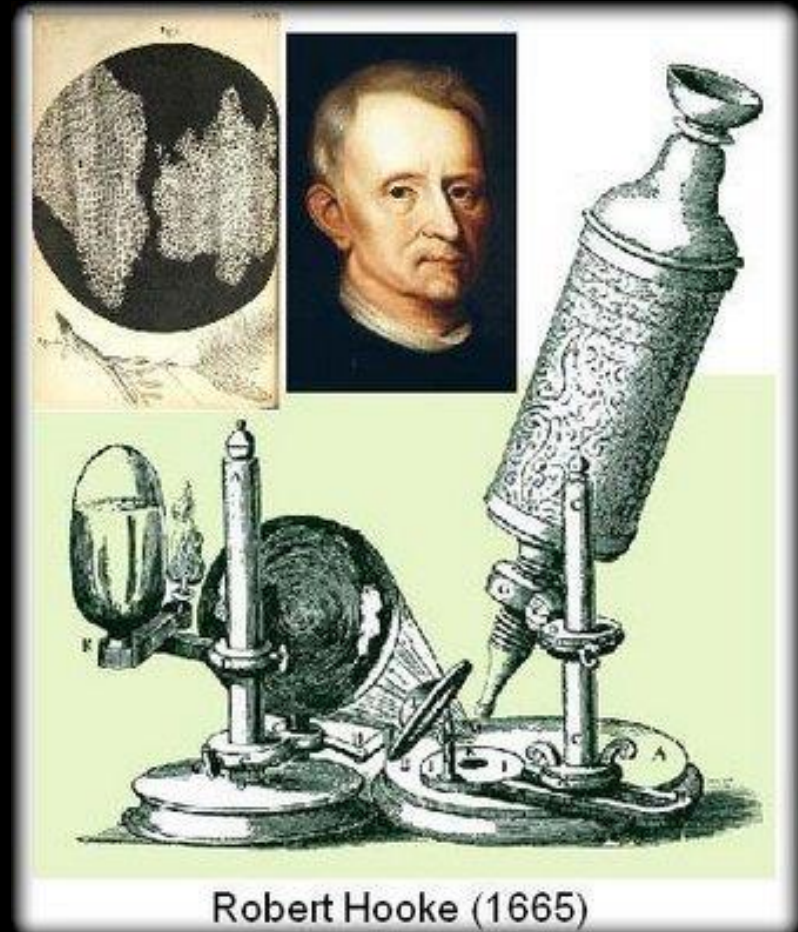
# *Microbes Benefit Humans*

- essential for life on this planet as some produce oxygen e.g. algae and cyanobacteria
- are involved in the decomposition of dead organisms and the waste product of living organisms. These are called (**Decomposers** or **Saprophytes**)
- decompose industrial waste like oil spills
- part of the food chain as tiny animals feed on them

# *History of the Study of Microorganisms*

## Robert Hooke, UK (1665)

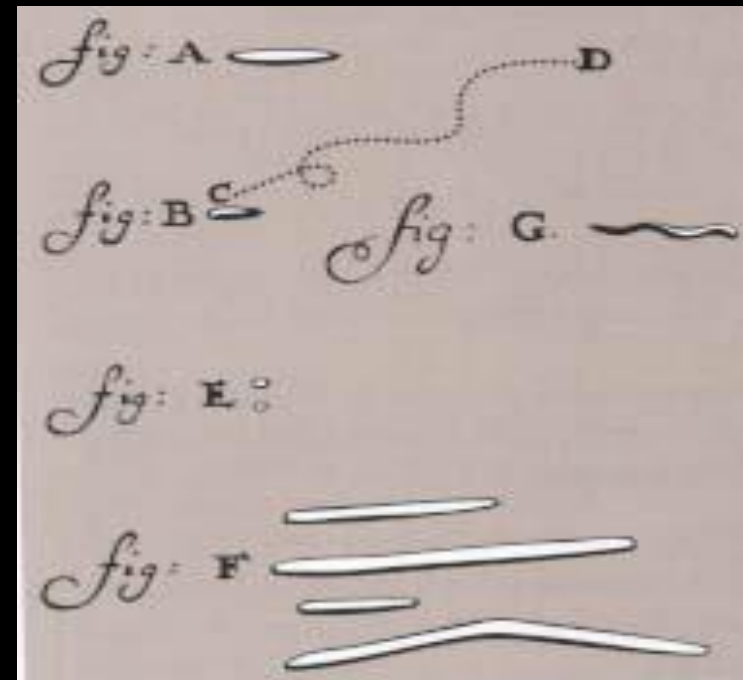
- Proposed the Cell Theory
- All living things are composed of cells



# *History of the Study of Microorganisms*

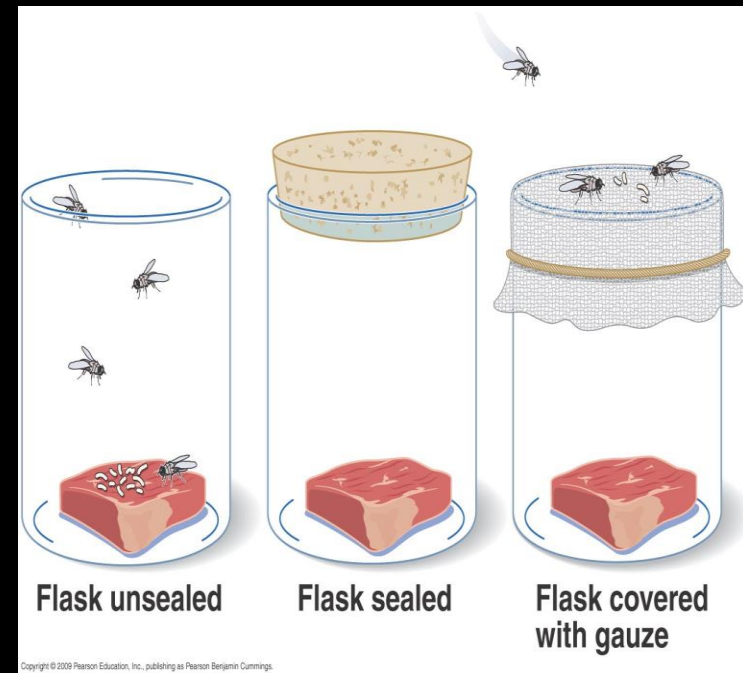
## **Anton van Leeuwenhook (1670s)**

- made a simple one-lens microscope
- observed and provided accurate descriptions of protozoa, fungi and bacteria
- examine almost anything around him then he called the small living organisms “animalcules”.



# *Spontaneous Generation Theory*

- **Spontaneous Generation**
- Theory that life just “spontaneously” developed from non-living matter
- based on observations of rotting food seemingly producing living organisms
- **Francesco Redi, IT (1626-1678)**
- Redi’s experiments first to disprove S.G
- Experiment showed that rotting meat carefully kept from flies will not spontaneously produce maggots



# *Pioneers of Microbiology*

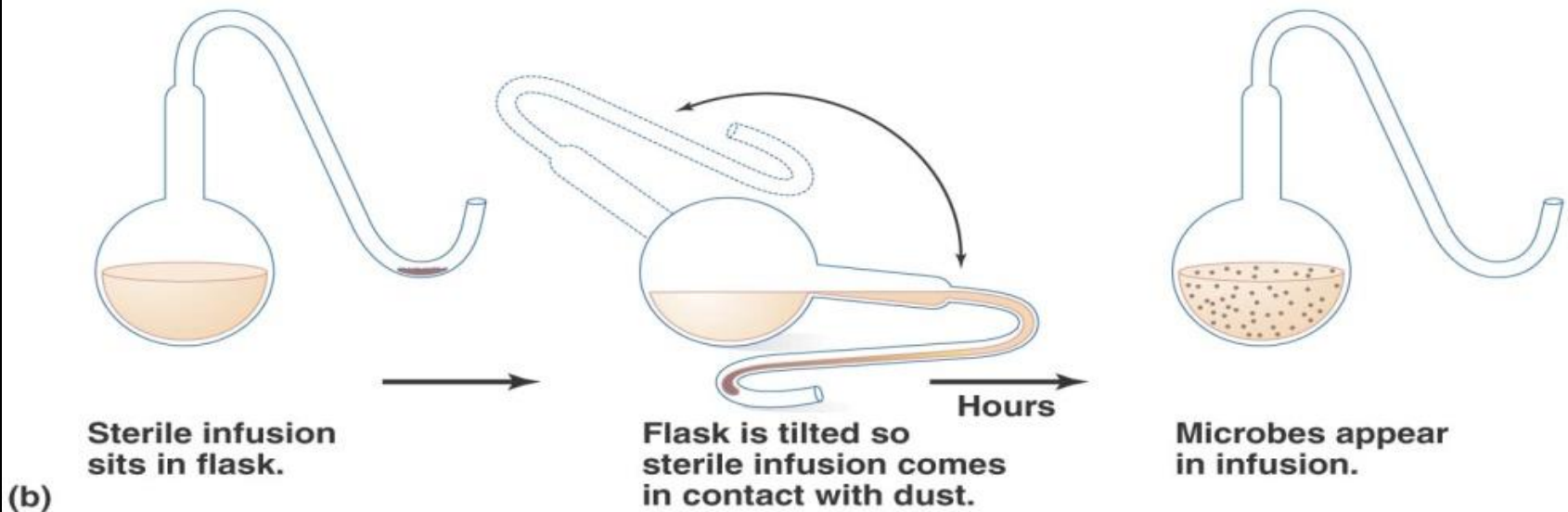
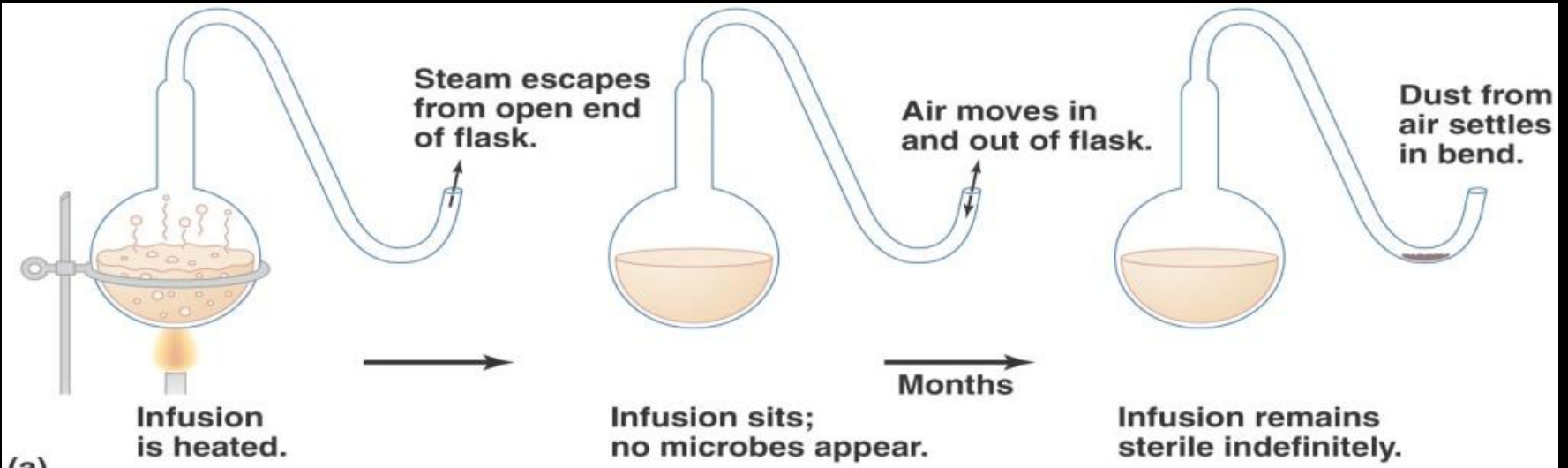
## Louis Pasteur (1822-1895), Chemist

- Fermentation
- Pasteurization: heat liquid enough to kill spoilage bacteria
- Vaccine development
- Proposed the germ theory of disease
- Proposed aseptic techniques (prevent contamination by unwanted microbes)
- discovered forms of life that can exist in the presence of oxygen called “aerobes” and ones that can exist in the absence of oxygen “anaerobes”.

# *Pasteur's Experiments*

- Pasteur designed special “swan-necked flasks” with a boiled meat infusion
- Shape of flask allowed air in (vital force) but trapped dust particles which may contain microbes





# Robert Koch (Germany 1843-1910)

1. He made significant contribution to the germ theory of disease.
2. He developed methods of fixing, staining, and photographing bacteria.
3. He developed methods for culturing bacteria on solid media.
4. He discovered the bacterium (*Mycobacterium tuberculosis*) that cause tuberculosis and Invented skin test to diagnose the Tb.
5. He discovered the bacterium (*Vibrio cholerae*) that causes cholera.

# *Pioneers of Microbiology*

## **Ibn Sina ( Avicenna )**

- states that "Body secretions of a host organism are contaminated by tainted foreign organisms that are not visible by naked eye before the infection
- He also discovered the contagious nature of tuberculosis
- introduced quarantine as a means of limiting the spread of contagious diseases

