Chapter 1 The Introduction of Microbiology

MICROBIOLOGY The word microbiology is derived from the two Greek words

- Micron means small
- Biologia means studying life.

Hence microbiology is the study of micro-organisms and their activities.

It is concerned with form, structure, reproduction, physiology, metabolism and identification of microbes. It includes the study of their distribution in nature, their relationship to each other and to other living things, the beneficial and detrimental effects on man, and the physical and chemical changes, they make in their environment. It may also be defined as.

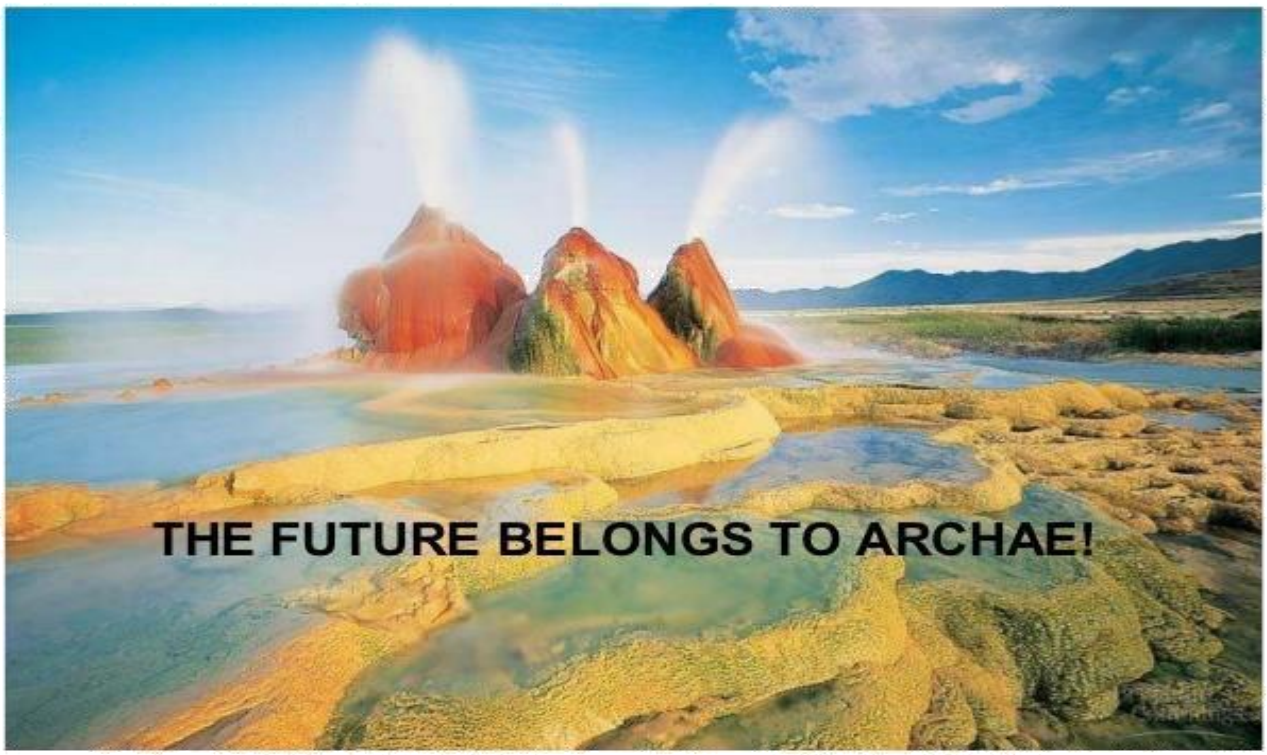
"The branch of biology that deals with microorganisms and their effects on other living organisms."

Microbe Microbe is a term for tiny creature that individually is too small to be seen with unaided eye.

Microbes include:

- Bacteria
- Virus
- Archaea
- Fungi
- Protozoa,
- Mycoplasma,
- Rickettsia, etc.

THERMOACIDOPHILE – thrives in super-hot, super-acidic conditions
the red stuff on the rocks
This is an archaebacteria.



History of Microbiology

In 1665 Robert hook an English scientist gave deception of microscope and its uses, but he did not invent it. He described a slice of cork and suggested that cork was composed of compartment, which he called cells.

The discoveries of Hook and other scientist showed that microscope is an important tool for discover the secrets of life.

Leven hooke revealed his descriptions of microorganism in 1670 by the invent of his simple and single lens microscope.

In 1674 he called tiny microorganism as animalcules which was a term used for microorganisms by him. He outlined the structural details of the familiar protozoa and paramecium and ameba. He died in 1723.

Scope of Microbiology:

1. The science of microbiology includes the study of micro-organism algae bacteria, rickettciae, protozoa, fungi, yeasts and viruses.
2. Without the **harmless organisms** which convert complex material into simple substances, life would be uncertain.
3. Interest in how micro-organism affects human existence has been the foundation of microbiology.
4. The **fermentation of fruit juice and the souring of milk** are natural processes long known to man. Yet why these changes occurred were unknown until Pasteur, in the last part of the 19^{th} century, showed a skeptical world that yeasts and bacteria converted sugars to alcohols and acids.
5. In fact, micro-organism has had a decisive role in shaping world history.
6. The growth of **the pharmaceutical industry** in recent decades has been paralleled by rising standards for product quality and more rigorous regulation of manufacturing procedure
7. For **a sterile product** criterion of quality is simple there should be no living detective microorganism what so ever.
8. The product should, therefore, be able to pass a test for sterility, and knowledge of the procedure and interpretation of results of such tests is an important aspect of pharmaceutical microbiology.
9. It is obvious that medicines contaminated with potentially pathogenic (disease causing) microorganisms are a safety hazard, so medicines administered by vulnerable routes (e.g. injections) or to vulnerable areas of the body (e.g. eyes) are manufactured as sterile products.
10. **Disinfection** and the properties of chemicals (biocides) used as antiseptics, disinfectants and preservatives are subjects of which pharmacists and other persons responsible for the manufacturing of medicines should have a knowledge, both from the perspective of biocide use in product formulation and manufacture, and because antiseptics and disinfectants are pharmaceutical products in their own right.
11. **Injections** are also subjected to a test for pyrogens these are substances that cause a rise in body temperature when introduced into the body.
12. **Sterile medicines** may be manufactured by two different strategies.

    1. The most straight forward and preferred opinion is to make the product, pack it in its final container and sterilize it by heat, radiation or other means.
    2. The alternative is to manufacture the product from sterile ingredients under conditions that do not permit the entry of

contaminating microorganisms. Spoilage of medicines as a result of microbial contamination, although obviously undesirable, has as its main consequence financial loss rather than ill health on the part of the patient.

Microbiology in Your Future

- ✓ Science dominates the twentieth century, and microbiology is one of the newer sciences. Microbiology is dynamic, exploding and revolutionary .

- ✓ The microbiologist has **discovered vaccines** for the prevention of disease such as smallpox and polio, and drugs such as penicillin, for the treatment of disease.
- ✓ The **discovery of some of the vitamins** and other basic food materials has resulted from the study of microorganisms.
- ✓ Knowledge of the **chemistry of the cell** and the importance of certain cell parts in heredity is a contribution of the microbiologist.

- ✓ The biologist may use microorganisms as possible sources of food and oxygen for the **space travelers**.

Vegetables grown in space

- The **PHYSICIAN** needs knowledge of microbiology to fight disease.
- ✓ Industrial scientists often utilize microbiology in the manufacturing of useful chemical products.

- ✓ The **GEOLOGIST** frequently uses information about microorganism in his search for oil.
- ✓ Thus microbiology is important from the core of the earth tothe far reaches of outer space