

Microbiology

۲ Year

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Lec. ۱

Microbiology defined:

- The study of microbiology is the study of microorganisms, which are organisms that are invisible to the naked eye.
- Among the many specialized fields of microbiology: Virology, Mycology, Bacteriology, Immunology, Microbial Ecology, Biotechnological Microbiology, Environmental Microbiology, Food Microbiology, Forensic Microbiology, Molecular Biology.

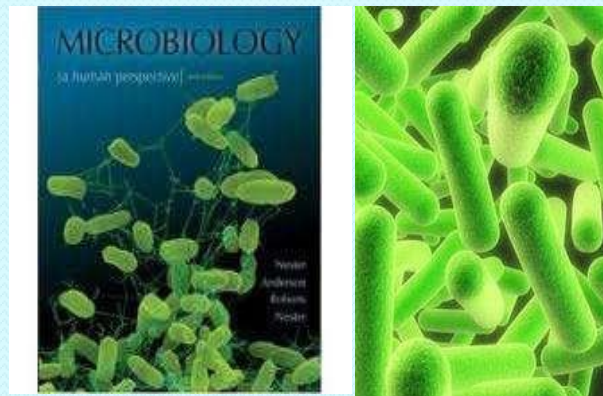
Why Study Microbiology?

- १. **Impact on Human Health**
- २. **Balance of Nature** - food source, play a role in decomposition, help other animals digest grass (cattle, sheep, termites).
- ३. **Environmental** – provide safe drinking water; development of biodegradable products; use bacteria to clean up oil spills, etc. – called **bioremediation**.
- ४. **Industrial** – foodstuffs (beer, wine, cheese, bread), antibiotics, insulin, genetic engineering
- ५. **Agricultural** - research has led to healthier livestock and disease-free crops.

Microorganism:

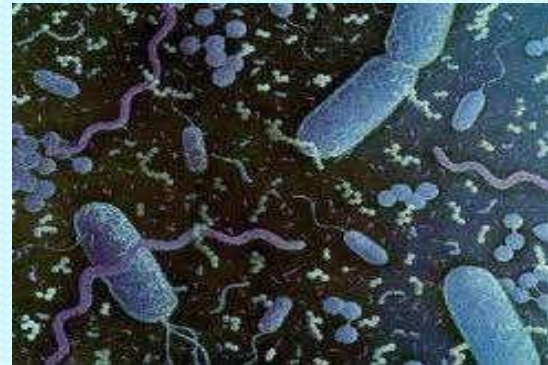
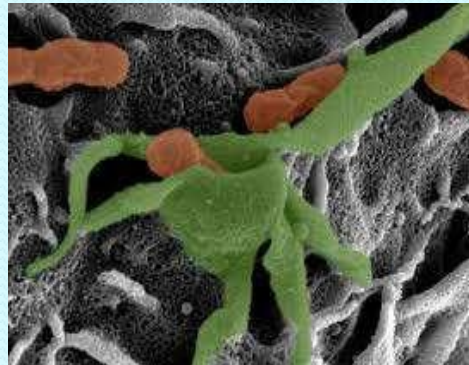
- Living things which individually are too small to be seen with the naked eye.
- All of the following may be considered microorganisms:
 - Bacteria (eubacteria, archaebacteria)
 - fungi (yeasts, molds)
 - protozoa
 - microscopic algae
 - viruses
 - various parasitic worms
- Too small
- Germ-rapidly growing cell

- Has habitat
- Live in population (not alone)
- Communities are either swimming freely or attached to a surface (biofilm)
- Interact between communities; may either be
 - - harmful (because of waste product)
 - - beneficial (cooperative feeding efforts-waste-nutrient)



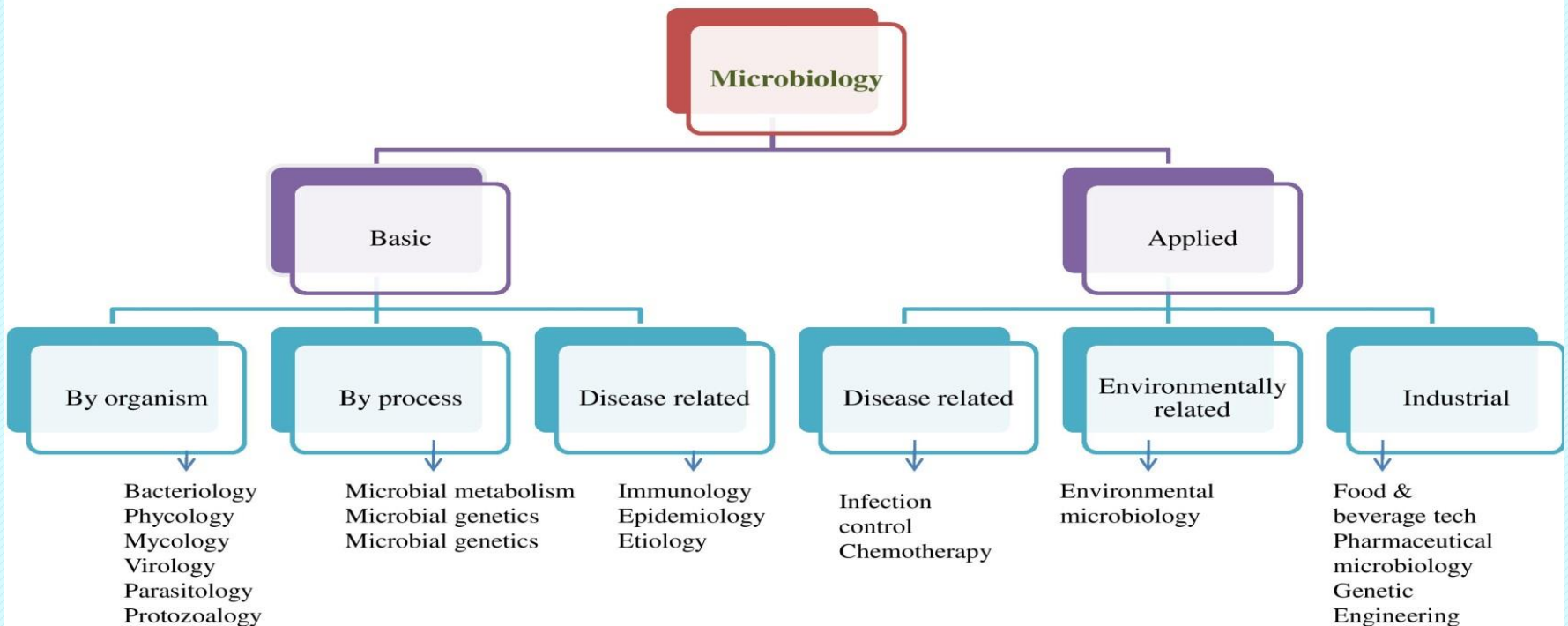
Microorganism & Microbiology cont'd:

- Two main themes involved in Microbiology:
- 1-**Basic**- cellular processes
- 2-**Applied**- concerning agriculture, industry and health



Themes in Microbiology and its field

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Microbes in our lives

- Some are pathogenic (disease-causing)
- Decompose organic waste
- Produces through photosynthesis (e.g. Purple sulphur bacteria must fix CO_2 to live)
- Play role in industry (e.g. fermentation to produce ethanol and acetone)
- Produce fermented food (vinegar, cheese & bread)
- Produce products used in manufacturing (cellulase) and treatment (insulin)



Microbes in our lives



Food

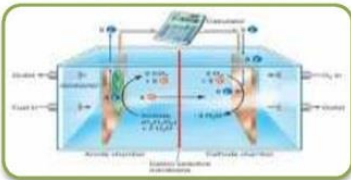
- Lactococci
- Ferment milk



Water treatment

Such as certain bacteria belonging to the Bacillus species

1. Digest a wide variety of organic material that are present in wastes.
2. Digest waste quickly and completely, without producing significant odors of noxious gas.
3. Non-pathogenic.
4. Grow and reproduce quickly and readily in the environmental conditions found in waste disposal systems.



Energy

- Produce methane



Science- laboratories



Warfare -anthrax



End