

**Ministry of Higher Education
and Scientific Research
University of Ishik
College of education
Department of Biology**



Practical Microbiology 2018- 2019 (3rd Grade) Lab 1

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Introduction to Microbiology

Hi! I'm *E. coli* ☺



➤ Be Respectful

➤ Be On Time

(I reserve the right to close and lock the door 10 min after class or lab begins.)

➤ Pay Attention

➤ If you can't pay attention, at least keep it to yourself ... don't disrupt others.

➤ Cell Phones *off/silenced*



IMPORTANCE OF LAB SAFETY



Lab safety is a major aspect of every lab-based science class.

Why does it matter?



- ▶ Safe working protects:
 - ▶ You
 - ▶ Other lab workers
 - ▶ Cleaners
 - ▶ Visitors
 - ▶ Your work

Laboratory hygiene

- ▶ Never eat, drink or smoke in a laboratory
- ▶ Never apply cosmetics
- ▶ Never touch your face, mouth or eyes
- ▶ Never suck pens or chew pencils
- ▶ Always wash your hands before you leave and especially before eating



Use only the materials that you need



Keep your classmates safe



Wash your hands after an investigation



Listen carefully and follow directions



**Science
Safety
Rules**

Use all tools responsibly
Wear goggles



Keep yourself safe



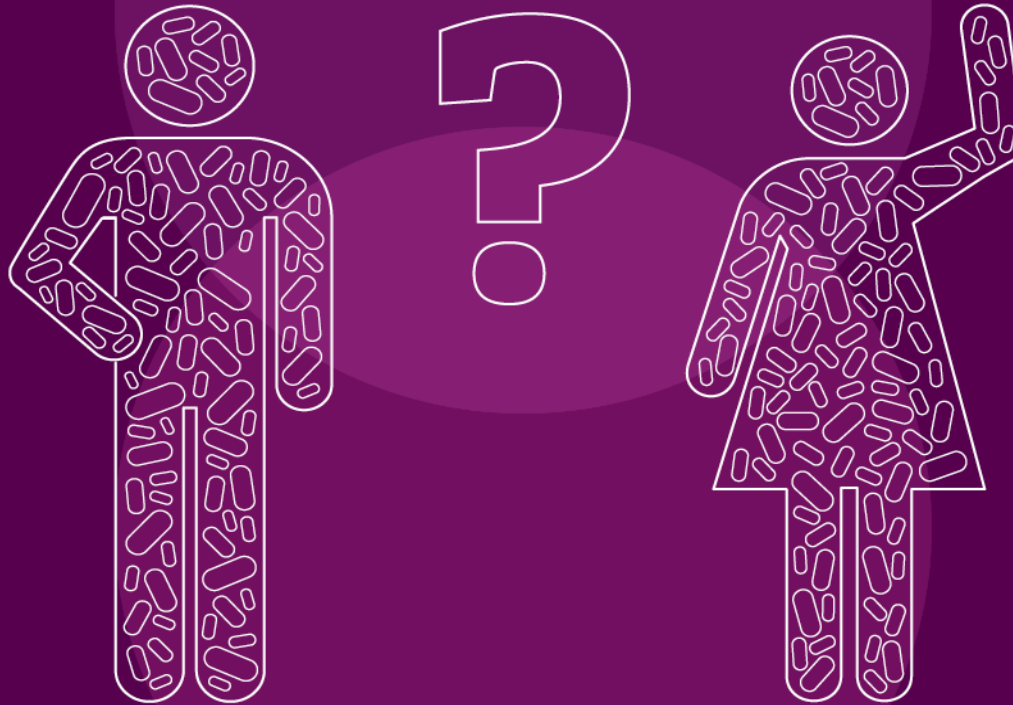
Don't taste



Follow instructions



What do you know about Microbiology ?

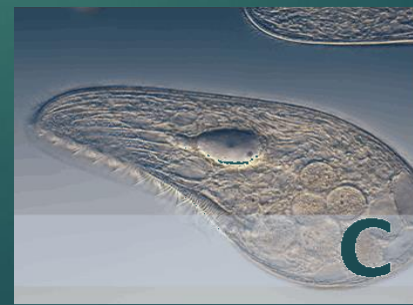
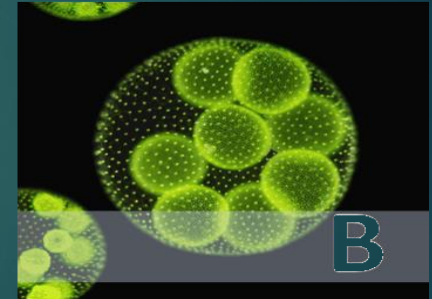
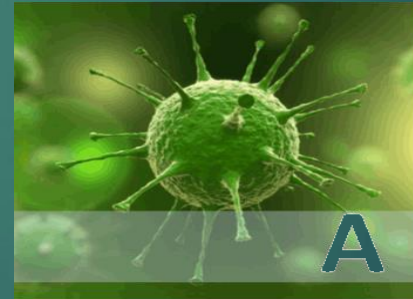


What is microbiology ?

- ▶ **Microbiology is** the study of microorganisms which include: bacteria, viruses, yeast, molds, protozoan's, algae, fungi and other very small organisms.
- ▶ **Microbiology** is important because it helps us to understand and treat diseases. (how)?
- ▶ **Microorganisms** are necessary for the production of bread,cheese,beer,antibioics vaccines,enzymes,vitamins..etc

-Microorganisms are everywhere .almost every natural surface is colonized by microbes from body to ocean .some microorganisms can live in hot spring and others in frozen sea ice

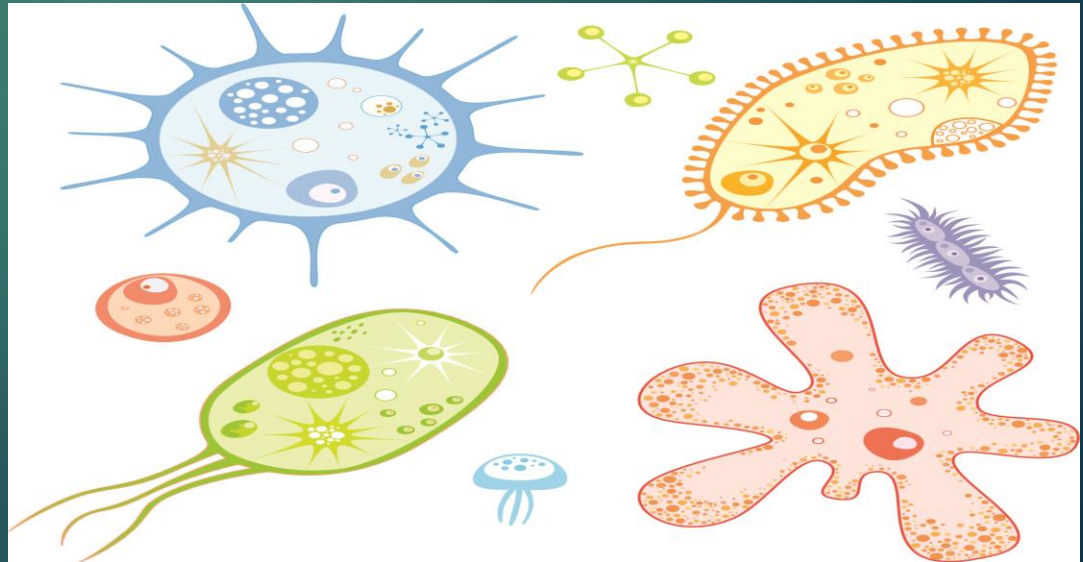
-most organisms are harmless to human .you swallow million of microbes everyday with no ill effect. in fact we are dependent on microbes to help us digest our food



-Microbes also keep the biosphere running by carrying out essential functions such as decomposition of dead animals and plant they make possible the cycle of carbon ,oxygen ,nitrogen and sulfur that take place in terrestrial and aquatic systems

-They sometimes cause diseases in man ,animal and plant

-Infectious diseases have played major role in shaping history (decline of roman empire and conquest of the New York)



-Invisible creatures were thought to exist long before they were observed

- ▶ Antony Van Leeuwenhoek (1632-1723) who invented the first microscope (50-300x). Was the first to accurately observe and describe microorganisms



Roles of Microorganisms in Diseases

- ▶ Pasteur showed that Microorganisms caused disease
- ▶ Joseph Lister developed system of sterile surgery
- ▶ Robert Koch established the relationship between *Bacillus anthracis* and anthrax also isolated the bacillus that cause tuberculosis
- ▶ Chamberland discovered virus and their roles

Koch's postulates

- ▶ Microorganisms must be present in every case of the disease but absent from healthy individual
- ▶ The suspected microorganism must be isolated and grown in pure culture
- ▶ The disease must result when the isolated microorganism inoculated in a healthy host
- ▶ The same microorganism must be isolated from the disease host

Louis Pasteur

- ▶ Developed vaccine for chicken pox, anthrax, rabies
- ▶ Demonstrated that all fermentations were due to the activities of specific yeasts and bacteria
- ▶ Developed Pasteurization to prevent wine during storage and important foods
- ▶ Discovered that fermentative microorganisms were anaerobic and could live only in the absence of oxygen

Scope of microbiology

-microbiology has an impact on medicine ,immunology and many other fields,agriculture,food science ecology, genetics biochemistry
-many microbiologists are primarily interested in the biology of microorganisms while other focused on specific groups

- ▶ Virology-viruses
- ▶ Bacteriologists-bacteria
- ▶ Phycologists-algae
- ▶ Mycologist-fungi
- ▶ Protozoologist-protozoa

Microbial physiology

Microbial genetics

Microbial Morphology

Virology

Parasitology

Mycology

Protozoology

Branches of
Microbiology

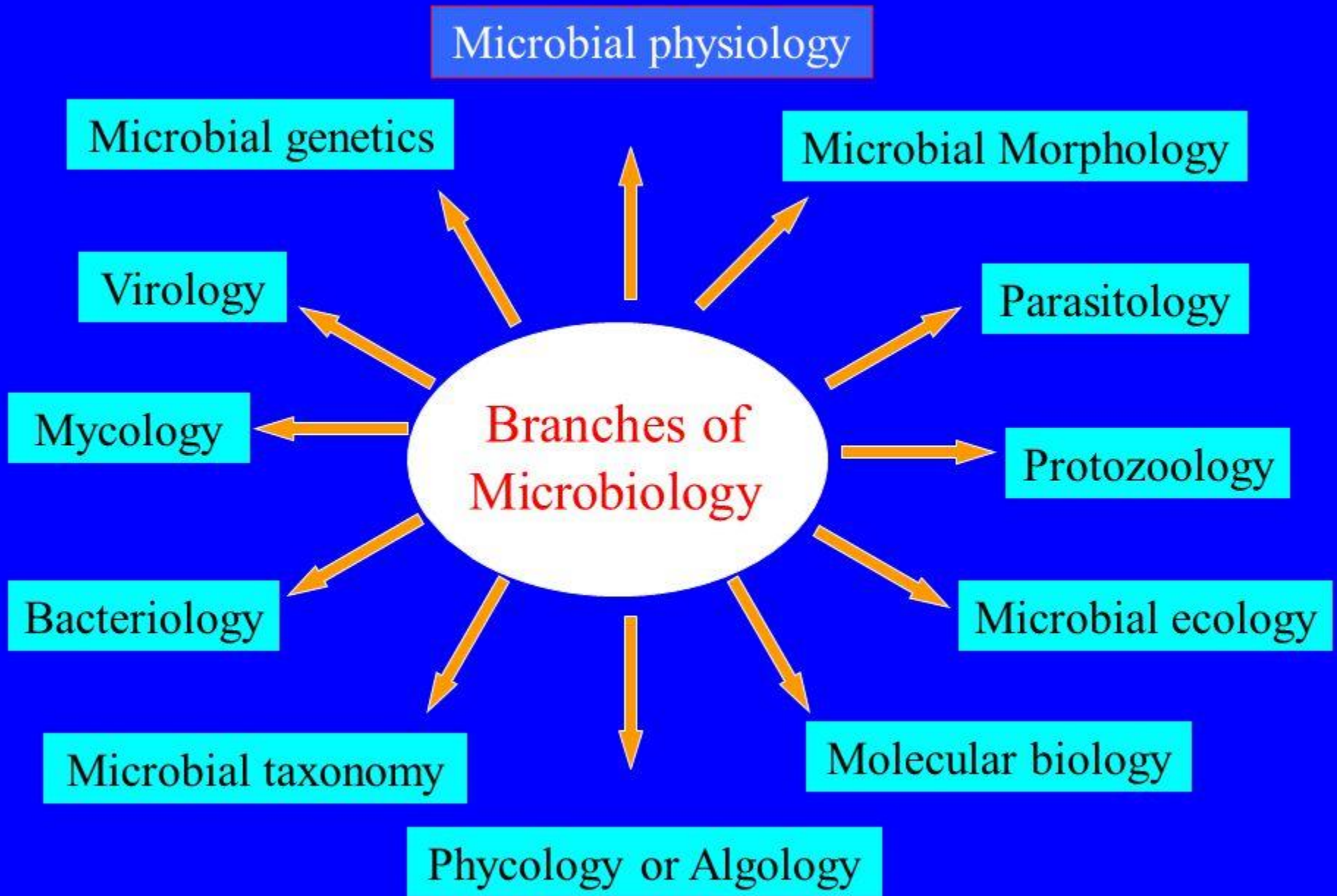
Bacteriology

Microbial ecology

Microbial taxonomy

Molecular biology

Phycology or Algology



- ▶ **Medical microbiology** :deals with disease of humans and animals ,identify and plan measures to eliminate agents causing infectious disease
- ▶ **Immunology** study of the immune system that protect the body from pathogens
- ▶ **Food and diary microbiology: prevent** microbial spoilage of food and transmission of food –borne diseases(.g salmonellosis)use microorganisms to make food such as chesses ,yogurt, pickles...etc



- ▶ **Industrial microbiology:** using microorganisms to make products such as antibiotics ,vaccine,steroid,alcohol,and other solvent vitamin ,amino acids ,enzyme..etc
- ▶ **Genetic engineering:** engineered microorganisms used to make hormones antibiotics and other products
- ▶ **Agricultural microbiology** :impact of microorganisms of agriculture combat plant disease that attack important food crops



ANY
QUESTIONS

