Date 12th November 2018

PAK SWISS NURSING COLLEGE SWAT

Mr. Muhammad Alam Khan
Sr. Nursing Lecturer

MICROBIOLOGY

UNIT-1

Definition:

"Microbiology is the branch of science that deals with the study of micro organisms". Microorganisms are the living things which cannot be seen with naked eyes but can be seen with the help of microscope.

Branches of microbiology:

- **Bacteriology -------** The study of bacteria
- **Virology** ---------- The study of viruses
- **Protozoology** -------- The study of protozoa
- **Immunology** ------- The study of immunity
- **Mycology** ---------- The study of fungi (unicellular & multicellular)
- **Phycology** ---------- The study of Algae (unicellular & multicellular)

Why Important study Micro Biology

1. Impact on Human Health

2. Balance of Nature - food source, play a role in decomposition, help other animals digest grass (cattle, sheep, termites).

3. Environmental – provide safe drinking water; development of biodegradable products; use bacteria to clean up oil spills, etc. – called **bioremediation.**

4. Industrial – foodstuffs (beer, wine, cheese, bread), antibiotics, insulin, genetic engineering

5. Agricultural - research has led to heal thier livestock and disease-free crops.

Basic Terminology

1. **Pathogen**: An organism which produces disease is called pathogen.
2. **Parasite:** An organism that lives in or on another species or creature and obtains food and shelter without benefiting but rather harming the host.
3. **Saprophyte**: An organism that lives on dead organic matter. eg Fungi
4. **Normal flora**: The microbes that live in or on another creature and benefiting each other in normal conditions.
5. **Vector:** An animal usually an arthropod such as insect or tick that transfers a pathogen to a person**. 1) Mechanical vector** and **2) Biological Vector.**

6. **Carrier:** An individual showing no sign and symptom of infection but harbors an infectious agent which may be harmful when passed to another person.
7. **Infection:** The entry of microorganism in the body is known as infection.
8. **Incubation period**: The period of proliferation of microorganisms to show sign and symptoms after their entry in a body is known as incubation period.
9. **Epidemiology:** The study of occurrence of disease, how, when and where it occurs and how it is transmitted. Epidemic disease: An unusual sudden onset of a disease which breaks out in a region of a country. eg. Cholera, or any other disease broken out
10. **Endemic disease:** A disease which is usually found in an area in a country. eg, typhoid, etc
11. **Pandemic disease:** An epidemic disease that occurs worldwide**.**
12. **Sporadic disease:** A disease which is found here and there at intervals. eg. T.B, etc
13. **Inflammation:** The response of body to infection or injury which is characterized by swelling, heat, redness and pain.
14. **Pathogenicity:** The ability of an organism to cause disease.
15. **Virulence:** The degree or intensity level of a pathogen. Toxin: A poisonous substance produced by a living organism.
16. **Toxicant:** A poisonous substance prepared by man. Antigen: Any substance usually made up of protein that stimulates the immune response.
17. **Antibody:** A protein that is formed as a result of the immune response to an antigen. **Sterilization:** The process by which all forms (vegetative and non-vegetative forms) of pathogenic and non-pathogenic microbes are killed.
18. **Bactericide:** A substance or agent that kills bacteria. Page 2 of 2
19. **Pasteurization:** This is the method of temperature treatment which is heated on either 63 C for 30 minutes to make it free from specific germs.
20. **Disinfectant:** An agent that kills microorganisms by applying to inanimate (non living) objects.
21. **Antiseptic:** An agent that kills microorganisms by applying to living things.
22. **Vaccine:** Attenuated or killed microbes or inactivated toxins used to induce immunity.
23. **Vaccination:** The process of inducing immunity by administrating a vaccine.
24. **Fomites:** Inanimate object or material used by an infected patient, which may transfer the infection to another person by coming in contact. For example, Lenin, clothes etc.
25. **Cell:** Cell is the basic structural and functional unit of life.
26. **Eukaryotic Cell:** A complete cell having a well defined nucleus and other membranous structures. eg. Multicellular(like animal and higher plant cells) and unicellular (like protozones).
27. **Prokaryotic Cell**: An incomplete cell having no well defined nucleus and other membranous structures. They are always unicellular. eg. Bacterial cell Bacteria: They are prokaryotic microorganisms which can't be seen with naked eyes.
28. **Virus:** A minute microorganism which shows the characteristics of both living and non living things. It is an obligatory parasite.
29. . **Protozoa:** Microscopic single-celled eukaryotic microbes. Some are pathogenic and some are not.
30. **Mutation:** A sudden change in the genetic make up of a cell is called mutation.

Date 12th November 2018

IMPORTANCE OF MICROBIOLOGY FOR NURSES:

Microbiology is very important and useful and it enables the nurses to:

1. Know the nature and behavior of microorganisms in relation to infectious diseases.
2. Know the pathogenicity and virulence of different microorganisms
3. Know the process and purposes of sterilization to prevent communicable diseases.
4. Know the importance of vaccine and other preventive measures against various diseases.
5. Use safe and aseptic techniques while handling patients.
6. Minimize the patients' stay in hospital by preventing cross and nosocomial infection.
7. Be familiar with the effects of microbes on the environment.
8. Gain the knowledge of environmental hygiene and sanitation.
9. Create awareness in community to use safe food and water.
10. Help in generalizing health. 11. Help in minimizing morbidity and mortality rate.
11. It also helps to see how the patient's health progresses during the treatment.

- 12. Nurses use *hot water or anti-septic* as a measure to sterilize the surgical knives, needles, scissors and other metals instruments to free from microbes.

13. Many patients admitted in the hospital are prescribed with antibiotic as part of treatment. But not all of them will be effective to the patients. Then to test effectiveness, the patients sputum, fecal, urine or blood *samples taken. This sample is examined for the type of microbe* and based on the identification, the right antibiotic is given.

14. Further nurse can also *identify blood groups* of the people by simple immune reactions.
15. It also helps *detect diseases like Tuberculosis by simple skin test* namely the Mantoux test.