**4th semester**

**BS (DT)**

**Submitted to Dr Sohail**

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**Paper microbiology**

**Q1**. what do you know about parasites explain endo and ecto parasites in details?

Ans. **Parasites**

**Definition**

It is defined as an animal or plant that lives in or upon another organism (host) and draws its nutrient directly from it.

e. g include bacteria, viruses, fungi, protozoas and helminths.

Study of parasites is called parasitology.

Medical parasitology is the study of animal parasites that infect and produce diseases in humans.

**Classification**

1. Ectoparasites

The parasite that live on the outer surface or in the superficial tissues of the host are called ectoparasites. infection caused by these parasites is called infection e.g lice

1. Endoparasites

The parasites that live within the host are called endoparasites. invasion by such parasites is called infection e. g leishmania

Types of endoparasites

1. Obligate parasites

The parasites that cannot exist without a host are called obligate parasites. e. g toxoplasma gonodi.

1. Facultative parasites

The parasites that live a parasitic or free-living existence when an opportunity arises are called facultative parasites e. g naegleria fowleri

1. Accidental parasites

The parasites that attack an unusual host are called accidental parasites. E. g echinococcus granulosus.

1. Aberrant parasites

The parasites that during migration in the host reach a site where they cannot live or develop further are called aberrant parasites e. g toxocara types

Q2. Explain protozoa its characteristic and morphology, also classify protozoa on the basis of motility and reproduction into its types?

Ans.

**Protozoa**

The word protozoa come from Greek protozoon meaning “first animal”. protozoa are unicellular may be multicellular eukaryotic microorganism. Protozoa constitute a large group of about 65000 species. Most of which are harmless free living and inhabits water and soil. A few species are pathogenic in nature parasitize of million of infections in a gear around the world.

**Characteristic**

Mostly unicellular organism with fully functional cell.

Live freely may be parasitic or symbiotic.

Protozoa are chemo-hetrotrops.

They have motile have locomotive organelles e. g flagella and cilia for movement.

**Morphology**

Protozoa are eukaryotic resemble to animal cell contain major cell organelles including nucleus, mitochondria.

They are microscopic in size less than 50 micrometer.

Their organelles are highly specialized for feeding, reproduction and movement.

The cytoplasm of protozoa are divided into an outer layer called ectoplam and inner layer called endoplasm.

Ectoplasm helps in movement feeding and protection.

Endoplasm houses nucleus , mitochondria and food.

Some protozoa have special appendages flagella and cilia that helps in their movements.

Freshwater protozoa have contractile vacuoles to pump out excess water.

Their shape may remain constant specially in ciliates or change constantly ( as seen in amoeba).

**Classification of protozoa**

Protozoa are classified on the basis of their motility and method of reproduction. Also classified into four major types.

1. Flagellates:

Flagellates move by the help of flagella. Tail like structure. The movement is whip like. Examples. Trypnosoma, leishmania (blood pathogen), giardia (intestinal parasites), trichomonas (reproductive tract pathogen).

1. Ciliates:

 Ciliates protozoa have movement through cilia (fine hair like structure attached with their body). Some protozoa have special kind of cilia for feeding and attachment. Most are harmless. Only one species Balantidium coli is pathogenic for human causes a rare and server from of dysentery.

1. Sarcodina:

Major locomotor organelles in sarcodina is pseudopodia ( psedo means false, podia means foot). Example is amoeba. Most species are harmless. Enaemoba is a parasitic for human causes intestinal disease.

1. Sporozoites:

They are the nonmotile form of protozoa. Sporonzoites have well-developed sexual and asexual stages. Entire group is parasitic in nature and are harmful. Common example are plasmodium (causes 100 to 300 million infection world wide). Toxoplasma gondi (causes toxoplasmosis).

Q3.write down name of organelles and its function present in paramecium and euglena?

Ans.

**Paramecium:**

1. cytoplasm:

Support the internal structure and shape consistency of the cell.

1. Anal pore:

Help in Feces secretion.

1. Food vacuole:

Help in digestion of food.

1. Oral groove:

Food intake through cilia.

1. Cilia:

Movement food intake receptors.

1. Micronucleus:

Help in reproduction.

1. Macronucleus:

Non-reproductive cell function e. g metabolism.

1. Contractile vacuole:

Expels excess liquid on contraction.

**Euglena**

1. Nucleus:

Contains the genetic material (brain of the cell).

1. Chloroplast:

Help in photosynthesis.

1. Stigma (eyespot):

Allows the cells to sense light direction and intensity and respond to it.

1. Cytoplasm:

Support the internal structure and shapes and consistency of the cell.

1. Nucleolus:

Contributes to ribosome synthesis.

1. Flagellum:

Help in movement.

1. Contractile vacuole:

Expels excess water.

1. Photoreceptor:

Light-sensitive protein involved in the sensing and response to light.

Q4. What is antibiotic resistance. Explain the mechanism of bacterial resistance. Its causes and solution to the problem?

Ans.

**Antibiotic resistance**:

Antibiotic resistance occurs when an antibiotic has lost its ability to effectively control or kill bacterial growth, in other words, the bacteria are resistant and continue to multiply in the presence of therapeutic levels of an antibiotic.

**Mechanism of antibiotic resistance:**

Denied access: antibiotic wants to pass the bacterial cell membrane but membrane becomes impermeable for antibiotic e. g imipenem

Antibiotic modification: in second step antibiotic becomes modified by the help of bacterial enzyme. E. g beta lactamase inactivates penicillin

Altered target site: antibiotic cannot bind to its intended target because the target itself has been modified.

Pumping out: the antibiotic faster than it gets in e. g tetracyclines

Alternative target: typically enzyme. E. g alternative pencillin binding protein in MRSA.

**Causes:**

Over prescription:

1. Physicians prescribe medicine without detecting the pathogen.
2. Prescribe broad spectrum antibiotics when narrow spectrum is actually needed.

Patient non-compliance:

1. Antibiotics are prescribe in a specific dose regiment.
2. Patients forget to take medicine on right time.
3. Unable to afford full coarse.

Over dose of antibiotics:

1. Antibiotic taken as OTC drug.
2. Retail drug store presents a chaotic situation during drug distribution.
3. Patients demand for antibiotics for normal cold, fever.

Use of antibiotics on domestic animals:

1. A good chance for antibiotics to develop resistance.
2. Spreading of resistance microbes through water and food.

Poor quality of antibiotic:

1. Expired and fake antibiotics.
2. Due to lack of quality compliance and monitoring.

Poor hygiene and sanitation:

1. In some areas waste water hospitals are poorly filtered which allows resistance bacteria to escape.
2. The bacteria spreads when people drinks this water.

**Solution to this resistance:**

Only use antibiotics when prescribed by a certified health professional.

Never demand antibiotics if your health worker says you don’t need them.

Never use leftover antibiotics.

Never share antibiotics with others.

Make information available on the impact of antibiotic resistance.

Q5. Explain the mechanism of bacterial pathogenicity. write down at least two bacterial disease?

Ans.

**Mechanism of** **bacterial pathogenicity**:

1. Invasion: the ability to invade tissues.

Encompasses mechanism for

Colonization (adherence and initial multiplication)

Production of extracellular substances which facilitate invasion.

Ability to bypass or overcome host defense mechanism.

1. Toxigenesis: ability to produce toxins

Bacteria may produce two types of toxins.

1. Exotoxins are released from bacterial calls and may act at tissue sites removed from the site of bacterial growth.
2. Endotoxins are cells associated substances. (classic sense, endotoxin refers to the lipopolysaccharide component of the outer membrane of gram-negative bacteria)

Endotoxins may be released from growing bacterial cells and cells that are lysed as a result of effective host defense or the activities of certain antibiotics (e. g penicillins and cephalosporins)

Hence, bacterial toxins both soluble and cell associated, may be transported by blood and lymph and cause cytotoxic effects at tissue sites.

Some bacterial toxins may also act at the site of colonization and play a role in invasion.

Bacterial diseases:

1. **Meningitis:**

Meningitis inflammation of the lining around the brain and spinal cord. It is usually caused by infection.

Types:

**Bacterial:** it isn’t as common. But its very serious. It needs to be treated right away to prevent brain damage and death.

**Sinusitis:**

It is an inflammation or swelling of the tissue lining the sinuses.

Acute sinusitis:

A sudden onset of cold like symptoms such as runny, stuffy nose and facial pain that does not go away after 10 to 14 days. Acute sinusitis typically lasts 4 weeks or less.

**Symptoms:**

Facial pain\pressure

Nasal stuffiness

Nasal discharge

Loss of smell

Cough

**Causes:**

Colds

Bacterial upper respiratory tract infections

Fungal sinus infection

Allergies that cause mucus production in the sinuses

Lack of cilia motility.