**IQRA NATIONAL UNIVERSITY**

**DEPARTMENT OF ALLIED HEALTH SCIENCES**

**Final-Term Examination 2020**

**Course Title: ,Medical microbiologyDT 4th Instructor: Muhammad sohail**

**Time: 6 hours Total Marks: 50**

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Q1. What do you know about parasites explain endo and ecto parasites in details

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

Q3. Write down names of organelles and its functions present in paramecium and euglena

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

Q5. Explain the mechanism of bacterial pathogenicity. Write down at least two bacterial diseases in detail.

## What do you know about parasites explain endo and ecto parasites in details

### Q NO.1 Answer

# What is a parasite?

### Introduction to Parasitology

Parasite 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 parasite is known as Parasitology.

Medical Parasitology is the study of animal parasite that infect and produce diseases in humans

## Classification of Parasites

### 1. Ectoparasite

The parasites that live on the outer surface or in the superficial tissues of the host are called ectoparasites. Infection caused by these parasites is called infestation. E.g Lice

### 2. Endoparasite

The parasites that live within the host are

called endoparasites. Invasion by such

parasites is called infection. Eg. Leishmania

### Symptoms

There are many types of parasite, and symptoms can vary widely. Sometimes these may resemble the symptoms of other conditions, such as a hormone deficiency, [pneumonia](https://www.medicalnewstoday.com/articles/151632.php), or [food poisoning](https://www.medicalnewstoday.com/articles/154555.php).

### Types of Endoparasites

### Obligate Parasites

The parasites that cannot exist without a host are called obligate parasites. Eg. Toxoplasma gonodii

### Facultative Parasites

The parasites that live a parasitic or free-living existence when an oppurtunity arises are called facultative parasites. Eg Naegleria fowleri

### Accidental Parasites

The parasites that attack an unusal host are called accidental parasites. Eg. Echinococcus granulosus

### Aberrant Parasites

The parasites that during migration in the host, reach a site where they cannot live or develop further are called aberrant parasites. Eg Toxocara types

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

### Q NO.2 Answer

## Protozoa

The word protozoa is come from Greek protozoon word meaning "First Animal"

Protozoa are unicellular (may be Multicellular) Eukaryotic microorganism.

Protozoa constitute a large group of about 65,000 species. Most of which are harmless free living and inhabits water and soil

A few species are pathogenic in nature parasitize human and other animals causing hundreds of million of infections in a year around the world

1- Protozoa are unicellular (eukaryotic) or acellular organisms which are capable of performing all the vital functions of life.

2- Protozoan is measured in microns (size vary from 2-150 p).

3- Cytoplasmic extension in form of pseudopodia, flagellae or cilia are responsible for locomotion.

4- Nucleus may be compact with diffuse chromatin or vesicular with central or eccentric karyosome (DNA) and peripheral chromatin (RNA).

5- Respiration is mostly anaerobic.

6- Secretion: Protozoa secrete digestive enzymes, toxms, cytolysin and antigenic substances.

7-Reproducuon. may be asexual or sexual.

# Characteristics

• Mostly Unicellular organism with fully functional cell

• Live freely, may be parasitic or symbiotic

• Protozoa are chemo-hetrotrops

• They are 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 um.

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

• The cytoplasm of protozoa are divided into an outer layer called Ectoplasm and an 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

• They are classified into Four main types

• Flagellates

• Ciliates

• Sarcodina

• Sporozoates

## Q3. Write down names of organelles and its functions present in paramecium and euglena

### Q NO.3 Answer

## PARAMECIUM

Cilia movement food intake receptors

Micronucleus reproduction

Macronucleus non-reproductive cell functions e.g. metabolism

Cytoplasm supports the intemal structures & shape and consistency of the cell

Anal pore feces secretion

Contractile vacuole expells excess liquid on contraction

Food vacuole digests the food

Oral groove (cytostome)food intake through cilia (water currents)

## EUGLENA

Nucleus contains the genetic material brain of the cell

Chloroplast photosynthesis

Cytoplasm supports the internal structures & shape and consistency of the cell

Nucleolus contributes to ribosome synthesis

Flagellum movement

Contractile vacuole Expels exces water

Photoreceptor light-sensitive protein involved in the sensinl and response to light

Stigma (eyespot) allows the cells to sense light direction and intensity and respond to it

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

### Q NO.4 Answer

## 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: Antibiotics wants to pass the bacterial cell rnembrane but membrane becomes impermeable for antibiotic: e.g. Imipenem

Antibiotic modification: In second step antibiotic becomes modified by help of bacterial enzyrne. 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 penicillin binding protein (PBP2a) in MRSA

## CAUSES OF ANTIBIOTIC RESISTENCE

### Over prescription of antibiotics

l. Physicians prescribe medicine without detecting the pathogen.

2. Prescribe broad spectrum antibiotics when narrow spectrum is actually needed.

### Patient Non-Compliance

1Antibiotics are prescribed in a specific dose regiment.

2Patients forget to take medicine on right time.

3Unable to afford full coarse.

### Over dose of antibiotics

1 Antibiotics taken as OTC drug.

2 Retail drug store presents a chaotic situation during drug distribution.

3 Patients demand for antibiotics for nonnal 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 antibiotics

1 Expired and fake antibiotics.

2 Due to lack of quality compliance and monitoring.

### Poor hygiene and sanitation.

1In some areas waste water from hospitals are poorly filtered which allows resistant bacteria to escape.

2 The bacteria spreads when people drink this water.

### Solution to this Resistance

1 Only use antibiotics when prescribed by a certified health professional

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

3 Never use left over antibiotics.

4 Never share antibiotics with others.

5 Make information available on the impact of antibiotic resistance.

to the problem

## Q5. Explain the mechanism of bacterial pathogenicity. Write down at least two bacterial diseases in detail.

### Q NO.5 Answer

## Mechanisms of Bacterial pathogenicity

1. Invasiveness: the ability to invade tissues.

.encompasses mechanisms for

.colonization (adherence and initial multiplication),

.production of extracellular substances which facilitate invasion (invasins) and

.ability to bypass or overcome host defense mechanisms.

2. Toxigenesis: ability to produce toxins.

\*Bacteria may produce two types of toxins:

exotoxins and endotoxins.

.Exotoxins are released from bacterial cells and may act at tissue sites removed from the site of bacterial growth.

.Endotoxins are cell-associated substance. (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 (e.g. lysozyme) 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 andcause cytotoxic

effects at tissue sites

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

### Pneumonia

• Pneumonia is an inflammation of the lungs caused by bacteria, viruses, or chemical irritants.

• The air sacs fill with pus and other liquid.

### Bacterial Pneumonia

• Most common of which is streptococcus pneumonia

Sym ptoms

Shaking, chills

Chattering teeth

Severe chest pain

High temperature

Heavy perspiring

Rapid pulse

Rapid breathing

Bluish color to lips and nail beds

Confused mental state or delirium

Cough that produces rust-colored or greenish mucus

### Typhoid

It's a bacterial disease caused by Salmonella typhi.

• Transmitted through ingestion of food or drink contaminated by the feaces or urine of infected people.

### Causes

• Contact with chronic asymptomatic typhoid carrier

• Water is contaminated with sewerage system.

### Symptoms

Headache/ Anorexia

Abdominal Discomfort

Lethargy

Diarrhea

Sustained fever as 103 or 104 F

Chest congestion

Vom iting

Slow Heart beat

Soft Palpable spleen

Hepatomegaly