**IQRA NATIONAL UNIVERSITY**

**DEPARTMENT OF ALLIED HEALTH SCIENCES**

**Final-Term Examination 2020**

**Course Title: ,Medical microbiology DT 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

**PARASITES:** Parasites are organisms that lives in or upon their host and get nutrients directly from it. Parasites get nourishment from other organisms. Parasites may harm their host. Without host, parasite cannot live, grow and multiply. Tapeworm, fleas and barnacles are few examples of parasite.

**ECTOPARASITES:** Ecto is a prefix that means outer. Ecto parasites lives externally on the host and do not kill it or may live in the superficial tissues. They do not carry disease causing agents instead they are direct cause of diseases. Virtually, all ectoparasites are arthropods, that is they are invertebrates with a chitinous exoskeleton. Infections caused by such parasites is called infestation. EXAMPLE: Lice, flea and red bugs.

**ENDOPARASITES:** Endo means inside. Endoparasites lives within the host to survive. Invasion caused by endoparasite is known as infection. EXAMPLE: Giardia lamblia, an anaerobic protozoan parasite which reproduce via binary fission. Endoparasite affects humans, cats and dogs among ather wild anaimals. **TYPES OF ENDOPARASITES:** Following are the types of endoparasites. 1.**Obligate Parasites;** Those parasites which cannot exists without any host, are called obligate parasites. Example: Toxoplasma gonodi 2.**Facultative Parasites;**  Those parasites that lives a free-living existence when an opportunity arises, are known as facultative parasites. Example: Naegleria fowleri 3. **Accidental Parasites:**  Those parasites that target and attacks an unusual host are called accidental parasites. Example: Echinococcus granulosus 4. **Aberrant Parasites:** The parasites which reaches a site where they cannot live or multiply, during migration in the host, such parasites are called aberrant parasites. Example: Toxocara types

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

**PROTOZOA:** Protozoa come from a Greek word Protozoon meaning ‘’First Animal” Protozoa is a unicellular eukaryote, either free living or parasitic. Protozoa constitutes a large group of about 65,000 species. A few species of protozoa are pathogenic in nature.

**CHARACTERISTICS:** They are unicellular but performs all physiological activities such as locomotion, reproduction, respiration, ingestion, digestion and excretion. Most are microscopic. They are chemo-hetrotrophs. They are motile and move through flagella and cilia. All symmetries are present. No germ layers are present. Both sexual and asexual reproduction occurs in protozoa but majority are asexual. No organ or tissues are formed but specialized organelles serve many of these functions. They include free-living, mutualistic and parasitic forms.

**MORPHOLOGY:** The size of protozoa ranges between 3 to 300 micrometers. Few ciliate and amoeba are larger enough to be seen with naked eyes, they are 4 to 5mm. Except sporozoates, all protozoas are motile, either through cilia, flagella or pseuodopodia. Protozoa has Eyespot that can detect change in light. Respond to light and learn by trial and error. Protozoa contains major cell organelles, including nucleus, mitochondria. The cytoplasm of protozoa are divided into an outer layer called Ectoplasm and an inner layer called Endoplasm. Endoplasm houses nucleus, mitochondria and food. Fresh water protozoa have contractile vacuoles to pump out excess water. The shape may remain constant specially in ciliates or change constantly as seen in amoeba.

**CLASSIFICATION OF PROTOZOA: on the basis of their reproduction and motility** Protozoa are classified into 4 main types. 1.**Flagellates:** Move with the help of flagella, which is a tail-like structure. The movement is whip like. Examples of flagellates are; Trypsonoma, Leishmenia <blood pathogen> Giardia <intestinal parasite>

2.**Ciliates:** Ciliates have movement through cilia which isfine hair-like structure attached with their bodies. Some protozoa have special kind of cilia for feeding and attachment. Most are harmless except one species Balantidium colii is pathogenic for humans, causing a rare and severe form of dysentery.

3.**Sarcodina:** Pseudopodia is major locomotory organelles in sarcodina. Ameoba is the most common example. Most species are harmless.

4.**Sporozoites:**  Sporozoites are the only non-motile form of protozoa. They have well developed sexual and asexual stages. All sporozoites are parasitic in nature and are harmful. Some common sporozoites and their infections are; Plasmodium <causes malaria and responsible for 100 to 300 million infections worldwide. Toxoplasma Gonodii <causes toxoplasmosis>

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

**ORGANELLES IN PARAMECIUM:**  Following are the functions of organelles of paramecium.

1.**Cilia:**  Function of cilia is movement, food intake and also act as receptor.

2.**Cytoplasm:** Function of cytoplasm is to support the internal structure and shape, and consistency of the cell.

3.**Micronucleus:** Function of micronucleus is reproduction.

4.**Macronucleus:** Function of macronucleus is non-reoroductive i;e: metabolism

5.**Contractile Vacuoles:**  Function of contractile vacuole is to expel excess water or liquid on contraction.

6.**Anal Pore:**  Function of anal pore is secretion of feaces.

7.**Food Vacuole:**

8.**Oral Groove:** Function of oral groove is food intake through cilia <water currents>

**ORGANELLES OF EUGLENA:** Following are the functions or organelles of euglena.

1.**Cytoplasm:**  Supports the internal structure, shape and consistency of the cell.

2.**Nucleolus:**  Contributes to ribosome synthesis.

3.**Flagellum:** Movement

4.**Contractile Vacuole:** Expels excess water.

5.**Photoreceptor:**  Respond to light.

6.**Nucleus:**  Brain of the cell, contain genetic material.

7.**Chloroplast:** Photosynthesis.

8.**Stigma: Eyespot**  Allow the cell 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

**ANTIBIOTIC RESISTANCE:** Antibiotic resistance occurs when an antibiotic has lost its ability to effectively control or kill bacterial growth.

**MECHANISM OF ANTIBIOTIC RESISTANCE:** Following steps are include in antibiotic resistance.

1.**Denied access:** Antibiotics wants to pass the cell membrane but membrane become impermeable for antibiotic. Example; Imipenem

2.**Antibiotic modification:** In second step, Antibiotic become modified by the help of bacterial enzyme. Example; beta-lactamase inactivates pencillin.

3.**Altered Target site:** Antibiotic cannot bind to its intended target because the target itself has been modified.

4.**Pumping out:** Pumping out the antibiotic faster than it gets in. Example: Tetracyclines.

5.**Alternative target:** Typically enzyme. Example: Alternative penicillin binding protein PBP2a in MRSA.

**CAUSES OF ANTIBIOTIC RESISTANCE:** 1. Over prescription of antibiotics 2. Patient non-complaince 3. Over dose 4. Use of antibiotic on domestic animals 5. Poor quality of antibiotics 6. Poor hygiene and sanitation.

**SOLUTION TO ANTIBIOTIC 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.

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

**PATHOGENICITY:** It is the ability to produce disease in a host organism.

**MECHANISM OF BACTERIAL PATHOGENICITY:**

1.**Invasiveness:** It is the ability to invade tissues. Encompasses the mechanisms for:; a. Colonization <adherence and initial multiplication> b. Production of extracellular substances which facilitates invasion <invasins> c. Ability to bypass and overcome host defence mechanisms.

2.**Toxogenisis:** Ability to produce toxins. Bacteria may produce 2 types of toxins. A. Exotoxins: B. Endotoxins Endotoxins may be released from growing bacterial cells and cells that are lysed as a result of effective host defense <lysozymes> or the activities of certain antibiotics <penicilins and cephalosporines> .

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

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

**BACTERIAL DISEASES:**

**1.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. Typically lasts 4 weeks or less. **Symptoms:**  1. Facial pain and pressure 2. Nasal stuffiness 3. Nasal discharge 4. Loss of smell 5. Cough and congestion **Causes:**  1. Colds 2. Bacterial upper respiratory tract infections 3. Fungal sinus infections 4. Allergies that cause mucous production in the sinuses 5. Lack of cilia motility

**2.BRONCHITIS:** Bronchitis is an inflammation in the lungs , also known as chest cold.

**Symptoms:**  1. Fatigue 2. Wheezing sounds when breathing 3. Tightness or dull pain in the chest 4. Shortness of breath 5. Production of mucous and sputum which can be clear white , yellowish , grey or green in colour, rarely it may be streaked with blood.

**Causes:**  1. Flu 2. Dust 3. Cold 4. Air pollution 5. Viruses usually influenza virus.

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