Effort by M Arif khan



Bt102 Current final term Questions solved by M Arif khan. (2021)

Q.1: What is reverse transcription? 2marks

Answer: A reverse transcriptase is an enzyme used to generate complementary DNA from an RNA template, a process
termed reverse transcription.

Q.2: What is epidemiology? Write the study method of epidemiology. 3-marks

Answer: Epidemiology is the study of the distribution and determinants of health-related states or events in specified populations. The application of this study to the control of health problems

Following are the broad categories of epidemiological studies;

- Cross-sectional studies.
- Case-control studies.
- Cohort studies.
- Intervention studies

Q.3: Explain the following terms.(5-10marks)

Phaeophyta (Kelp):

- Commonly known as brown algae.
- Brownish in color and contains cellulose aliginic acid cell walls.
- Multicellular and contain chlorophyll *a* and *c*, xanthophylls. These store carbohydrates and are used for algin.

Rhodophyta.

- Reddish in color.
- Contains Cellulose cell walls.
- Most are Multi-cellular
- Contains Chlorophyll *a* and *d*, phycobiliproteins.
- Store glucose polymer.

Chlorophyta.

- It is a Green algae
- It contains Cellulose cell walls
- These are Unicellular or multi-cellular
- Contains Chlorophyll *a* and *b*
- Store glucose polymer
- Rise to terrestrial plants

Bacillariophyta.

- These are Brownish in color
- Contains cell wall which is composed of Pectin and silica.
- These are Unicellular.
- Contains Chlorophyll *a* and *c*, carotene, xanthophylls.
- Bacillariophyta Store oil and Fossilized diatoms formed oil.
- Produce domoic acid.

Dinoflagellata.

- These are Brownish in color.
- Contains Cellulose in plasma membrane.
- These are Unicellular.
- Contains Chlorophyll *a* and *c*, carotene, xanthins.
- Store starch.
- Some are symbionts in marine animals.
- Neurotoxins cause paralytic shellfish poisoning

Q.4: Explain Natural immunity, Aquired active and passive immunity. 3mrks

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Natural immunity: Immunity that is naturally existing.Natural immunity does not re quire prior sensitization to an antigen.

Aquired Active Immunity: Acquired active immunity occur when the individual is introduced to a live microorganism, develops the disease and gets safe due to the fundamental safe response. Once a microbe penetrates the body's skin, mucous membranes, or other primary defenses, it interacts with the immune system.

Passive Immunity:

Passive immunity is protection from a disease provided by antibodies created outside of the body. Passive immunity can occur naturally, when maternal antibodies are transferred to the fetus through the placenta.

Q.5: What is Plaque? 2marks

Answer: Plaques are equivalent to bacterial colonies. Basically a plaque is an area where the virus infection has lysed the cells. These plaques are formed on cultured cells in a culture dish. Plaques can be counted easily much like bacterial colonies.

e.g: Dental plaque is an example of bio-film.

Q.6: What is hypersensitivity? Explain its types? 5-marks

Answer: Hypersensitivity refers to undesirable reactions produced by the normal immune system, including allergies and autoimmunity.

Types: Following are the four types of hypersensitivity;

Type-I hypersensitivity: Type-1 hypersensitivity reaction is an allergic reaction provoked by re-exposure to a specific type of antigen referred to as an allergen. The reaction may be either local or systemic. Its examples are Asthma and dermatitis.

Type-II hypersensitivity: Type II hypersensitivity reaction refers to an antibody-mediated immune reaction in which antibodies (IgG or IgM) are directed against cellular or extracellular matrix antigens with the resultant cellular destruction, functional loss, or damage to tissues.

Type-III hypersensitivity: Type III hypersensitivity occurs when there is an excess of antigen, leading to small immune complexes being formed that fix complement and are not cleared from the circulation. It involves soluble antigens that are not bound to cell surfaces

Type-IV hypersensitivity: Type IV hypersensitivity, also called delayed-type hypersensitivity involves T-cell antigen interactions that cause activation and cytokine secretion.
This type of hypersensitivity requires sensitized lymphocytes that respond 24–48 h after exposure to soluble antigens.

Q.7: Name the drugs which resist cell wall? 2marks

Answer: Penicillin and cephalosporin are the major drugs (antibiotics) that inhibit bacterial cell wall synthesis. They are called beta-lactams.

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Q.8: Explain Primary and secondary immune response. 5marks

Primary immune Response: The primary immune response occurs when an antigen comes in contact to the immune system for the first time. During this time the immune system has to learn to recognize antigen and how to make antibody against it and at last produce memory lymphocytes.

When a person is exposed to antigen the antigen is presented to B cells which start making antibodies. Initially, there are no detectable antibodies in the serum. However, after 3-5 days, IgM antibodies are secreted and then after 7-10 days, the same B cell starts making IgG. The level of IgG rises to a level and then it starts declining. This is a typical response of an antigen exposure and is called a primary immune response.

Secondary immune Response: The secondary immune response occurs when the second time the person is exposed to the same antigen. At this point immunological memory has been established and the immune system can start making antibodies immediately.

During the secondary immune response, memory T cells rapidly generate into active helper T-cells specific to that antigen, while memory B cells rapidly produce antibodies to neutralize the pathogen.

Q.9: What is disk diffusion method? 2-3marks

Answer: The disk-diffusion agar method tests the effectiveness of antibiotics on a specific microorganism. An agar plate is first spread with bacteria. Then paper disks of antibiotics are placed atop of it. The bacteria is then allowed to grow on the agar media and then observed for growth and effect of the antibiotic on it.

Q.10: What is the function of capsule and write the name of bacteria which produced it? 2marks

Answer: The capsule impairs phagocytosis and help the organisms evade the immune system; however, antibodies can help cells of the immune system in phagocytosis of such encapsulated organisms. Only a few bacteria produce capsule which include Strep pneumonia, Klbesiella pneumonia.

Q.11: Viral replication: Viral replication is the formation of biological viruses during the infection process in the target host cells. Viruses must first get into the cell before viral replication can occur. Through the generation of abundant copies of its genome and packaging these copies, the virus continues infecting new hosts.

Q.12: Difference b/w Antigen and Epitopes. 2marks

- A foreign substance that provokes immunity is called an antigen while Specific regions on antigen called epitope.
- An antigen is any substance that causes your immune system to produce antibodies against it. While epitope is known as antigenic determinant, is the part of an antigen that is recognized by the immune system, specifically by antibodies, B cells, or T cells.

Q.13: What is difference b/w capsule and Slime. 2-marks

If glycol-calyx is organized and firmly attached to the cell, it is called a capsule. Capsule plays important role in virulence. It can also be a part of the vaccine against the bacteria to which it belongs. It can be demonstrated by negative staining technique. While, if glycol-calyx is loosely attached to the cell, it is called slime.

Q.14: Bactericidal and Bacteriostatic drug. 2 marks

Bactericidal: Those antibiotics that kill and lyse the cells are called bactericidal.
Bacteriostatic: Such antibiotics stop the growth of the organism, they do not kill the cells. Cells of the immune system then clear them from the body.

Q.15: Difference b/w Prevalence and incidence. 2-mrks

- **Prevalence**: New + existing cases while **Incidence:** # of new cases in a given time period in a population.
- Prevalence refers to proportion of persons who have a condition at or during a particular time period while incidence refers to the proportion or rate of persons who develop a condition during a particular time period.

Q.16: Structure of Algae:

Answer: Body of multi-cellular alga is called a thallus which consists of branched holdfasts (anchor alga to rock) stem-like hollow stipes and leaf-like blades.

Q.17: Which factors effect the location of algae on ocean? 2marks

Answer: Algae location in oceans depends on the following factors;

- Aavailability of nutrients.
- Wavelength of light.
- The surface on which to grow.

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Q.18: Acid fast staining. 3-marks

Answer: Acid fast stains are used to differentiate acid fast organisms such mycobacteria. Acid fast bacteria have a high content of mycolic acids in their cell walls. Acid fast bacteria will be

red, while nonacid fast bacteria will stain blue/green with the counter-stain with the Kinyoun stain.

Q.19: What are Antigen presenting cell. 3 marks

Answer: These cells are able to present antigens to B cells for making antibodies by B cells. There are three cells that fall into this category:

- Dendritic cells. M
- Macrophages.
- B cell.

Q.20: Use of antifungal drugs. 2mrks

Answer: Antifungal drugs are used to treat fungal infections. They target processes and structures unique to fungi in order to kill fungal cells or prevent them from growing

Q.21: How microbes become resistant against antimicrobial?

Answer: Microbes develop resistance mechanisms by using instructions provided by their DNA. Often, resistance genes are found within plasmids, small pieces of DNA that carry genetic instructions from one germ to another. This means that some microbes can share their DNA and make other germs become resistant.

Q.22: What are inflammation and its consequence? 3mrks.

Answer: Inflammation refers to the body process of fighting against infections, injuries and toxins in an attempt to heal itself.

Consequences: When inflammation happens, chemicals from body's white blood cells enter into blood or tissues to protect the body from invaders. This raises the blood flow to the area of injury or infection. It can cause redness and warmth. Some of the chemicals cause fluid to leak into your tissues, resulting in swelling.

Q.23: Difference b/w Mortality and Morbidity. 3mrks

Answer:

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- Morbidity is the state of being unhealthy for a particular disease or situation while mortality is the number of deaths that occur in a population.
- Morbidity rate is the number of people affected in relation to the total population in a given time period while Mortality rate is the number of deaths from a disease in relation to the population in a given
  time.

Q.24: Define the following terms. 3marks.

Virion: Virion an entire virus particle, consisting of an outer protein shell called a capsid and an inner core of nucleic acid (RNA or DNA). The core provides infectivity and the capsid provides specificity to the virus.

VIROIDS: They are composed only of circular single stranded (ss) RNA.

Virus: A virus is a submicroscopic infectious agent that replicates only inside the living cells of an organism. Viruses infect all types of life forms, from animals and plants to microorganisms, including bacteria and archaea.

Q.25: What are Cytokines? 2 marks

Answer: Cytokines are released as a result of defense cell stimulation by PAMPs and TLRs interactions. Cytokines recruits more immune cells and also stimulate adaptive immune response.

Q.26: Define endemic, epidemic and Pandemic. 3-marks

Endemic: Endemic consistently present, but with low incidence. Infected ones are reservoir of infection.
Epidemic: within an area unusually high incidence of a disease is known as epidemic.
Pandemic: World-wide epidemic disease is called pandemic.

Q.27: Write the mode of action of the following Chloramphenicol Streptomycin and Tetracyclines.
Answer:

Chloramphenicol: It Binds to 50S and Inhibits peptide bonding.

Streptomycin: It Changes shape of 30S and Misreading of RNA codes.

Tetracyclines: Interfere with attachment of tRNA to mRNA ribosome complex

Q.28: Which drugs inhibits the protein synthesis? 2-marks

Answer: Several antibiotics act on ribosomes and inhibit protein synthesis like Streptomycin, Tetracyclines, chloramphenicol, and clindamycin.

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