**Mid-term Assignment**

**Pathology and microbiology (DPT 4th)**

**Instructor: Dr. Imran khan**

**Max Marks: 30**

**Name: Amir Faraz ID: 14928**

**Q2: What is cancer? How cancer is diagnosed? What is the role of genetics in cancer? Also explain TNM diagnostic test for cancer?**

**ANS:**

**CANCER:**

Cancer is the uncontrolled growth of abnormal cell in the body. cancer can be developing when the body’s normal mechanism stops working and the old cell do not die and there is growth of abnormal cells occurs these extra abnormal cells may form a mass of tissue, called a tumor.

**CANCER DIAGNOSIS:**

There are different ways to diagnose cancer which are as follow.

1. **PHYSICAL EXAM:**

The doctor will feel the area of body for lumps to that may indicate tumor. the doctor will also check for some other physical abnormalities such as change in skin color or enlargement of an organ that may indicate the presences of cancer.

1. **LABORATORY TEST:**

Laboratory test may include urine test and blood tests, these tests may help the doctor to identify abnormalities that can cause cancer.

1. **IMAGING TESTS:**

In imagining test the doctor examine bones and internal organs in a noninvasive way. Imagining test used in diagnosing cancer may include a computerized tomography CT scan, bone scan and MRI X-RAY and PET scan.

1. **BIOPSY:**

In biopsy the doctor collects a sample of cells for testing in the laboratory. There are several ways of collecting a sample, in which biopsy procedure is right for you depends on your type of cancer and its location.

**ROLE OF GENETIC IN CANCER:**

Our gene has an important role in causing cancer because cancer us an genetic disease. Cancer caused when certain changes occurs to the gene, our gene control the function and growth of our cell and when certain changes/ mutation occurs to our gene it leads to caused cancerous cell.

**TNM DIAGNOSTIC TEST FOR CANCER:**

The TNM test is widely used for cancer staging system.

* The latter T refers to tumor it describes the size of the and location of the tumor, including how much the tumor has grown in centimeters.
* The letter N refers to number of nearby lymph nodes that have cancer.
* The letter M stand for metastatic. It indicates whether the cancer has spread to other parts of the body, called distant metastasis. if the cancer has not spread, it is labeled MO. If the cancer has spread it is considered M1.

**Q1: Write down any viral or bacterial disease in detail?**

**ANS:**

**HIV/AIDS:**

Acquired immunodeficiency syndrome is a chronic disorder caused by HIV human immunodeficiency virus. The HIV effect the immune system of the body.

HIV is a sexually transmitting infection STI. it can also spread by contact with infected blood from mother to child during pregnancy, childbirth or breast feedings. Without medication it may take years before HIV weakens your immune system to the point that you have AIDS.

**SYMPTOMS:**

The symptoms of HIV and AIDS vary, depending on the phase of infection

* **PRIMARY INFECTION (ACUTE HIV):**

The acute HIV symptoms may include flue like illness within two or four weeks after the virus enters the body. The possible sign and symptoms may include.

* Fever
* Headache
* Rash
* Diarrhea
* Weight loss
* **CLINICAL LATENT INFECTION (CHRONIC HIV):**

In this stage the infection is present in the body and in white blood cells. However, many people may not have any symptoms or infections during this time.

This stage can last for many years if you’re not receiving antiretroviral therapy ART, some people develop more severe disease much sooner.

**SYMPTOMATIC HIV INFECTION:**

As the virus continues to multiply and destroy your immune cells, the cells in your body that help fight off germs you may develop mild infection or chronic signs and symptoms such as.

* Fever
* Fatigue
* Swollen lymph nodes
* Weight loss
* Oral yeast infection
* Shingles
* Pneumonia

**WHEN TO SEE DOCTOR:**

If you think you may have been infected with HIV or are at risk of contracting the virus, see a doctor as soon as possible.

**Q:3 Explain the structure of Bacterial Cell. How antibiotics kills bacteria? What is the mood of action of antibiotics?**

**ANS:**

**Structure of Bacterial Cell:**

It is a gel like matrix composed of water, enzymes, nutrients, waste, gases and contains cell structure such as ribosomes, a chromosome and plasmid. The cell envelope encases the cytoplasm and all its components. Unlike the eukaryotic cells, bacteria do not have a membrane enclosed nucleus.

A prokaryotic cell has five essential structure components a nucleoid (DNA), ribosomes,cell membrane, cell wall and some sort of surface layer which may or may not be inherent part of the wall. Structurally there are there regions:

* Appendages in the form of flagella and pili
* A cell envelope consisting of a capsule
* Cell wall and plasma membrane and a cytoplasm region that contains the cell chromosome and ribosomes and various sorts of inclusions.

**How antibiotics kills bacteria?**

Antibiotics fight bacteria infection either by killing bacteria or slowing and suspending its growth. They do this by attacking the way or coating surrounding bacteria. Interfering with bacteria reproduction.

An antibiotic is a type of antimicrobial substance active against bacteria and is the most important type of antibacterial agent for fighting bacterial infection. Antibiotics medication are widely used in the treatment of and prevention of such infections. They may either kill or inhibit the growth of bacteria.

**Antibiotics Mode of Action:**

Different antibiotics have different modes of action, Owing to the nature of there structure and degree of affinity to certain target site within bacterial cell.

* **Inhibitors of cell wall synthesis:**

While the cells of humans and animals do not have cell walls, this structure is critical for the life and survival of bacterial species. A drug that targets cell walls can therefore selectively kill or inhibit bacterial organisms.

Examples: penicillin. cephalosporins, bacitracin and vancomycin

* **Inhibitors of cell membrane function**

Cell membranes are important barriers that segregate and regulate the intra-and extracellular flow of substances. A disruption or damage to this structure could result in leakage of important solutes essential for the cell's survival. Because this structure is found in both eukaryotic and prokaryotic cells, the action of this class of antibiotic are often poorly selective and can often be toxic for systemic use in the mammalian host. Most clinical usage is therefore limited to topical applications.

Examples: polymyxin B and colistin

* **Inhibitors of protein synthesis**

Enzymes and cellular structures are primarily made of proteins. Protein synthesis is an essential process necessary for the multiplication and survival of all bacterial cells. Several types of antibacterial agents target bacterial synthesis by binding to either 30S or 50S subunits of the intracellular ribosomes. This activity then results in the disruption of the normal cellular metabolism of the bacteria, and consequently leads to the death of the organism or the inhibition of its growth and multiplication.

Examples: Aminoglycosides, macrolides, lincosamides, streptogramins. chloramphenicol, tetracyclines.

* **Inhibitors of nucleic acid synthesis**

DNA and RNA are keys to the replication of all living forms, including bacteria. Some antibiotics work by binding to components involved in the process of DNA or RNA synthesis, which causes interference of the normal cellular processes which will ultimately compromise bacterial multiplication and survival.

Examples quinolones, metronidazole, and rifampin

* **Inhibitors of other metabolic processes**

· Other antibiotics act on selected cellular processes essential for the survival of the bacterial pathogens. For example, bath sulfonamides and trimethoprim disrupt the folic acid pathway, which is a necessary step for bacteria to produce precursors important for DNA synthesis. Sulfonamides target and bind to dihydropteroate synthase, trimethoprim inhibits dihydrofolate reductase; both of these enzymes are essential for the production of folic acid, a vitamin synthesized by bacteria, but not humans.