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**Q1) Write down any viral or bacterial disease in detail.**

**Ans) VIRAL DISEASE:**

**DEFINATION:**

Viruses are very small infectious agents. They are made up of a piece of genetic material. Such as DNA or RNA, that is enclosed in a coat of protein.

Viruses invade cells in your body and use components of those cells to help them multiply. This process often damage or destroy infected cells.

A viral disease is any illness or health condition caused by a virus.

**THEY ARE NOT ALWAYS CONTAGIOUS:**

Not all viral diseases are contagious. This mean they are not always spread from person to person. But many of them are common example of contagious viral diseases include the flu, the common cold, HIV. And herpes. Other type of viral diseases spread through other means, such as the bite of an infected insects.

**SYMPTOMS:**

The symptoms of HIV and AIDs vary depending on the phase of infection.

**PRIMARY INFECTION (Acute HIV):**

Some people infected by HIV develop a flu like illness within two to four weeks after the virus enters the body. This illness, known as primary (acute) HIV infection, may last for a few weeks possible signs and symptoms include:

- 1) Fever
- 2) Headache
- 3) Muscle aches and joint pain
- 4) Rash
- 5) Swollen lymph gland
- 6) Diarrhea
- 7) Weight loss

**CLINICAL LATENT INEFCTION (CHRONIC HIV):**

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

**SYMPTOMATIC HIV INFECTIONS:**

As the virus continuous to multiply and destroy your immune cells the cells in your body that help fight off germs you may develops mild infections or chronic signs and symptoms such as:

- 1) Diarrhea
- 2) Weight loss
- 3) Oral yeast infection (thrush)
- 4) Pneumonia

**CAUSES:**

HIV is caused by a virus. It can spread through sexual contact or blood or from mother to child during pregnancy childbirth or breast feeding.

**HOW HIV SPREADS:**

To become infected with HIV infected blood, semen or vaginal secretions must enter your body. This can happen in several ways:

- 1) By having sex
- 2) By sharing needles
- 3) From blood transfusions
- 4) During pregnancy

**RISK FACTORS:**

Anyone of any age, race, sex or sexual orientation can be infected with HIV/AIDs. However you are at greater risk if you:

- 1) Have unprotected sex
- 2) Have an STI.
- 3) Use IV drugs

**COMPLICATIONS:**

HIV infection wakens your immune system, making you much more likely to develop many infections and certain types of cancers.

**INFECTIONS COMMON TO HIV/AIDS:**

- 1) Pneumocystis pneumonia (PCP).
- 2) Candidiasis (thrush).
- 3) Tuberculosis (TB). Etc.

## **CANCER COMMON TO HIV/AIDS:**

- 1) Lymphoma.
- 2) Kaposi's Sarcoma

## **PREVENTION:**

There is no vaccine to prevent HIV infection and no cure for AIDs. To help prevent the spread of HIV:

- 1) Use a clean needle
- 2) If you are pregnant get medical care right away.
- 3) Consider male circumcision
- 4) Consider preexposure
- 5) Prophylaxis (PrEP)

**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 a broad term. It describes the disease that results. When cellular changes cause the uncontrolled growth and division of cells. Some type of cancer cause rapid cell growth, while others cause cells to grow and divide at a slower rate.

Certain forms of cancer result in visible growths called tumors, while others. Such as leukemia, do not. Most of the body's cells have specific functions and fixed lifespans while it may sound like a bad thing, cell death is a part of a natural and beneficial phenomenon called apoptosis. A cell receive instructions to die so that the body can replace it with a newer cell that functions better. Cancerous cells lack the components that interact them to stop dividing and to die.

Cancers cells may appears in one area, then spread via the lymph nodes. These are cluster of immune cells located throughout the body.

### **HOW CANCER IS DIAGNOSED:**

There is no single test that can accurately diagnose cancer. The complete evaluation of a patient usually requires a thorough history and physical examination along with diagnostic testing

### **CANCER DIAGNOSTIC METHOD:**

- 1) Lab tests
- 2) Diagnostic imaging
- 3) Endoscopic exams
- 4) Genetic tests
- 5) Tumor biopsies

### **ROLE OF GENETICS IN CANCER:**

Cancer is a genetic disease cancer is caused by certain changes to genes that control the way our cells function especially how they grow and divide.

Genes carry the instructions to make proteins, which do much of the work in our cell. Certain gene changes can cause cells to evade normal growth controls and becomes cancer. For example, some cancer causing gene changes increase production of a protein that makes cells grow.

Genetic changes that promote cancer can be inherited from our parents if the changes are present in germ cells of the body (eggs and sperm) such changes are called germline changes are found in every cell of the offspring. In general, cancer cells have more genetic changes than normal cells. But each person's cancer has a unique combination of genetic alterations. Some of these

changes may be the result of cancer. As the cancer continues to grow, additional changes will occur. Cancer cells may have different genetic changes.

### **TNM STAGING SYSTEM:**

The TNM system is the most widely used cancer staging system. Most hospitals and medical centers use the TNM system as their main method for cancer reporting.

### **IN THE TNM SYSTEM:**

- 1) The T refers to the size and extent of the main tumor. The main tumor is usually called the primary tumor.
- 2) The N refers to the number of nearby lymph nodes that have cancer.
- 3) The M refers to whether the cancer has metastasized. This means that the cancer has spread from the primary tumor to other parts of the body.

**Q3) Explain structure of bacterial cell. How antibiotics kill bacteria? What is the mode of action of antibiotics?**

**Ans) STRUCTURE OF BACTERIAL CELL:**

The bacterium, despite its simplicity contains a well-developed cell structure. Which is responsible for some of its unique biological structure and pathogenicity. Many structure features are unique to bacteria and are not found among archaea or eukaryotes. Because of the simplicity of bacteria relative to larger organisms and the ease with which they can be manipulated experimentally, the cell structure of bacteria has been well studied revealing many biochemical principles that have been subsequently applied to other organisms.

**HOW ANTIBIOTICS KILL BACTERIA:**

**ANTIBIOTICS:**

Antibiotics are medications used to fight infections caused by bacteria. They are also called antibacterial. They treat infections by killing or decreasing the growth of bacteria.

### **HOW DO ANTIBIOTICS WORK AGAINST BACTERIAS:**

Antibiotics fight bacterial infection either by killing bacteria or slowing and suspending, its growth. They do this by:

- 1) Attacking the wall or coating surrounding bacteria.
- 2) Interfering with bacteria reproduction.
- 3) Blocking protein production in bacteria.

### **MODE OF ACTION OF ANTIBIOTICS:**

Antibiotics or antibacterial action generally falls within one of four mechanisms, three of which involve the inhibition or regulation of enzymes involved the disruption of membrane structure. Many of these cellular functions targeted by antibiotics are most active in multiplying cells. Since there is often overlap in these functions between prokaryotic bacterial cells and eukaryotic mammalian cells.