



ORIGINAL RESEARCH PAPER

Botany

HUMAN IMMUNODEFICIENCY VIRUS VERSUS ACQUIRED IMMUNE DEFICIENCY SYNDROME.

KEY WORDS: HIV, AIDS, Immunity, Infection, DNA

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ABSTRACT

There is a common notion and belief that HIV and AIDS are the same and to prove that wrong we have discussed in this paper why human immunodeficiency virus and acquired immunodeficiency virus are not the same. HIV and AIDS are not the same disease. HIV can be controlled whereas AIDS on the other hand cannot be controlled because by that time the immune system will be beyond repair and the medication will only increase the life expectancy of the patient. HIV enters the host's body and destroys the T-helper cells which are the pillars of the immune system results in a bad immune response. HIV spread through unprotected sex, unsterilised and infected needles, blood transfusions from a patient who is HIV positive to another patient. By avoiding having multiple partners and taking proper precautions we can prevent ourselves from getting infected with this virus. HIV can be controlled through many therapies and medications. They mainly target the CD-4 cells of the immune system. Most of the therapies focus on repairing the genes. There are different medications for HIV and AIDS because of the difference between the severity and the seriousness of both these illnesses.

INTRODUCTION

HIV and AIDS are amongst the most dreaded and life-threatening diseases we humans have been facing for the longest time. HIV stands for Human Immunodeficiency virus and AIDS stand for acquired immunodeficiency syndrome. The HIV-1 virion is a spherical particle, with the size of around 100 nm in diameter, that contains two copies of single-stranded RNA together with the enzymatic machinery. Humans are susceptible to make kinds of infections which lead to various diseases, some may be curable and easy to recover from but once a person comes in contact with HIV it is impossible to completely cure it. You can come in contact with it by coming in contact with infected blood, semen or vaginal fluids. The mutation rate of HIV is very high and it is very hard to make a vaccine for it because of this very reason HIV can mutate itself around the medication that is prescribed which results in HIV being resistant to the medication and those medications now will be ineffective. When the person is diagnosed with HIV, the body goes through tremendous stress both mentally and physically. HIV destroys WBCs (White blood cells) that plays a large role in our body to fight against diseases which in turn makes us susceptible to all kinds of diseases because of our weak immune system. You can have an infection for years without proper medication for HIV before it turns into AIDS. From the above statement, it is understood that a patient who receives proper medication can have HIV without the development AIDS. There are different medications for HIV patients. It only helps their body to fight the disease and keep them from falling ill but it does not cure HIV. If the patient stops medication, HIV will destroy more CD-4 cells which affects their immunity and which will ultimately lead to their death [12].

MATERIALS AND METHODOLOGY

HIV is a virus that is known to attack the body's immune system. With proper medication and caution it can be controlled but if left untreated, it can turn into AIDS. HIV infection in humans came from a species of chimpanzee [10], [11]. Some people have flu-like symptoms after two-four weeks of infection. The symptoms may include fever, fatigue, night sweats, muscle aches, mouth ulcers and rashes [1]. There are three stages of HIV infection. Acute HIV infection is the first stage of infection. In this stage the patient will have high amounts of HIV in their blood, it will be very contagious. The second stage is known as Chronic HIV infection, it is also known as asymptomatic HIV infection. In this stage HIV reproduces at very low levels, without medication this stage

can last for a long time. During this stage the patient can transmit the HIV virus. When this stage comes to an end it is seen that the viral load goes up and the CD-4 cell count goes down. The third stage is known as AIDS (acquired immunodeficiency syndrome). This is the most severe and threatening stage of HIV infection. People who have reached this stage of the infection have severely damaged immune system and they encounter several illnesses. They can have a very high amount of viral load and can be extremely infectious and without treatment they die very soon.

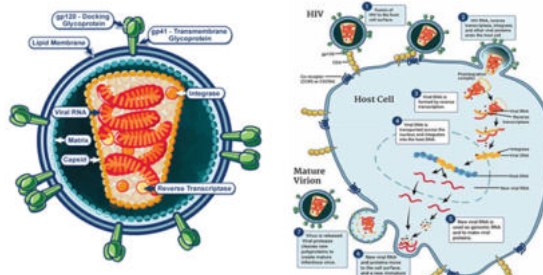


Fig-1a: Structure of Human Immunodeficiency Virus (HIV) (Source-Microbe Online); Fig-1b: HIV multiplication (Source-Source: <https://onlinelearning.hms.harvard.edu>)

Mechanism of HIV in brief

There is always time lag between the infection and appearance of HIV. This can be months or years, there is no specific period. After the retrovirus which causes HIV enters the body of the host, it enters into the macrophage where the replication of the RNA genome to viral DNA occurs with the help of an enzyme called Reverse Transcriptase. Now this viral DNA gets incorporated into the host's DNA and makes the infected cells to produce viral particles. In a way the macrophages act as the HIV production factory. HIV then enters into the T-Lymphocytes and replicates to produce progeny viruses and these viruses which are released into the blood attack the other helper T-lymphocytes. This keeps happening over and over again and results in lower number of T-helper cells in the body of the infected person and it is during this period that the person tends to show the symptoms of HIV infection [8], [9], [14].

Improvement in HIV studies and research

Over the decades, researchers have been able to study and find out interesting things about HIV but are not able to come up with a cure for it. The studies keep going on because there are millions of people that are threatened by the global

HIV/AIDS pandemic. NIAID- supported research on HIV treatment today is concerned about the cure but more importantly focused on treatment and therapies for the infected and in the reduction of transmission. They support scientists to develop longer acting pills. They have come up with two long-acting drugs, rilpivirine LA and cabotegravir LA and are investigating their effectiveness in people who are adhering to antiretroviral therapy. Another study is planned to check if combination of monthly injections of cabotegravir LA and monthly infusions of NIAID-discovered broadly neutralising antibody called VRC01LS can keep HIV suppressed in people who are infection of HIV was monitored and controlled by antiretroviral therapy [7], [15].

Broadly Neutralising Antibodies

Broadly neutralising antibodies or bNAbs are antibodies that are accustomed to treat HIV. Many of the infected patients have shown efficiency in HIV prevention in preclinical trials [15]. It can potentially thwart HIV in 3 ways,

- It binds to the virus and prevents it from entering the cell and destroying it.
- Binds to an infected HIV infected cell, recruiting immunity system component that starts cell killing.
- It binds to the key fragment of HIV, forming an intricate compound that may lead to the stimulation of immune cells almost like a vaccine. By the application of this method, it helps in preparing the patient's immune system for future encounters with the virus [7].

RESULTS AND DISCUSSION

From all this information we are able to come up with only treatment and precautions for HIV and not the cure for it. The more we study into it, the more complex it gets. Recent studies show that there are similarities between the SARS-CoV-2 and the HIV virus. The survival rates in patients infected with the HIV progressing to AIDS have been analysed and the survival rates have gone up to 95% [13]. The fear in population, modification of the original human microbiota, increased synthesis of proinflammatory cytokines, the origin of these vaccines tracing back to animals (animal reservoirs) are some of the similarities that are seen between them. Due to the advancement of the studies in corona virus and the production of its vaccine, there are improvements in the HIV studies as well [6]. We should mainly focus on the prevention and control of HIV infection and the ways by which we can attain that is by maintaining good health, making sure that the needles used are sterile/disinfected during surgeries or blood transfusions or injections. and by having protected intercourse. HIV is very common between drug injecting addicts. When a person who is infected with HIV shares the same needle with another drug user, their blood which carries this virus contaminates the other individuals blood stream and put them in a risk of getting infected with HIV [4]. There are studies going on regarding the use of condoms in sexual activity and it is found that the potential risk of HIV transmission is very less when the sexual activity is protected by the usage of condoms. Condom uses were high among those who had multiple partners [5]. Moreover, HIV can be controlled but once it turns into AIDS the odds of the infected person leading a normal healthy life is impossible. A person diagnosed with HIV should not be treated any different from the ordinary people. It can take a toll on them mentally and make them even more sick and lead to their untimely death.

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