



## HIV: New Hope

Recently a person suffering from HIV has been treated in London called as 'London Patient'. He is the second person after Timothy Ray Brown who got cured of HIV. He has been cured with CCR5-delta 32 technique, which is based on a stem cell transplant involving CCR5-delta 32 homozygous donor cells.

### Human Immunodeficiency Virus (HIV)

- **HIV attacks CD4, a type of White Blood Cell (T cells)** in the body's immune system. T cells are those cells that move around the body detecting anomalies and infections in cells.
- After entering body, **HIV multiplies itself and destroys CD4 cells, thus severely damaging the human immune system.** Once this virus enters the body, it can never be removed.
- CD4 count of a person infected with HIV reduces significantly. In a healthy body, CD4 count is between 500- 1600, but in an infected body, it can go as low as 200.
- Weak immune system makes a person prone to opportunistic infections and cancer. It becomes difficult for a person infected with this virus to recover from even a minor injury or sickness.
- By receiving treatment, severe form of HIV can be prevented.

### Transmission

- HIV is transmitted from person to person **through bodily fluids including blood, semen, vaginal secretions, anal fluids and breast milk.**
- To transmit HIV, bodily fluids must contain enough of the virus. A person with 'Undetectable HIV' cannot transfer HIV to another person even after transfer of fluids.
- 'Undetectable HIV' is when the amount of HIV in the body is so low that a blood test cannot detect it. Treatment can make this possible. But regular monitoring of the same through blood tests is also required.

### Symptoms

- Around 80% of people infected with HIV develop a set of symptoms known as **Acute Retroviral Syndrome**, around 2-6 weeks after the virus enters into body.
- The early symptoms include fever, chills, joint pains, muscle aches, sore throat, sweats particularly at night, enlarged glands, a red rash, tiredness, weakness, unintentional weight loss and thrush.
- A person can carry HIV even without experiencing any symptoms for a long time. During this time, the virus continues to develop and causes immune system and organ damage.

### Global Stats

- Since the beginning of epidemic, more than 70 million people have got infected with HIV virus and about 35 million have died.
- Globally, 36.9 million People were living with HIV at the end of 2017. Of these, 1.8 million were children under 15 years of age.
- According to Global HIV & AIDS statistics, only 59% of those infected with HIV are receiving the antiretroviral drugs.
- The African Region is the most affected region with 1 in 25 adults living with HIV.

## Indian Stats

- The total number of people living with HIV was estimated at 21.40 lakh in 2017.
- India witnessed over 87,000 new cases in 2017 and saw a decline of 85% compared to 1995.

## Treatment

- **Anti-Retroviral Therapy:**
  - It is a **combination of daily medications that stop the virus from reproducing.**
  - The therapy helps in protecting CD4 cells thus keeping the immune system strong enough to fight off the disease.
  - It, besides reducing the risk of transmission of HIV, also helps in stopping its progression to AIDS (a spectrum of conditions caused by infection due to HIV).
- **Stem Cell Transplant:**
  - Under this, **an infected person is treated with stem cell transplant from donors carrying a genetic mutation that prevents expression of an HIV receptor CCR5.**
  - CCR5 is the most commonly used receptor by HIV-1. **People who have mutated copies of CCR5 are resistant to HIV-1 virus strain.**
  - It has been reported that till now, only two people have been cured of HIV by experts using this method of treatment. The first person is Timothy Ray Brown (**Berlin Patient**) who was cured in 2007 and the second is known as **London Patient**, who just got cured of HIV.
  - The difference in the treatment of both patients is that the Berlin Patient was given two transplants and he underwent total body irradiation while the London Patient received just one transplant and also less intensive chemotherapy.
  - Researchers find this method very complicated, expensive and risky.

## Acquired Immune Deficiency Syndrome (AIDS)

- It is a set of symptoms or syndrome caused by HIV. But **it is not necessary that a person infected with HIV will definitely develop AIDS.**
- A person infected with HIV is likely to develop symptoms of AIDS over a period of time when his/her immune system is too weak to fight HIV infection.
- **This is the last stage of HIV when the infection is very advanced and if left untreated will lead to death.**
- A person with HIV whose CD4 count falls below 200 per cubic millimetre is diagnosed with AIDS.
- The risk of HIV progressing to AIDS varies widely between individuals and depends on many factors including:
  - The age of the Individual
  - The body's ability to defend against HIV
  - Access to high quality sanitary healthcare
  - Presence of other infections
  - Individual's genetic resistance to certain strains of HIV
  - Drug-Resistant strains of HIV

**Prevention** includes safe sex, testing and counselling for HIV, voluntary medical male circumcision among other things.

## Timeline:

- **Pre-1980:**
  - It was in early 1900s that a form of Simian Immunodeficiency Virus (SIV) was transmitted to humans in Central Africa. This virus went on to become the pandemic strain of HIV.
  - It is believed that HIV infection was originated in Kinshasa in the Democratic Republic of Congo (DR Congo) around year 1920 when HIV crossed species from chimpanzees to humans.

- In 1959, the first known case of HIV in a human was confirmed in a man who died in Congo.
- Research suggests that virus had arrived in USA around 1968.
- **1980s:**
  - In September 1982, Centre for Disease Control and Prevention (CDC) (USA) used the term 'AIDS' for the first time.
  - In 1983, World Health Organization (WHO) held its first meeting to assess global AIDS situation.
  - By the end of 1985, every region in the world had reported at least one case of AIDS with 20,303 cases in total.
  - In May 1986, the International Committee on the Taxonomy of Virus said that the virus that causes AIDS would officially be called HIV.
  - In February 1987, WHO launched the Global Program on AIDS
  - In March 1987, the first antiretroviral drug zidovudine was approved as treatment for AIDS.
  - In October 1987, AIDS became the first illness to be debated in United Nations General Assembly (UNGA).
  - In 1988, WHO declared 1st December as World AIDS Day
- **1990s:**
  - In 1991, the New York-based Visual AIDS Artists Caucus launched the 'Red Ribbon' Project to create a symbol of compassion for people living with HIV. The Red Ribbon became an international symbol of AIDS awareness.
  - By the end of 1993, there were estimated 2.5 million AIDS cases globally.
  - In 1996, the Joint UN Program on AIDS (UNAIDS) was established.
- **2000s:**
  - From 2001, drug manufacturers began producing discounted generic forms of HIV medicines for developing countries.
  - In January 2003, U.S. President George Bush announced the creation of 'US President's Emergency Plan for AIDS Relief', a 15 billion dollar five year plan to combat AIDS primarily in the countries with high number of HIV infections.
  - In January 2010, the travel ban preventing HIV-positive people from entering USA was lifted.
  - In 2013, UNAIDS reported that AIDS- related deaths had fallen 30% since their peak in 2005.
  - In July 2015, UNAIDS announced that the Millennium Development Goal (MDG) related to HIV and AIDS was reached six months ahead of schedule. The target of MDG 6 was to halt the spread of AIDS by 2015 and to begin to reverse its spread.
  - In 2017, for the first time ever, more than half of the global population living with HIV was receiving the antiretroviral treatment.

*Based on two successful treatment cases, researchers are now considering several approaches to eliminate HIV from the human body. One such approach is Gene Therapy which will modify the CCR-5 gene in a person, but as per experts doing that will be difficult. The latest treatment case has boosted the confidence of researchers and they will continue to explore more and more till they find a proper and less risky treatment.*

## **Drishti Input**

### **HIV-1 and HIV-2**

- There are two types of HIV: HIV-1 and HIV-2.
- HIV-1 is considered the predominant type, representing the vast majority of infections worldwide, while HIV-2 is far less common and primarily concentrated in the west and central African regions.
- While both of these HIV types can lead to AIDS, HIV-2 is much more difficult to transmit and far less virulent than HIV-1.

## **UNAIDS**

- Established in 1996, UNAIDS has been leading and inspiring global, regional, national and local leadership, innovation and partnership to consign HIV to history.
- It is headquartered in Geneva, Switzerland.
- It places people living with HIV and people affected by the virus at the decision-making table and at the centre of designing, delivering and monitoring the AIDS response.
- It charts paths for countries and communities to get on the fast-track to end AIDS and is a bold advocate for addressing the legal and policy barriers to the AIDS response.
- Also, it is leading the global effort to end AIDS as a public health threat by 2030 as part of the Sustainable Development Goal-3 (SDG-3).
- SDG-3 deals with ensuring healthy lives and promoting wellbeing for all at all ages (including universal access to HIV prevention services, sexual and reproductive health services and drug dependence treatment and harm reduction services).

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