



## Human Immunodeficiency Virus

**For Prelims:** Human Immunodeficiency Virus, Bone-marrow transplant, CCR5-delta 32 Mutation.

**For Mains:** Acquired Immunodeficiency Syndrome stage (AIDS), Antiretroviral therapy, Stem Cell Transplant.

### Why in News?

An old man from Germany, referred to as the **Dusseldorf patient**, has become at least the **third person to have been “cured of HIV”** with the virus not being detectable in his body even four years after stopping the medicine.

- This was achieved with a **bone-marrow transplant** from people carrying a specific **HIV-resistant genetic mutation**.

### What are the Other Reported Recoveries from HIV?

- A Berlin patient became the first person to **overcome HIV after receiving two stem cell transplants** in 2007 and 2008 for his blood cancer.
  - The doctors selected a donor with a **genetic mutation called CCR5-delta 32** that makes carriers almost immune to HIV.
- In 2019, **similar results were replicated in the London patient**. Two more cases of successful treatment were reported in 2022.

### What is CCR5-delta 32 Mutation?

- **Cysteine-cysteine chemokine receptor 5 (CCR5)** is the main **HIV co-receptor** involved in the virus and cell-to-cell spread.
- The CCR5 receptors on CD4 cells are used as a doorway by HIV. The **CCR5-delta 32 mutation prevents these receptors** from forming on CD4 cells, which effectively removes the doorway.
- **Only 1% of people worldwide have two copies of the mutation**, and **20% carry one copy, mostly those of European descent**. Those with the mutation are almost **immune to HIV**, although some cases have been reported.

### What is HIV?

- **About:**
  - HIV stands for **Human Immunodeficiency Virus**, which is a virus that attacks the **immune system** in the human body.
  - It primarily **targets and damages CD4 immune cells**, which are essential for the **body's ability to fight infections and diseases**.

- Over time, HIV weakens the immune system, leaving the body **vulnerable to opportunistic infections and [cancers](#)**.

- **Transmission:**

- HIV is primarily spread through the exchange of certain bodily fluids such as **blood, semen, vaginal fluids, and breast milk**.

- **Severity:**

- If left untreated, the virus destroys a person's immune system and they are said to be in the **[Acquired Immunodeficiency Syndrome stage \(AIDS\)](#)** where they get **several opportunistic infections that may result in death**.

- **Cure:**

- Although there are **no cures for the infection at present**, the disease can be managed using **[antiretroviral therapy](#)**.
  - These medicines suppress the replication of the virus within the body, **allowing the number of CD4 immune cells to bounce back**.

## What is Bone Marrow Transplant?

- A bone marrow transplant is a medical treatment that **replaces one's bone marrow with healthy cells**.
  - The **replacement cells can either come from the person's own body or from a donor**.
- A bone marrow transplant is also **called a stem cell transplant** or, more specifically, a hematopoietic stem cell transplant.
  - Transplantation can be used to treat certain types of cancer, such as **leukemia, myeloma and lymphoma**, and other blood and immune system diseases that affect the bone marrow.
- Bone marrow transplants may use cells from the same person (**autologous transplant**) or from a donor (**allogeneic transplant**).

## UPSC Civil Services Examination Previous Year Question (PYQ)

**Q. Which of the following diseases can be transmitted from one person to another through tattooing? (2013)**

1. Chikungunya
2. Hepatitis B
3. HIV-AIDS

**Select the correct answer using the codes given below:**

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

**Ans: (b)**

**[Source: IE](#)**

