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named after S.I. Gelberg

Student scientific society

HIV DISEASE: 41 years since the epidemic



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1. WHAT IS HIV?

The human immunodeficiency viruses (HIV) are two species of Lentivirus that infect humans. Over time, they cause acquired immunodeficiency syndrome, a condition in which progressive failure of the immune system allows life-threatening opportunistic infections and cancers to thrive.



WHAT IS HIV?

HIV is a RNA virus

HIV infects the T cells

T cells help fight off infections


HIV is a type of “Hidden Virus”



02


DISCOVERY OF HIV





In the early 1980s, little was known about a mysterious disease that was killing thousands of people whose immune systems were effectively collapsing, leaving them vulnerable to an array of life-threatening illnesses.

In 1983, a team of doctors at the Pasteur Institute in France including **Françoise Barré Sinoussi** and **Luc Montagnier** reported that they had isolated a new retrovirus from lymphoid ganglions that they believed was the cause of AIDS. The virus was later named lymphadenopathy-associated virus (LAV).



ABOUT THE DISEASE



Françoise Barré Sinoussi
and Luc Montagnier



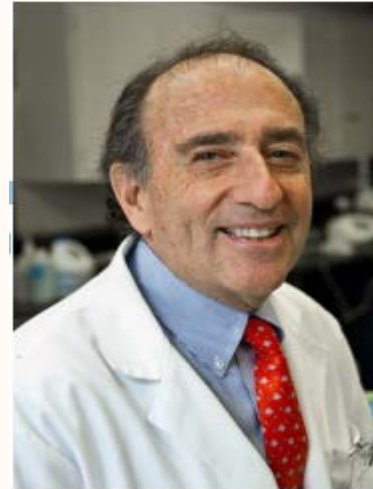
Robert Gallo

In 1984 a team led by Robert Gallo of the United States confirmed the discovery of the virus, but they renamed it human T lymphotropic virus type III (HTLV-III) because they only recently had discovered the first two human retroviruses, HTLV-I and HTLV-II.

Dr. Jay Levy's group at the University of California, San Francisco also played a role in the discovery of HIV. He independently isolated the AIDS virus in 1983 and named it the AIDS-associated Retrovirus (ARV), publishing his findings in the journal Science in 1984.

In 1985, a number of more-detailed reports were published concerning LAV and HTLV-III, and it got clear that the viruses were the same and was the etiological agent of AIDS. In 1986, the International Committee on Taxonomy of Viruses ruled that a new name, HIV (Human Immunodeficiency Virus), be used.

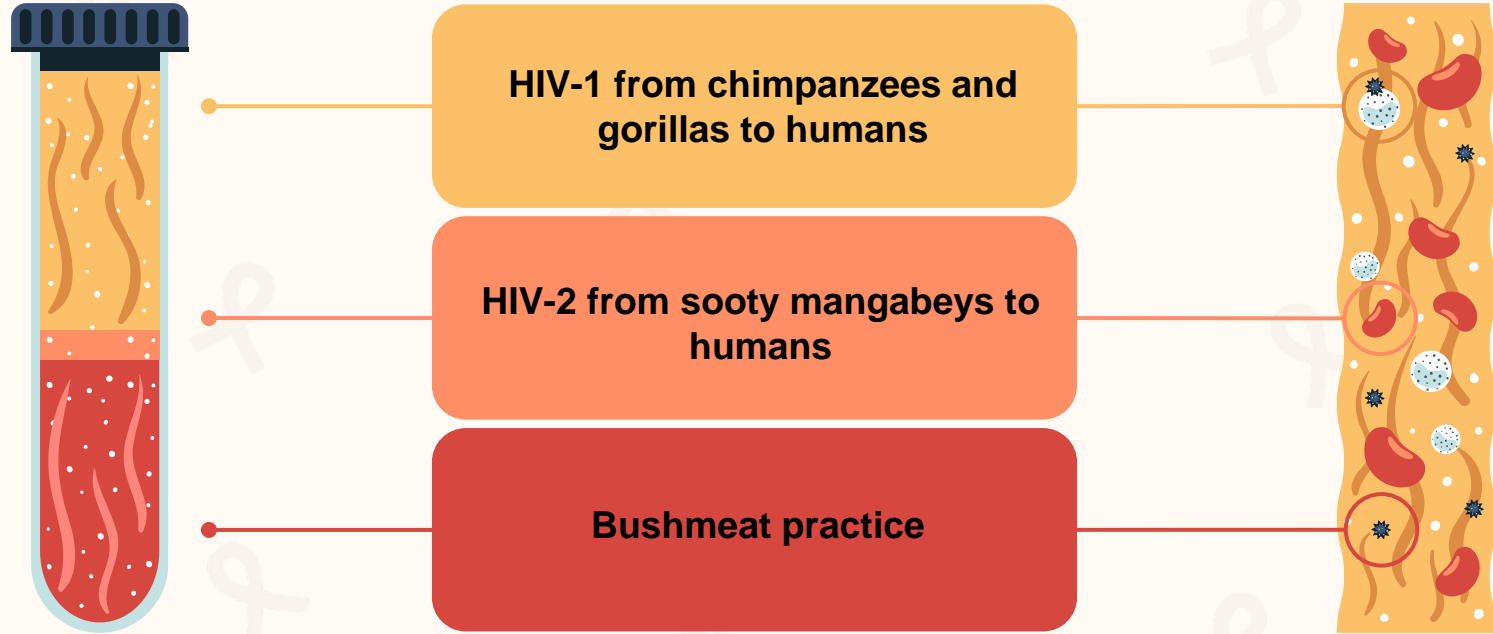
Dr. Jay Levy



Together with his colleague Françoise Barré-Sinoussi, Montagnier was awarded one half of the 2008 Nobel Prize in Physiology or Medicine for his "discovery of human immunodeficiency virus". Harald zur Hausen also shared the prize for his discovery that human papilloma virus leads to cervical cancer, but Gallo was left out. Gallo said that it was "a disappointment" that he was not named a co-recipient



TRANSMISSION FROM NON-HUMANS TO HUMANS



HIV-1 from chimpanzees and gorillas to humans

Scientists generally accept that the known strains (or groups) of HIV-1 are most closely related to the simian immunodeficiency viruses (SIVs) endemic in wild ape populations of West Central African forests. In particular, each of the known HIV-1 strains is either closely related to the SIV that infects the chimpanzee subspecies *Pan troglodytes* (SIVcpz) or closely related to the SIV that infects western lowland gorillas (*Gorilla gorilla*), called SIVgor.

Using HIV-1 sequences preserved in human biological samples along with estimates of viral mutation rates, scientists calculate that the jump from chimpanzee to human probably happened during the late 19th or early 20th century, a time of rapid urbanization and colonization in equatorial Africa.

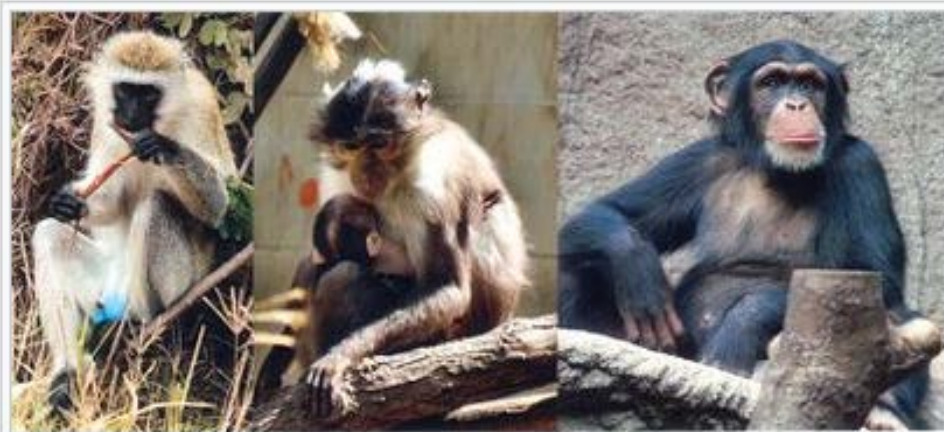


HIV- 2 from sooty mangabeys to humans

Similar research has been undertaken with SIV strains collected from several wild sooty mangabey (*Cercocebus atys atys*) (SIVsmm) populations of the West African nations of Sierra Leone, Liberia, and Ivory Coast. The resulting phylogenetic analyses show that the viruses most closely related to the two strains of HIV-2 that spread considerably in humans (HIV-2 groups A and B) are the SIVsmm found in the sooty mangabeys of the Tai forest, in western Ivory Coast.

Bushmeat practice

virus was transmitted from an ape or monkey to a human when a hunter or bushmeat vendor/handler was bitten or cut while hunting or butchering the animal. The resulting exposure to blood or other bodily fluids of the animal can result in SIV infection



Left to right: the African green monkey, source of SIV; the sooty mangabey, source of HIV-2; and the chimpanzee, source of HIV-1



Origin and epidemic emergence

Genetic studies of the virus suggested in 2008 that the most recent common ancestor of the HIV-1M group dates back to the Belgian Congo city of Léopoldville (modern Kinshasa), circa 1910. Proponents of this dating link the HIV epidemic with the emergence of colonialism and growth of large colonial African cities, leading to social changes, including a higher degree of non-monogamous sexual activity, the spread of prostitution, and the concomitant high frequency of genital ulcer diseases (such as syphilis) in nascent colonial cities.



Factors which contributed to the emergence of the Africa HIV epidemic

1. **Social changes and urbanization**
2. **Colonialism in Africa**
3. **Unsterile injections**
4. **Massive injections of the antibiotic era**
5. **Injection campaigns against sleeping sickness**
6. **Other early injection campaigns**
7. **Genital ulcer diseases and evolution of sexual activity**
8. **Probable time interval of cross-species transfer**
9. **Strong genital ulcer disease incidence in nascent colonial cities**
10. **Female genital mutilation**
11. **Male circumcision distribution and HIV origins**



Spread to the Western Hemisphere

HIV-1 is believed to have arrived in Haiti from central Africa, possibly from the Democratic Republic of the Congo around 1967.

The current consensus is that HIV was introduced to Haiti by an unknown individual or individuals who contracted it while working in the Democratic Republic of the Congo circa 1966.

A mini-epidemic followed, and circa 1969, yet another unknown individual took HIV from Haiti to the United States.

The vast majority of cases of AIDS outside sub-Saharan Africa can be traced back to that single patient. Later, numerous unrelated incidents of AIDS among Haitian immigrants to the U.S. were recorded in the early 1980s.





Also, as evidenced by the case of Robert Rayford, isolated occurrences of this infection may have been emerging as early as 1966. The virus eventually entered gay male communities in large United States cities, where a combination of casual, multi-partner sexual activity (with individuals reportedly averaging over 11 unprotected sexual partners per year) and relatively high transmission rates associated with anal intercourse allowed it to spread explosively enough to finally be noticed.

Spread to the Western Hemisphere



Because of the long incubation period of HIV (up to a decade or longer) before symptoms of AIDS appear, and because of the initially low incidence, HIV was not noticed at first. By the time the first reported cases of AIDS were found in large United States cities, the prevalence of HIV infection in some communities had passed 5%. Worldwide, HIV infection has spread from urban to rural areas, and has appeared in regions such as China and India.

HIV- Timeline

HIV/AIDS Timeline

RARE CANCER SEEN IN 41 HOMOSEXUALS

Outbreak Occurs Among Men
in New York and California
—8 Died Inside 2 Years

The New York
Times reports
a mysterious
illness

1981

1982

The name "AIDS"
— Acquired
Immune
Deficiency
Syndrome — is
created



Françoise Barré-
Sinoussi and Luc
Montagnier discover
HIV as the cause of
AIDS and later win
the Nobel Prize

1984

1985

A test for screening
blood donations is
developed through
chimpanzee
research



AZT, developed in
mice, becomes
the first drug
approved for
treating AIDS

1987

1990

8 million
people
have HIV



Infant HIV
infections
begin to fall
due to AZT
treatment

1994

1996

Combination
treatment of
antiretrovirals
developed



AIDS-related
deaths fall in
developed
countries due to
combination
treatments

1997

2007

22 million
people have
HIV



After tests in mice
and macaques,
Truvada is shown to
reduce the risk of
HIV infection

2010

2011

33 million
people
have HIV



Antiretrovirals are
shown to reduce the
risk of transmitting
HIV by 96%



The majority of
people
worldwide
eligible for
antiretrovirals
are now
receiving them



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THANKS!

