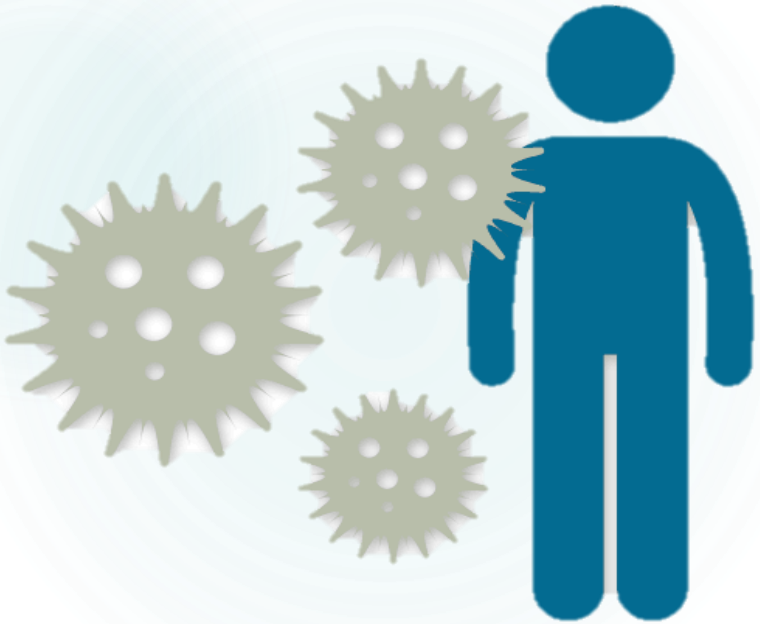

HIV
AIDS



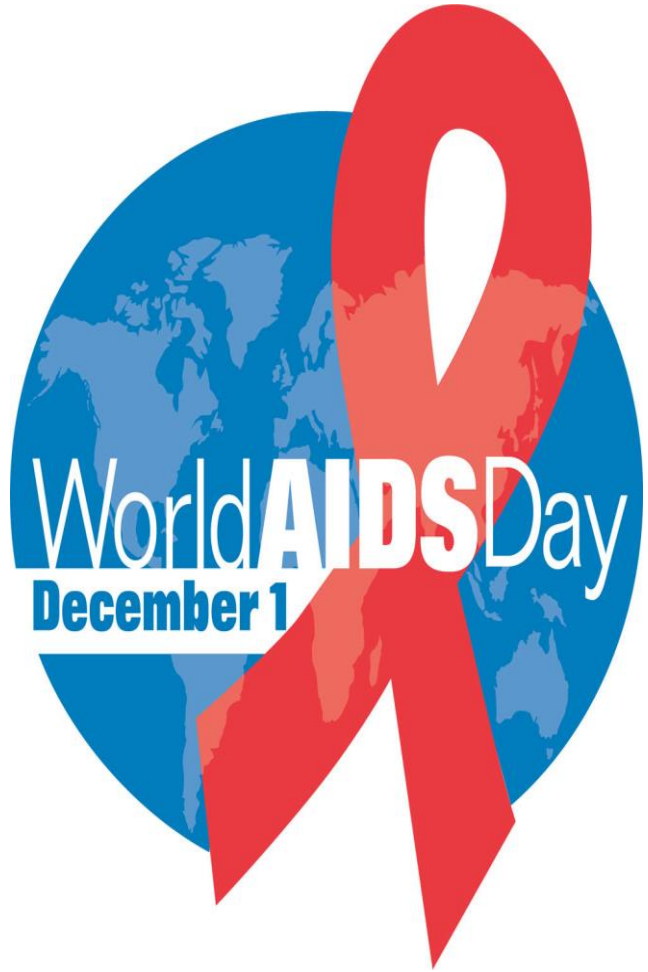
HIV (*human immunodeficiency virus*)

is a virus that attacks cells that help the body fight infection, making a person more vulnerable to other infections and diseases.

If left untreated, HIV can lead to the disease

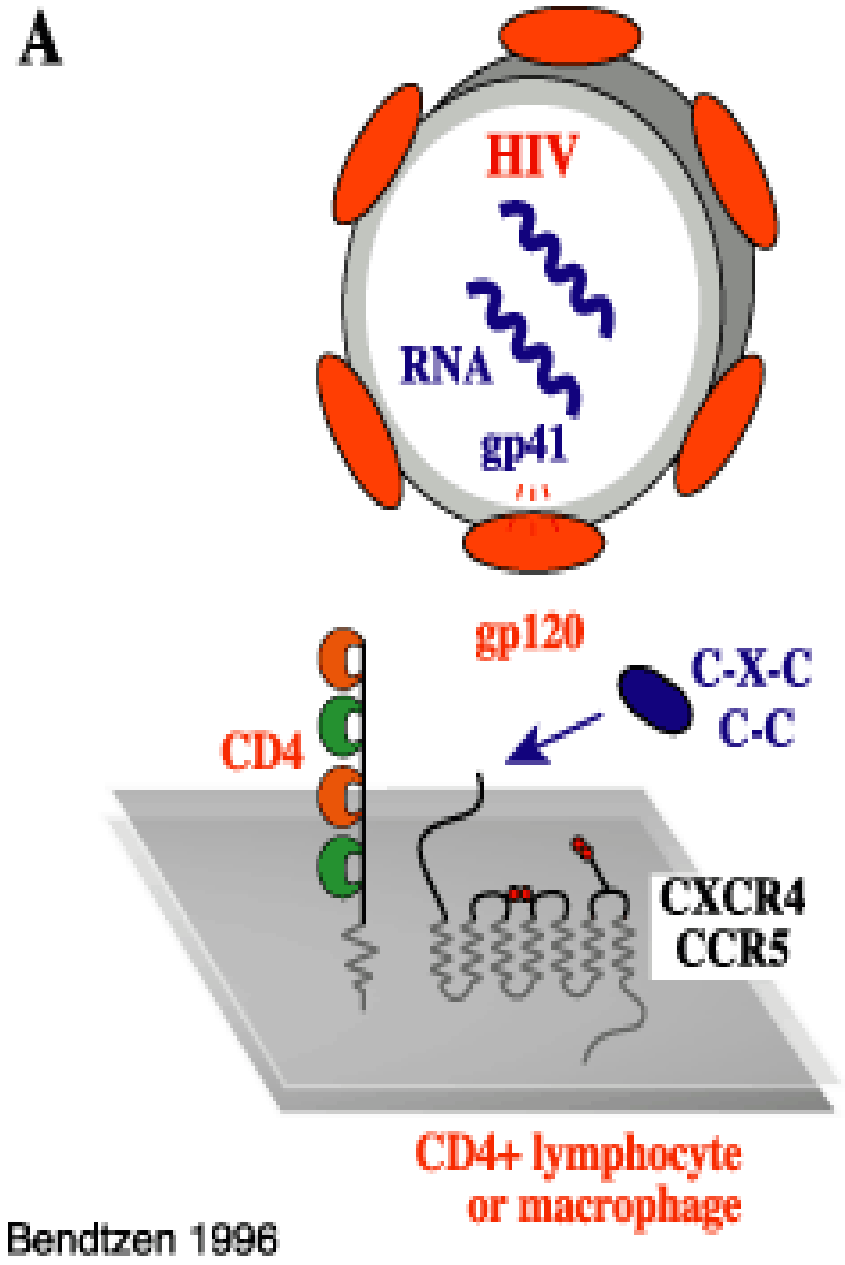
AIDS (*acquired immunodeficiency syndrome*).


That's
1 out of 5
people
with HIV who
are unaware
they are
HIV positive


World AIDS Day
December 1

Untreated HIV infects and kills CD4 cells, which are a type of immune cell called T cells.

Over time, as HIV kills more CD4 cells, the body is more likely to get various types of infections and cancers.



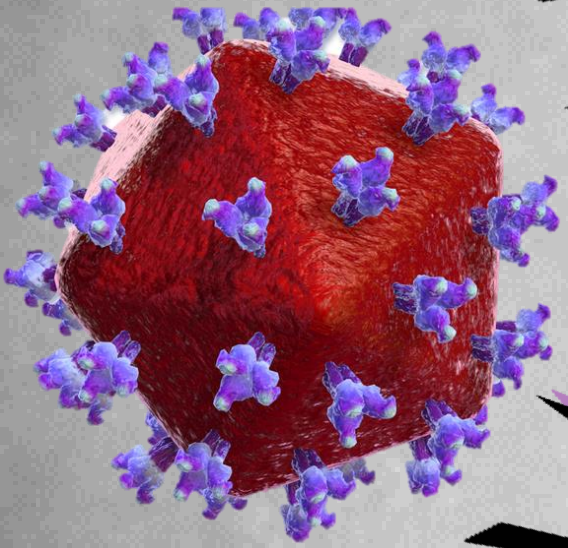
Healthy adults generally have a CD4 count of 500 to 1,500 per cubic millimeter.
A person with HIV whose CD4 count falls below 200 per cubic millimeter will be diagnosed with AIDS.

Without HIV medicine, people with AIDS typically survive about 3 years. Once someone has a dangerous opportunistic illness, life expectancy without treatment falls to about 1 year.

HIV medicine can still help people at this stage of HIV infection, and it can even be lifesaving.

But people who start ART soon after they get HIV experience more benefits—that's why HIV testing is so important.

HIV



Acute lymphopenia

Decreased resistance of the organism to pathogenic and conventional pathogenic microbes

Increased susceptibility to oncological diseases

It is a chronic disease of viral origin

It usually ends in death

New HIV Infections—

New HIV infections have been reduced by 54% since the peak in 1996. In 2021, around 1.5 million [1.1 million–2.0 million] people were newly infected with HIV, compared to 3.2 million [2.4 million–4.3 million] people in 1996.

. (New HIV infections, or "HIV incidence," refers to the estimated number of people who newly acquired the HIV virus during a year, which is different from the number of people *diagnosed* with HIV during a year. Some people may have HIV but not know it.) Of these new infections:

- **1.6 million infections were among people ages 15 and older**
- **160,000 infections were among children ages 0-14**

Summary of the global HIV epidemic, 2021

	People living with HIV in 2021	People acquiring HIV in 2021	People dying from HIV-related causes in 2021
Total	38.4 million [33.9–43.8 million]	1.5 million [1.1–2.0 million]	650 000 [510 000–860 000]
Adults (15+ years)	36.7 million [32.3–41.9 million]	1.3 million [990 000–1.8 million]	560 000 [430 000–740 000]
Women (15+ years)	19.7 million [17.6–22.4 million]	640 000 [480 000–870 000]	240 000 [180 000–320 000]
Men (15+ years)	16.9 million [14.6–19.7 million]	680 000 [500 000–920 000]	320 000 [250 000–430 000]
Children (<15 years)	1.7 million [1.3–2.1 million]	160 000 [110 000–230 000]	98 000 [67 000–140 000]

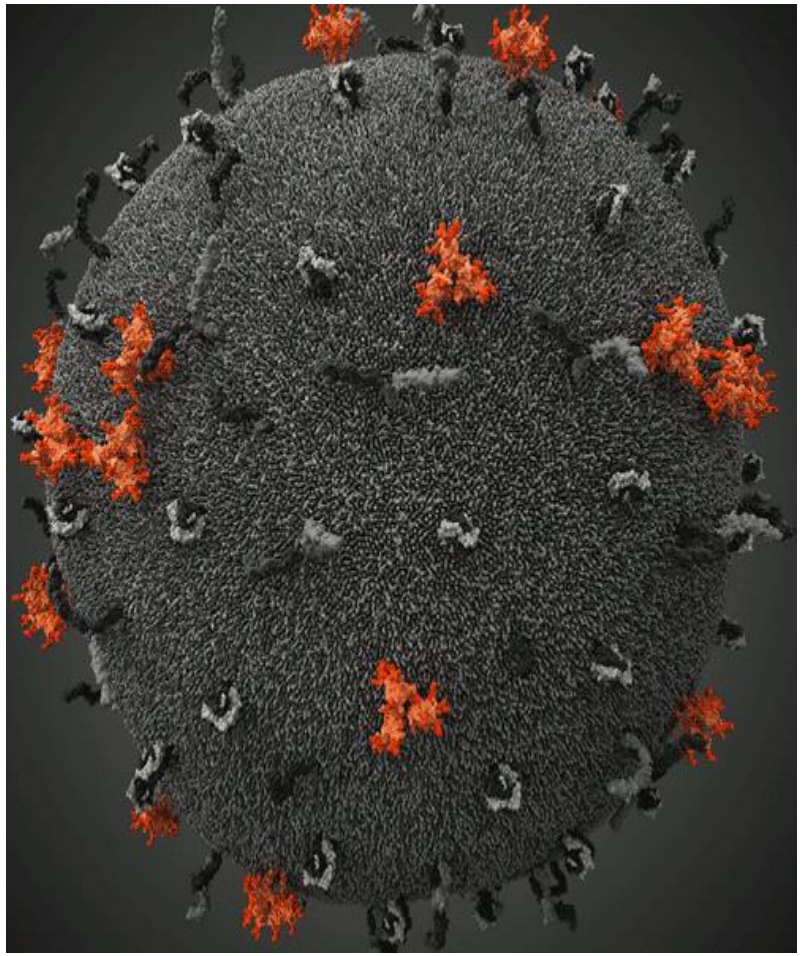
Source: UNAIDS/WHO estimates

HIV is a member of the genus *Lentivirus*, part of the family *Retroviridae*.

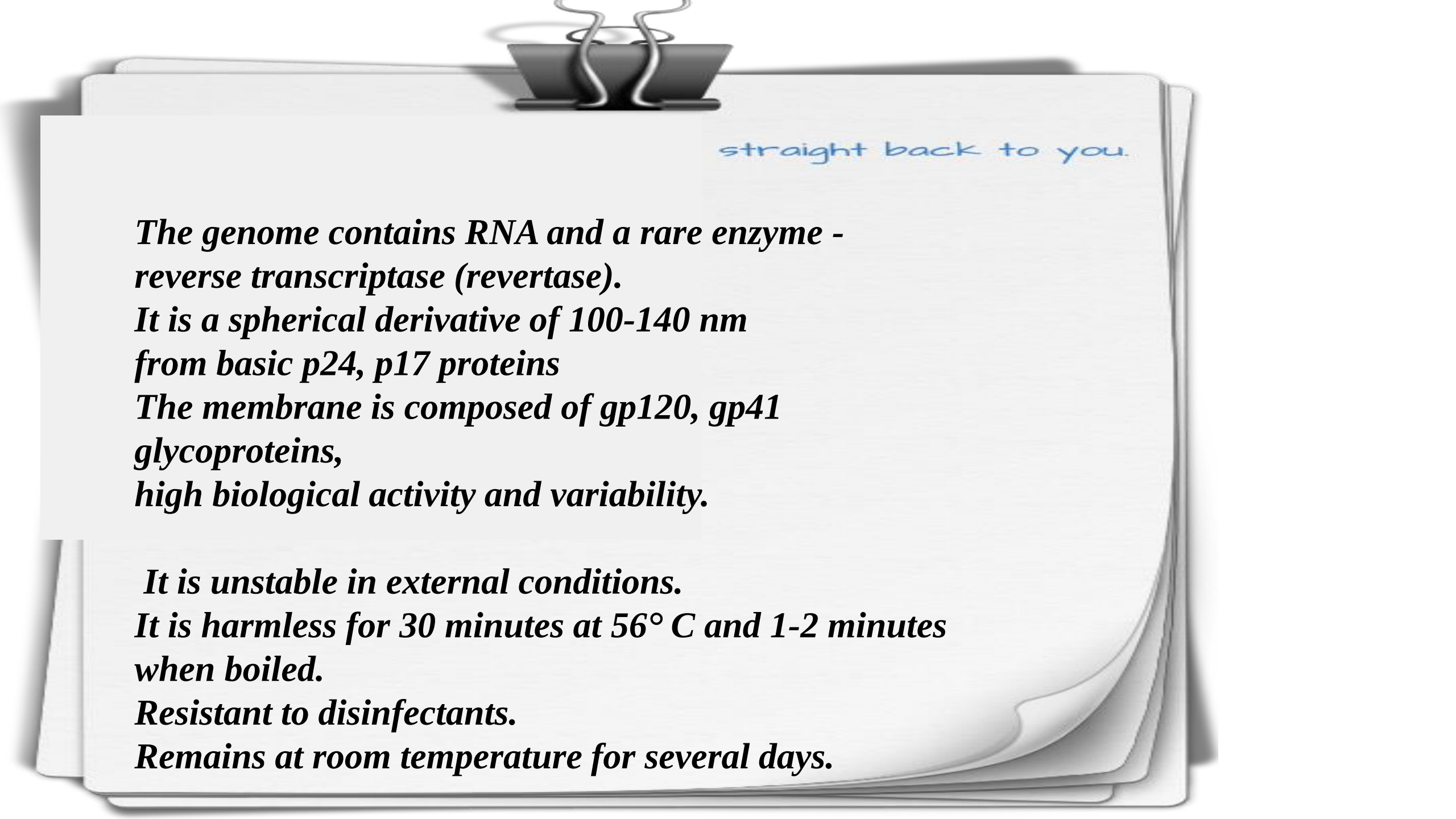
Lentiviruses share any morphological and biological characteristics. Many species of mammals are infected by lentiviruses, which are characteristically responsible for long-duration illnesses with a long incubation period.

Lentiviruses are transmitted as single-stranded, positive-sense, enveloped RNA viruses.

Upon entry into the target cell, the viral RNA genome is converted (reverse transcribed) into double-stranded DNA by a virally encoded reverse transcriptase that is transported along with the viral genome in the virus particle.



The resulting viral DNA is then imported into the cell nucleus and integrated into the cellular DNA by a virally encoded integrase and host co-factors. Once integrated, the virus may become latent, allowing the virus and its host cell to avoid detection by the immune system. Alternatively, the virus may be transcribed, producing new RNA genomes and viral proteins that are packaged and released from the cell as new virus particles that begin the replication cycle anew.

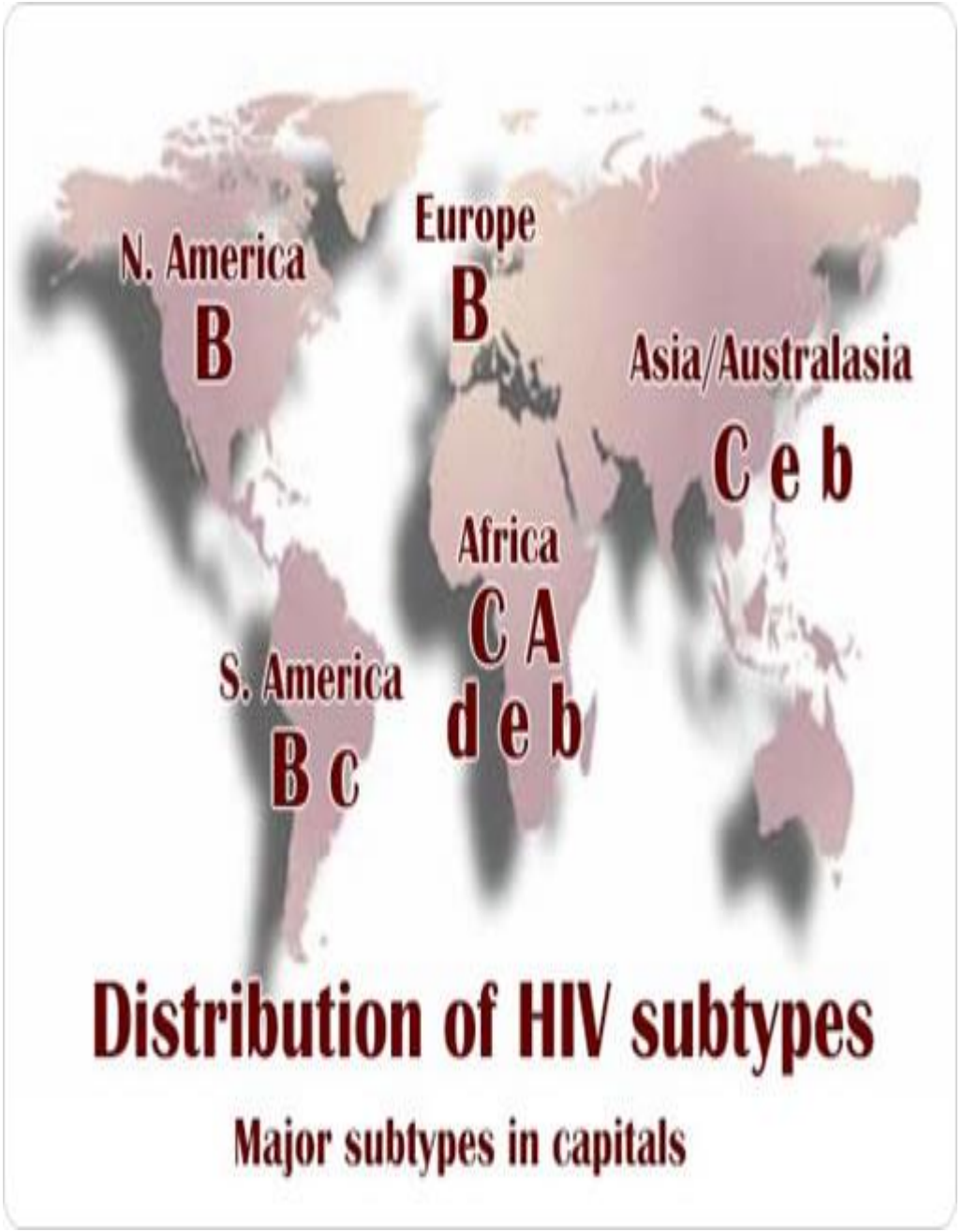


The genome contains RNA and a rare enzyme - reverse transcriptase (revertase).
It is a spherical derivative of 100-140 nm from basic p24, p17 proteins
The membrane is composed of gp120, gp41 glycoproteins,
high biological activity and variability.

It is unstable in external conditions.
It is harmless for 30 minutes at 56° C and 1-2 minutes when boiled.
Resistant to disinfectants.
Remains at room temperature for several days.

Two types of HIV have been characterized: HIV-1 and HIV-2. HIV-1 is the virus that was originally discovered (and initially referred to also as LAV or HTLV-III).

It is more virulent, more infective, and is the cause of the majority of HIV infections globally. The lower infectivity of HIV-2 as compared with HIV-1 implies that fewer people exposed to HIV-2 will be infected per exposure. Because of its relatively poor capacity for transmission, HIV-2 is largely confined to West Africa.



TRANSMISSION WAYS

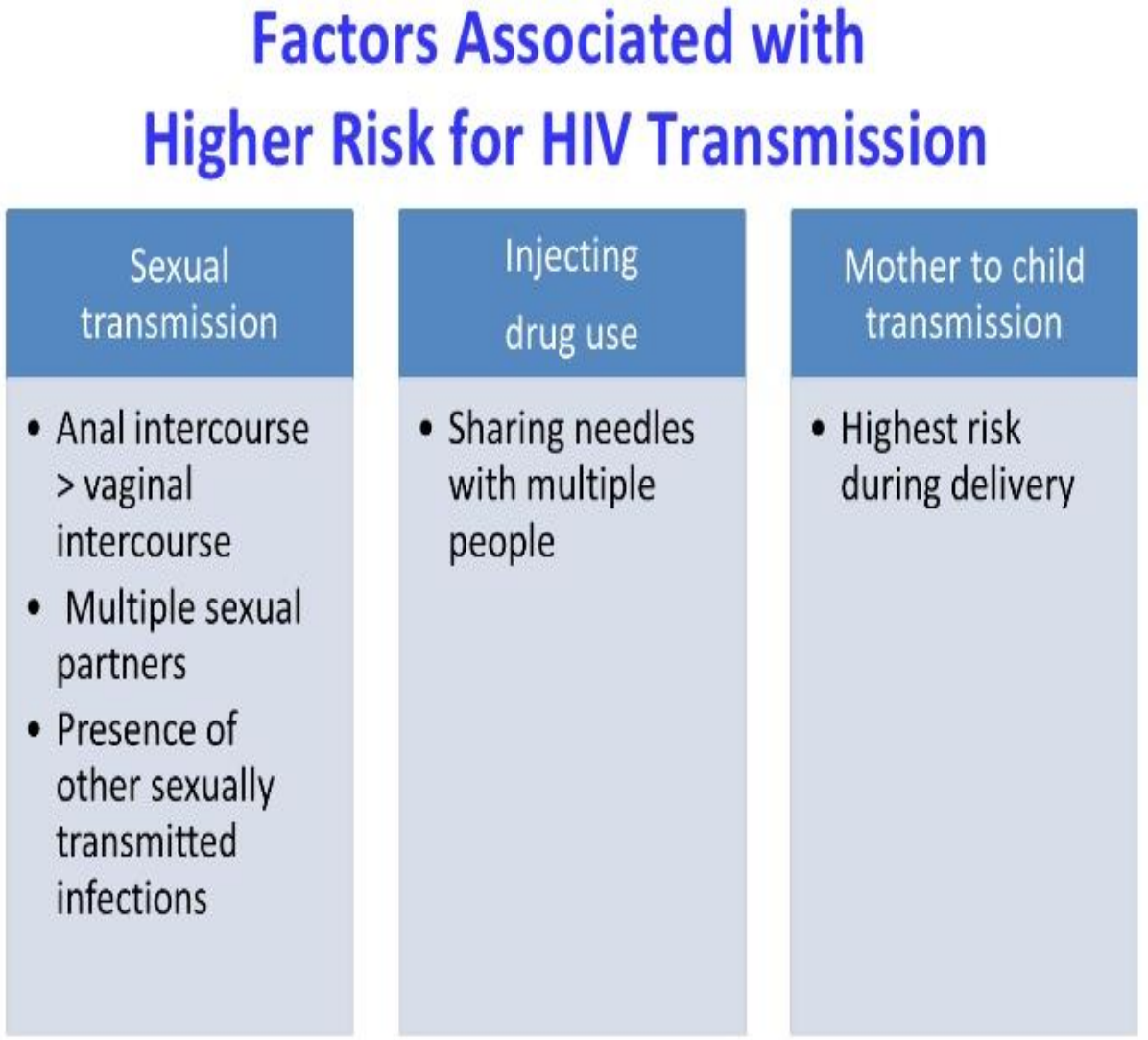
Sexual intercourse

Parenteral

Transplacental

RISK GROUP

- Homo- and bisexuals
- Drug addicts
- Street women
- Alcoholics
- Patients with hemophilia
- Recipients
- Medical personnel in contact with blood



Anyone can contract HIV. The virus is transmitted in bodily fluids that include:

- **blood**
- **semen**
- **vaginal and rectal fluids**
- **breast milk**

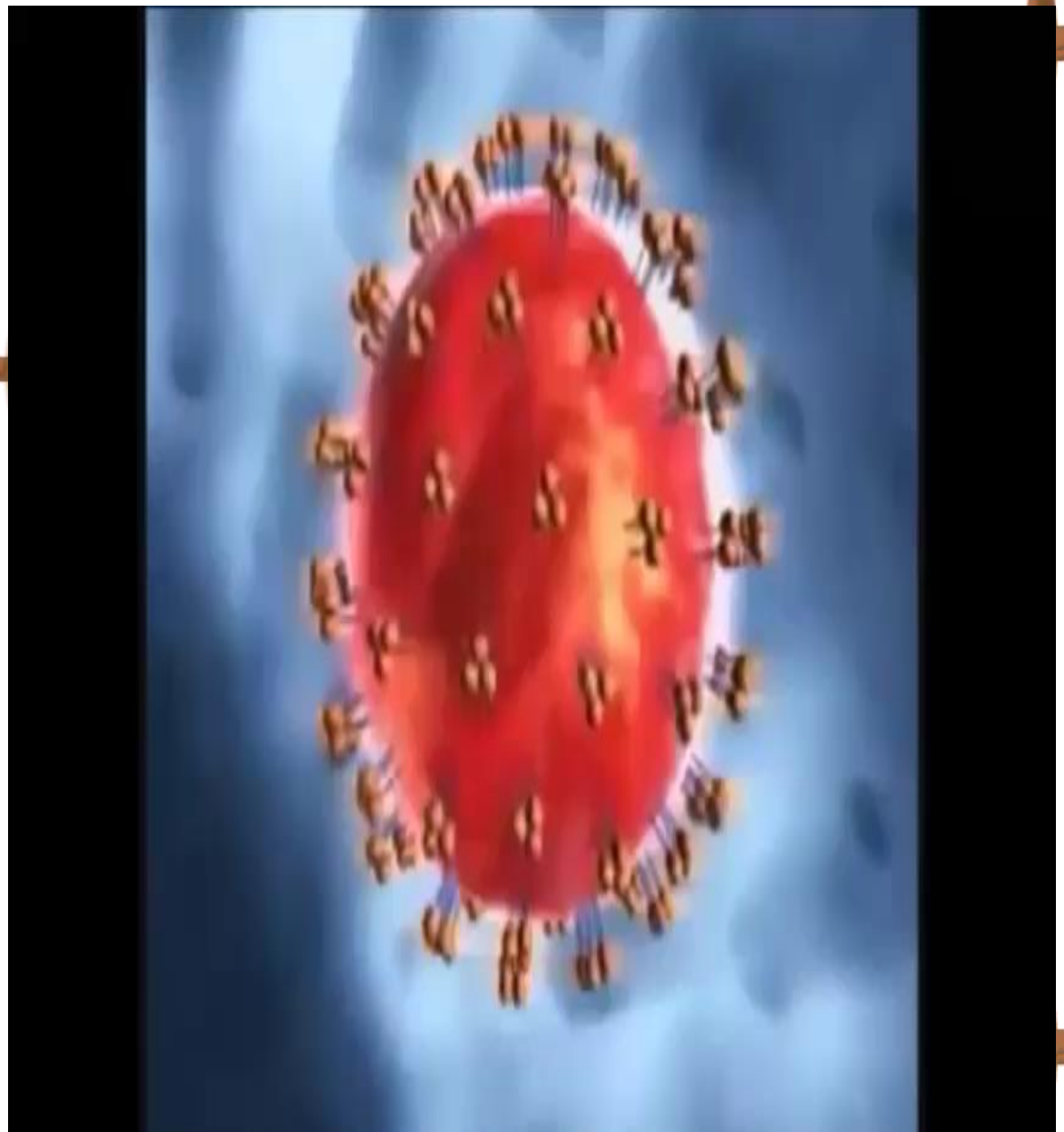
SOURCE OF INFECTION
sick people
are virus carriers

Some of the ways HIV is spread from person to person include:

- **through vaginal or anal sex — the most common route of transmission, especially among men who have sex with men**
- **by sharing needles, syringes, and other items for injection drug use**
- **by sharing tattoo equipment without sterilizing it between uses**
- **during pregnancy, labor, or delivery from a woman to her baby**
- **during breastfeeding**
- **through "pre-mastication," or chewing a baby's food before feeding it to them**
- **through exposure to the blood of someone living with HIV, such as through a needle stick**

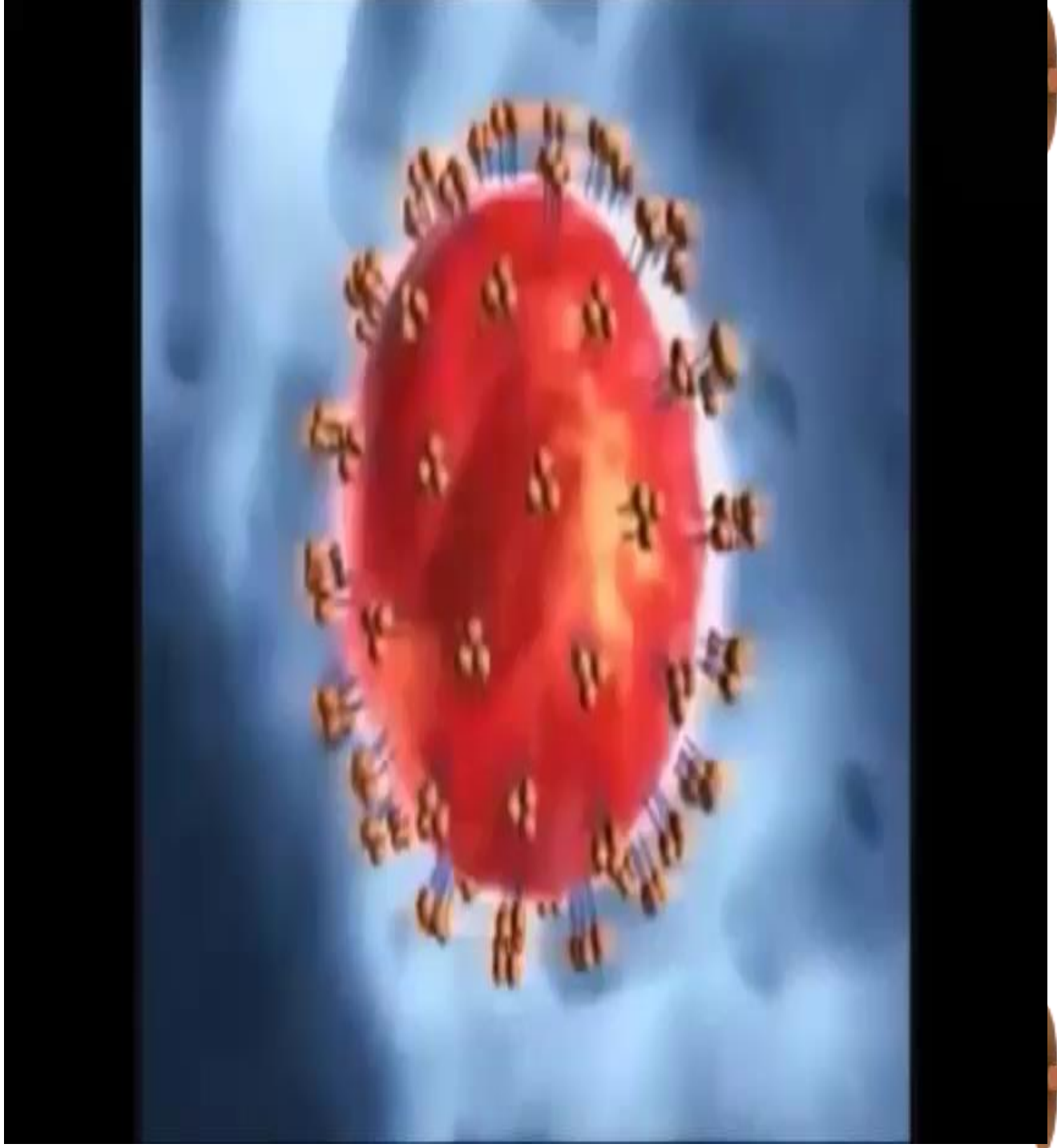
HIV does NOT spread through:

- ♦ skin-to-skin contact
- ♦ hugging, shaking hands, or kissing
- ♦ air or water
- ♦ sharing food or drinks, including drinking fountains
- ♦ saliva, tears, or sweat (unless mixed with the blood of a person with HIV)
- ♦ sharing a toilet, towels, or bedding
- ♦ mosquitoes or other insects

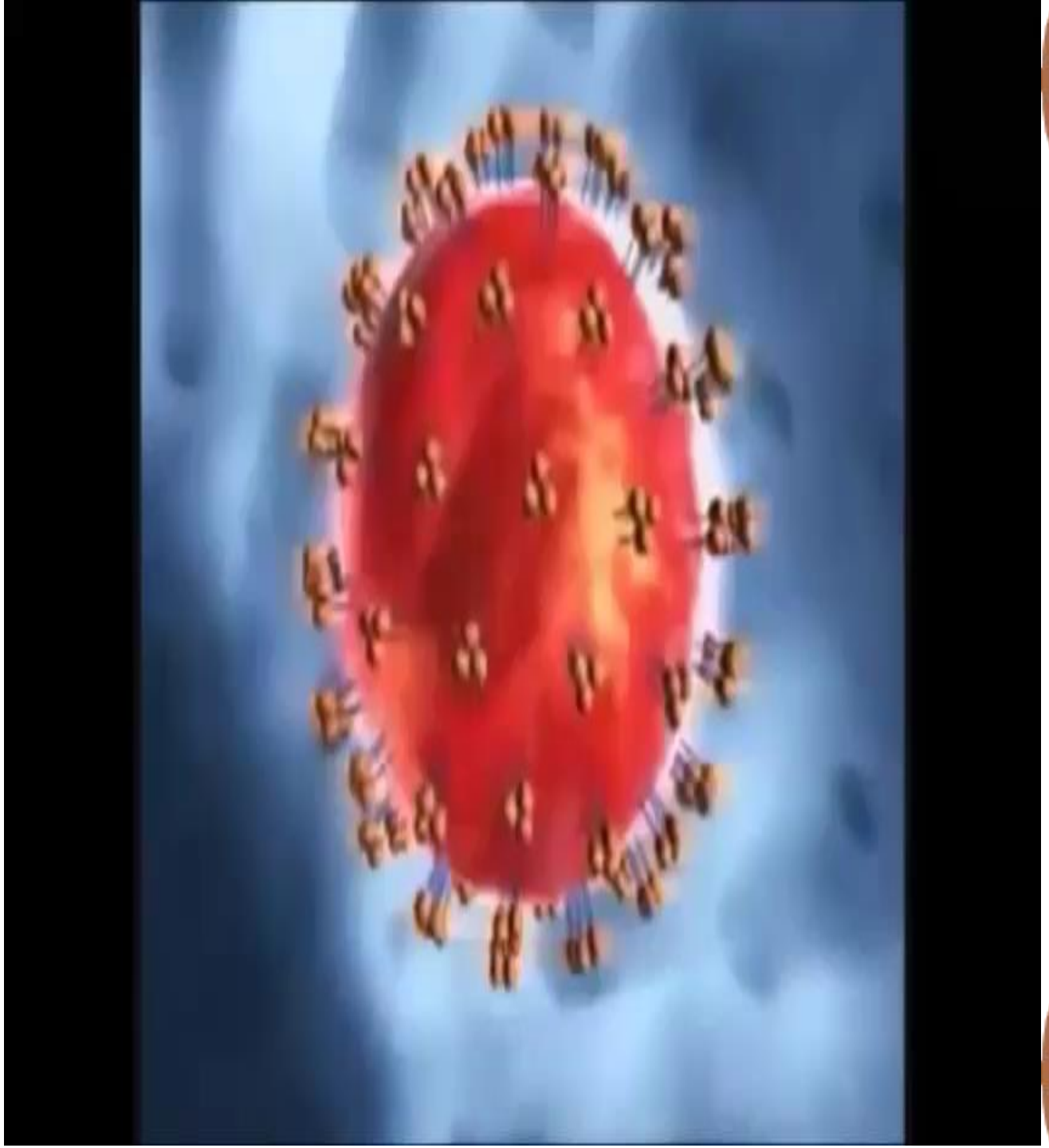


PATHOGENESIS

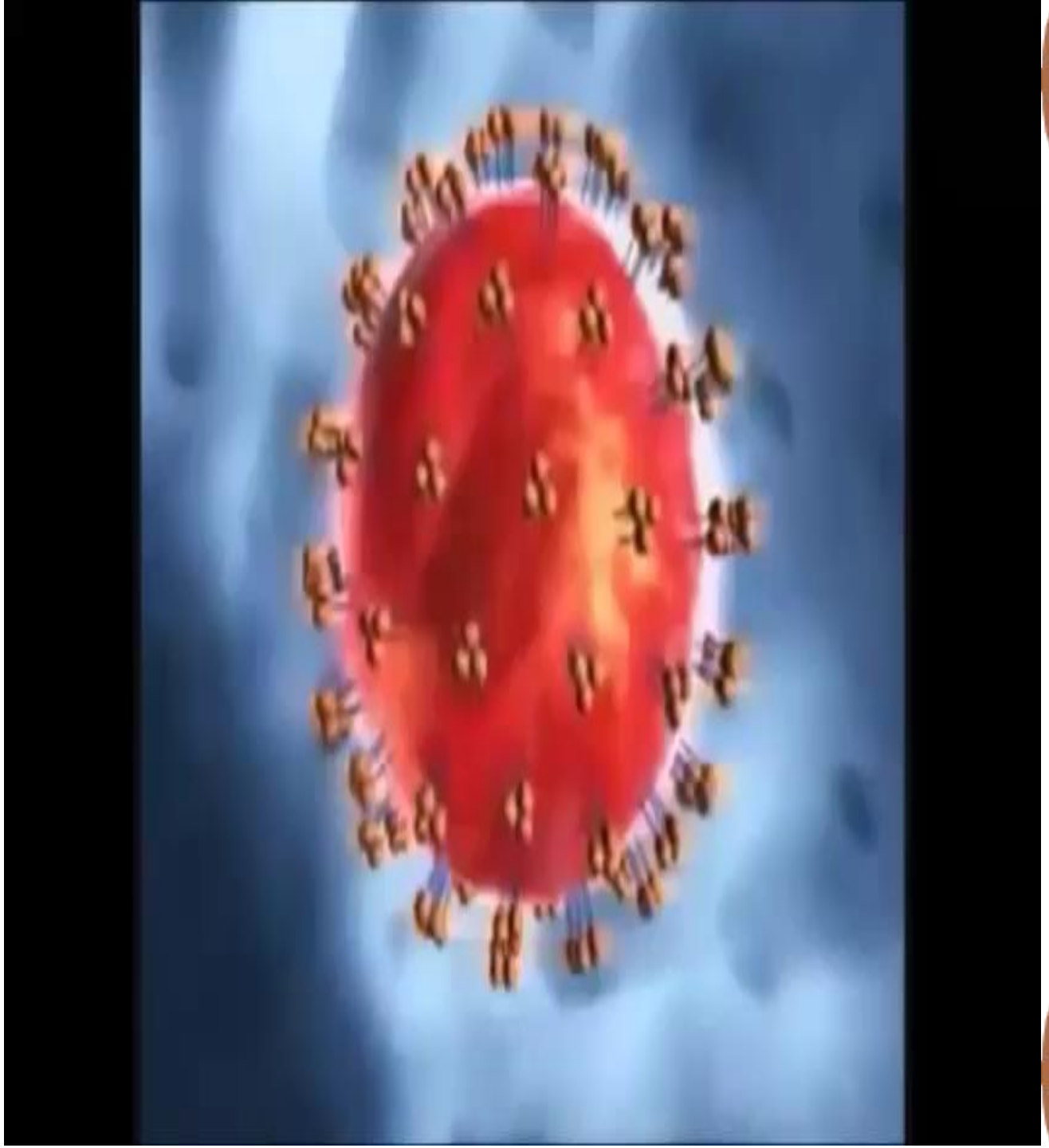
After the virus enters the body there is a period of rapid viral replication, leading to an abundance of virus in the peripheral blood. During primary infection, the level of HIV may reach several million virus particles per milliliter of blood. This response is accompanied by a marked drop in the number of circulating CD4+ T cells. The acute viremia is almost invariably associated with activation of CD8+ T cells, which kill HIV-infected cells, and subsequently with antibody production, or seroconversion. The CD8+ T cell response is thought to be important in controlling virus levels, which peak and then decline, as the CD4+ T cell counts recover. A good CD8+ T cell response has been linked to slower disease progression and a better prognosis, though it does not eliminate the virus.



Ultimately, HIV causes AIDS by depleting CD4+ T cells. This weakens the immune system and allows opportunistic infections. T cells are essential to the immune response and without them, the body cannot fight infections or kill cancerous cells. The mechanism of CD4+ T cell depletion differs in the acute and chronic phases. During the acute phase, HIV-induced cell lysis and killing of infected cells by cytotoxic T cells accounts for CD4+ T cell depletion, although apoptosis may also be a factor. During the chronic phase, the consequences of generalized immune activation coupled with the gradual loss of the ability of the immune system to generate new T cells appear to account for the slow decline in CD4+ T cell numbers.



Although the symptoms of immune deficiency characteristic of AIDS do not appear for years after a person is infected, the bulk of $CD4^+$ T cell loss occurs during the first weeks of infection, especially in the intestinal mucosa, which harbors the majority of the lymphocytes found in the body.The reason for the preferential loss of mucosal $CD4^+$ T cells is that the majority of mucosal $CD4^+$ T cells express the CCR5 protein which HIV uses as a co-receptor to gain access to the cells, whereas only a small fraction of $CD4^+$ T cells in the bloodstream do so. A specific genetic change that alters the CCR5 protein when present in both chromosomes very effectively prevents HIV-1 infection.



HIV seeks out and destroys CCR5 expressing $CD4^+$ T cells during acute infection.-A vigorous immune response eventually controls the infection and initiates the clinically latent phase. $CD4^+$ T cells in mucosal tissues remain particularly affected. Continuous HIV replication causes a state of generalized immune activation persisting throughout the chronic phase. Immune activation, which is reflected by the increased activation state of immune cells and release of pro-inflammatory cytokines, results from the activity of several HIV gene products and the immune response to ongoing HIV replication. It is also linked to the breakdown of the immune surveillance system of the gastrointestinal mucosal barrier caused by the depletion of mucosal $CD4^+$ T cells during the acute phase of disease.

clinic

incubation period → acute infection, → clinical latency

The incubation period can last from 1 to 8-10 years, usually from 2 weeks to 6 months.

persistent generalized lymphadenopathy → AIDS association complex → AIDS

Period of acute infection

Lasts 1-4 weeks.

Main symptoms:

fever

headache and sore throat

temporary lymphadenopathy

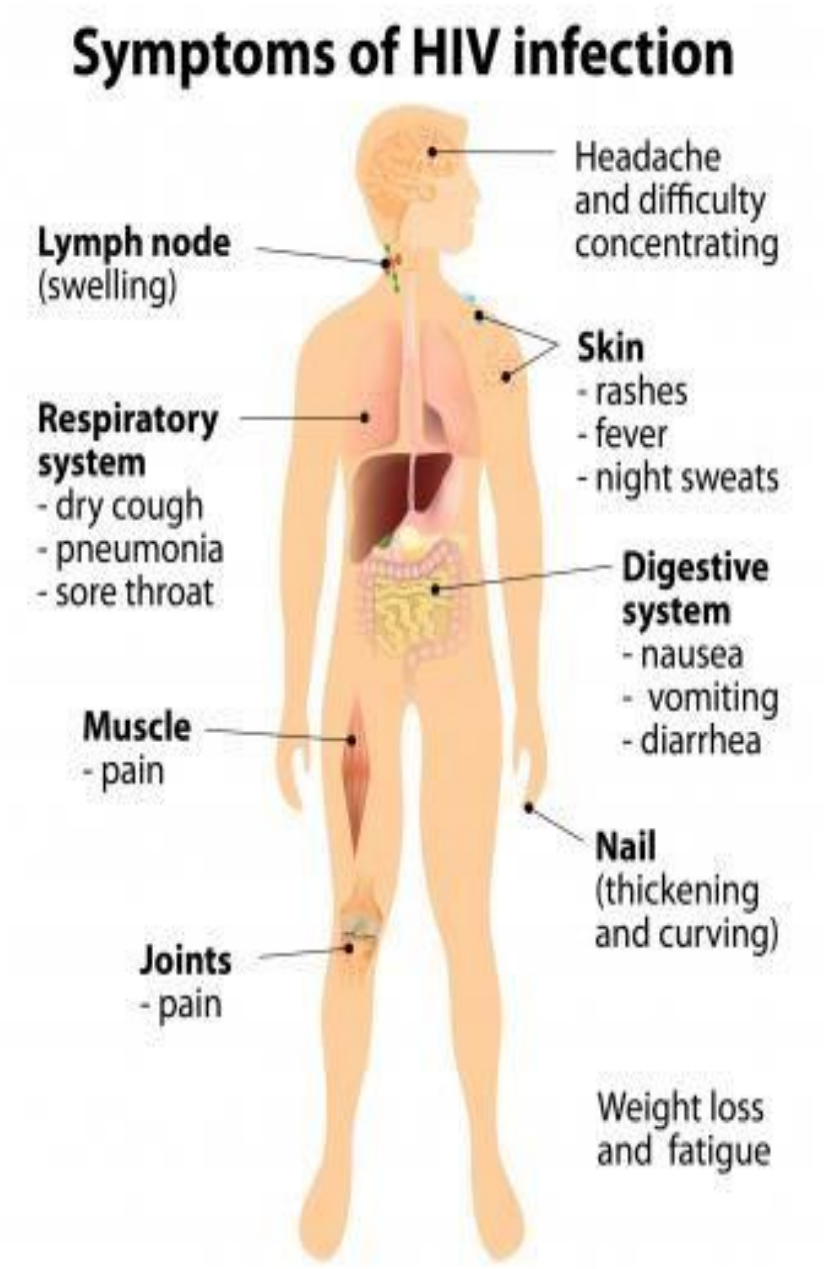
myalgia

measles-like or other rash

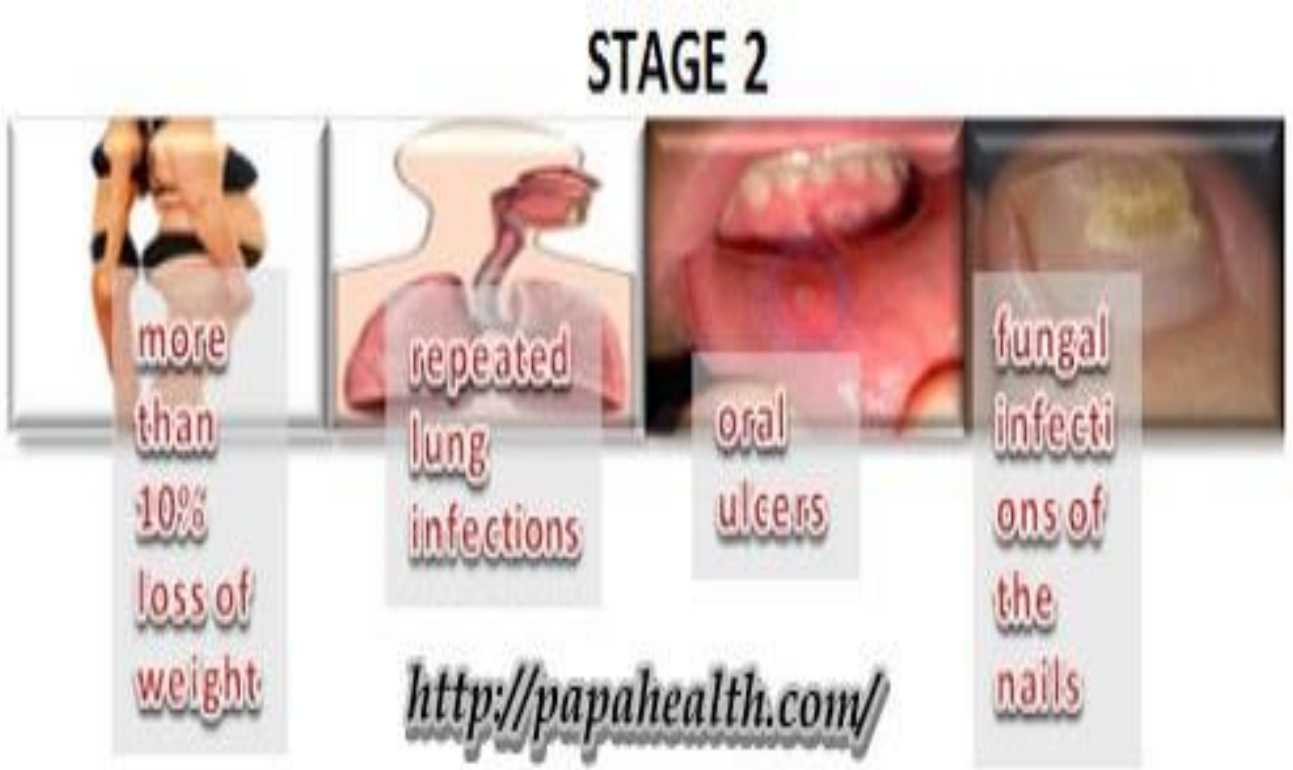
"Unreasonable" persistent diarrhea and weight loss

sometimes aseptic meningitis.

The initial period is contagious, antibodies to HIV are found in the blood, and CD-4 lymphocytes are reduced in transit.



Mononucleosis-like form
Prolonged fever
Severe sweating
Lymph node enlargement,
enlargement of the liver and spleen



Latent infection period

- Without making clinical and laboratory changes
- It takes 1-5, on average 4 years.
- Sometimes the lymph nodes are enlarged,
- Viremia continues
- Antibodies are found in the blood.

Persistent generalized lymphadenopathy

- ✓ *Lymph node enlargement of more than 1 cm in at least two areas outside the groin, lasting less than 3 months, is characterized by the same size, firmness and painlessness.*
- ✓ *The general condition of the patient does not change, the ability to work is maintained,*
- ✓ *30% of cases of spelenomegaly, fever, night sweats, weight loss occur.*

AIDS ASSOCIATION COMPLEX PERIOD

-Diagnosed on the basis of 2 clinical symptoms and 2 laboratory indicators lasting more than 3 months.

CLINICAL SYMPTOMS

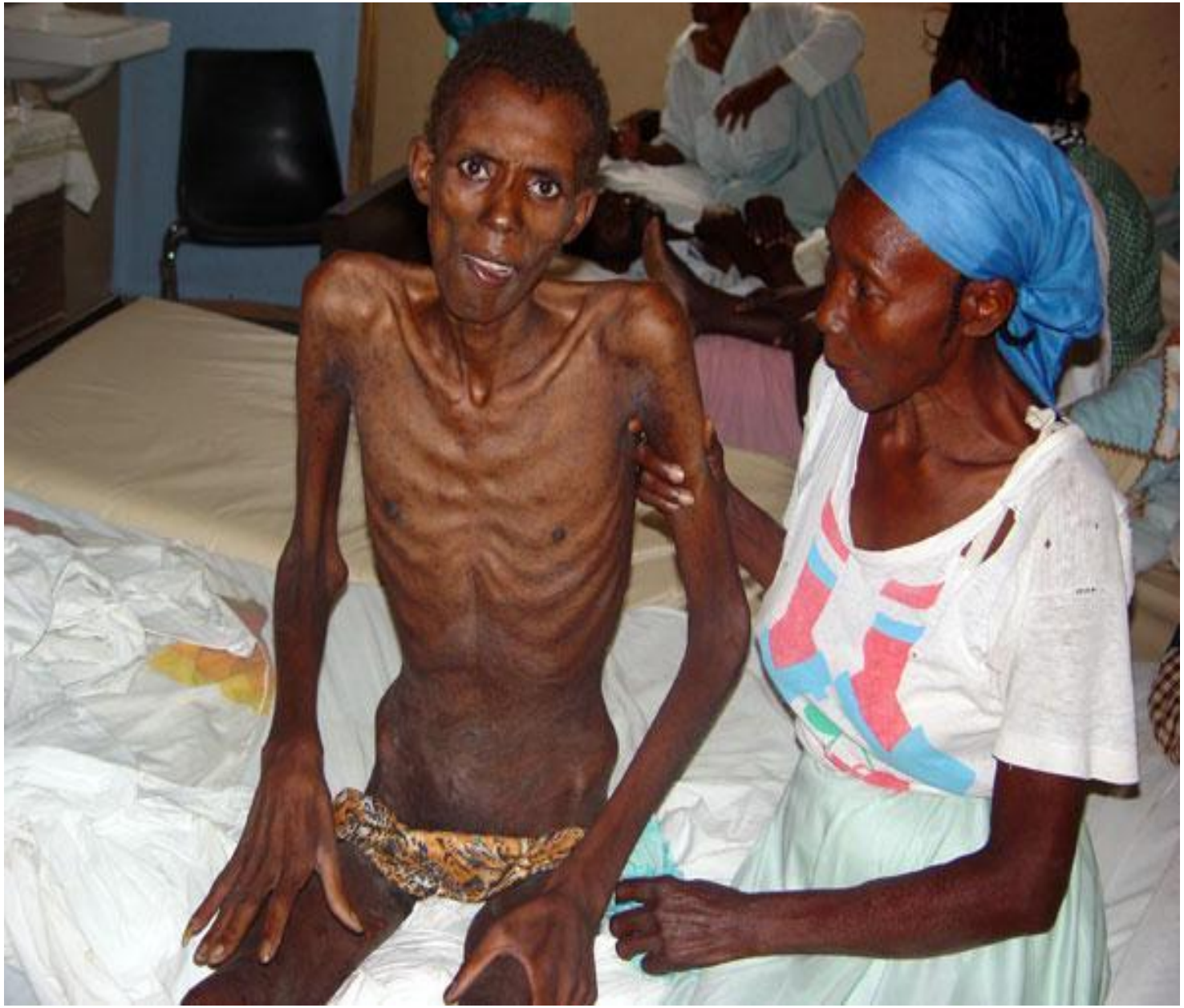
Damage and disorders of various organs and systems
Deficiency of certain areas of the immune system
Constant fatigue
Persistent recurrent fever
Intense night sweats
Fever and diarrhea lasting more than a month and weight loss of more than 10%
Occurrence of opportunistic disease

LABORATORY INDICATORS

Lympho-, leuko-, thrombocytopenia
Anemia
Cd4 / cd8 <1
Helpers <400
Weakening of blastogenesis

AIDS PERIOD

- It is the final stage
- It can occur within 6 months, or 2-5 years and later
- AIDS manifests itself in the form of CNS diseases, malignant tumors - CS, lymphoma and opportunistic infections.



HIV-CLASSIFICATION by V.I. Pokrovskiy .

I. Incubation stage

II. The stage of initial manifestations

III. Secondary disease stage.

IV. Terminal stage.

A. Acute febrile phase.
B. Asymptomatic phase
C. Generalized persistence Lymphadenopathy

A. Acute febrile phase.
B. Asymptomatic phase
C. Generalized persistence Lymphadenopathy

A. Less than 10% weight loss, bacterial damage to the skin and mucous membranes; shingles, etc.
B. Loss of more than 10% of body weight; Unexplained diarrhea and fever lasting more than a month, recurrent and persistent bacterial, viral, lesions of the internal organs, local Kaposi's sarcoma.
C. Common bacterial, viral, fungal, parasitic diseases, extrapulmonary and atypical tuberculosis; cachexia; generalized Kaposi's sarcoma; Damage to the CNS of various etiologies.

WHO Classification of AIDS according to the predominance of clinical symptoms

Lungs

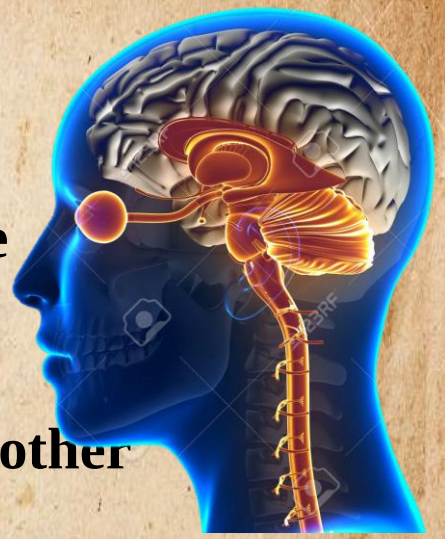
Gastrointestinal

Nervous

Heated forms.

Pneumonia
Kaposi's sarcoma
Cough
Difficulty breathing deeply
Later: fever
Weakness
Adynamics
Intensification of cough
Sputum secretion
Respiratory failure
Death occurs within 9-12 months.

Acute encephalitis in 80-90% of patients
Various CNS injuries:
Abscess
Meningoencephalitis
1st and 2nd tumors of the brain
Vascular disorders
Atrophy of the optic and other nerves



The nervous system can also be damaged by secondary tumor processes and opportunistic infections.

Chronic diarrhea
Avoid weight loss
Dehydration
Intoxication
Diarrhea 60% - primary, especially cryptosporidia
Ulcerative-hemorrhagic colitis
CS develops in the gastrointestinal silicate layer. The process in the liver can resemble hepatitis B and lead to portal cirrhosis

Prolonged fever
Increasing weakness
Weight loss
Damage to various organs
Autoimmune processes
Hemolytic anemia
Thrombopenic purpura

Black and dark brown wounds on the skin

Diseases of the internal organs

Progressive multifocal leukoencephalitis

Cerebral lymphoma

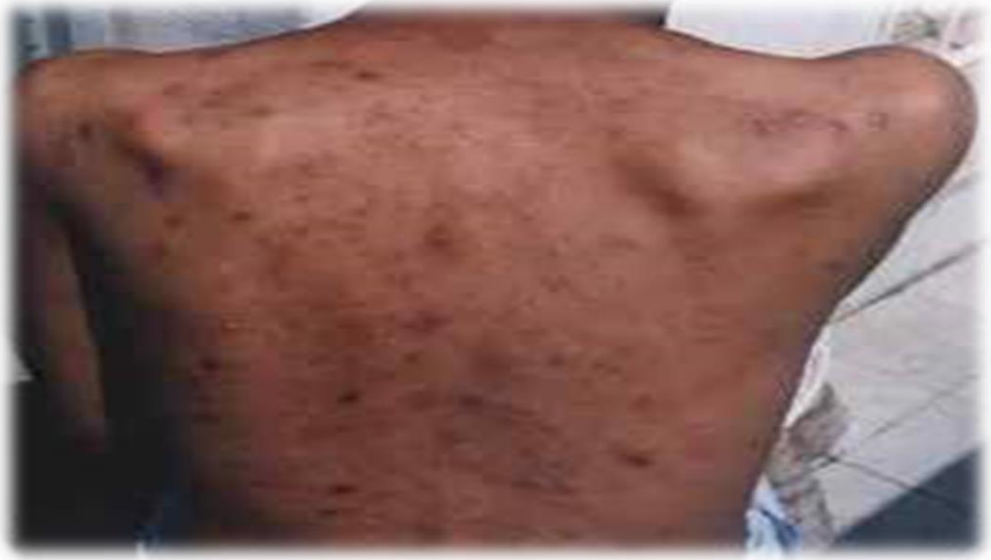
Fever associated with secondary infection

Cachexia

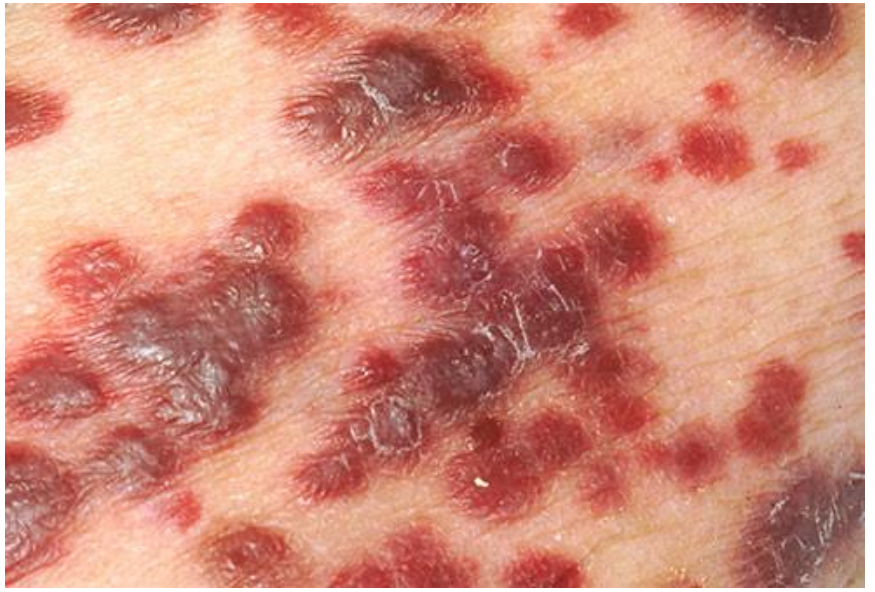
Endocrine Disorders-Addison's Disease

Brain atrophy-mental weakness

Kaposi's sarcoma

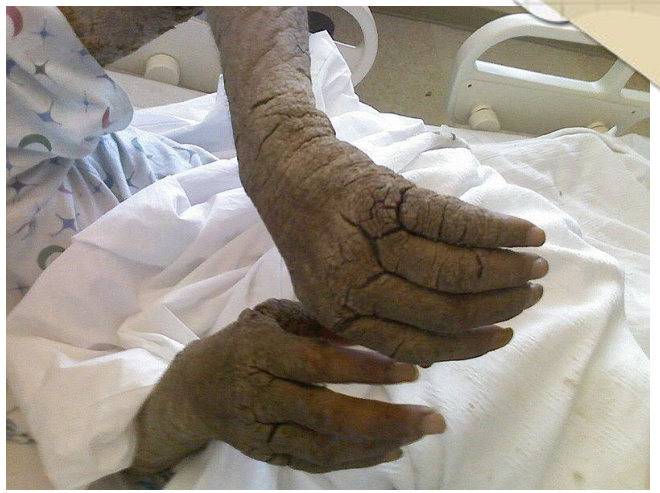


SKIN PATHOLOGIES



1. Tumors- KS, lymphomas, carcinomas

2. Infectious diseases- Herpes, fungal, primary, bacterial, oral leukoplakia



3. Dermatitis, vasculitis, seborrhea, xeroderma, general[zed papulosis and follicular rash

HIV and pregnancy

- *Premature birth*
- *Early termination of pregnancy*
- *Fetoplacental defects*
- *Birth time and postpartum hemorrhage*
- *Thrombohemorrhagic syndrome*
- *Functional liver failure*

Embryopathies
Premature birth
Metabolic and neurological disorder
respiratory failure
Hemolytic crises
DDL syndrome
Physical retardation
Malignant gait in a child

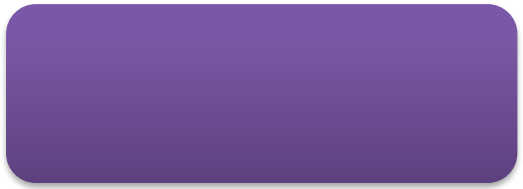
DIAGNOSIS

Clinical signs
Epidemiological data
Serological examinations
Virological examinations
Hematological examinations
At least two confirm the diagnosis:
Generalized herpes, cytomegalovirus, cryptococcosis, candidiasis, encephalopathy, large cell encephalitis, vacuolar myopathy, CS, lymphoma.
Antibodies to the virus in the blood appear 1 month after infection and are detected by radioimmune analysis, precipitation, IFA methods
Detection of viral antigen and DNA (PCR) is more accurate.
There are 3 serological variants of IV infection:
Antibodies to HIV are found in the blood until the patient dies without infection:
A period of clinical signs of antibody is detected and then disappears;
Antibody appears in the blood only before death.

DIFFERENTIAL DIAGNOSIS

- **Opportunistic infections - microscopic, serological, peripheral blood should be confirmed or denied based on re-examination.**

- **Secondary infectious diseases- Pneumonia, entrocolitis, sepsis, chronic amoebiasis**



- **Tumors of the CNS and internal organs, manifestations of visceral leishmaniasis- AIDS**

There is currently no cure or effective HIV vaccine.

Treatment consists of highly active antiretroviral therapy (HAART) which slows progression of the disease.

Treatment also includes preventive and active treatment of opportunistic infections.

Antiretroviral treatment must be carried out in a special hospital.

The effectiveness of antiretroviral therapy is determined by the reduction of the number of viruses in the blood plasma to 50 viruses / ml.

The treatment prolongs life, improves the ability to work and mood.

Current HAART options are combinations (or "cocktails") consisting of at least three medications belonging to at least two types, or "classes," of antiretroviral agents. Initially treatment is typically a non-nucleoside reverse transcriptase inhibitor (NNRTI) plus two nucleoside analogue reverse transcriptase inhibitors (NRTIs).

Typical NRTIs include: zidovudine (AZT) or tenofovir (TDF) and lamivudine (3TC) or emtricitabine (FTC). Combinations of agents which include protease inhibitors (PI) are used if the above regimen loses effectiveness.

Stribild - a common once-daily ART regime consisting of elvitegravir,emtricitabine, tenofovir and the booster cobicistat

PREVENTION

- ***Disposable use of medical devices.***
- ***Neutralization of blood products.***
- ***Fight against drugs and bad habits.***
- ***Awareness raising among the population.***
- ***There is no specific prevention.***
- ***From 01.06.2015, those who get married must undergo a mandatory medical examination (HIV, thalassemia, hepatitis).***