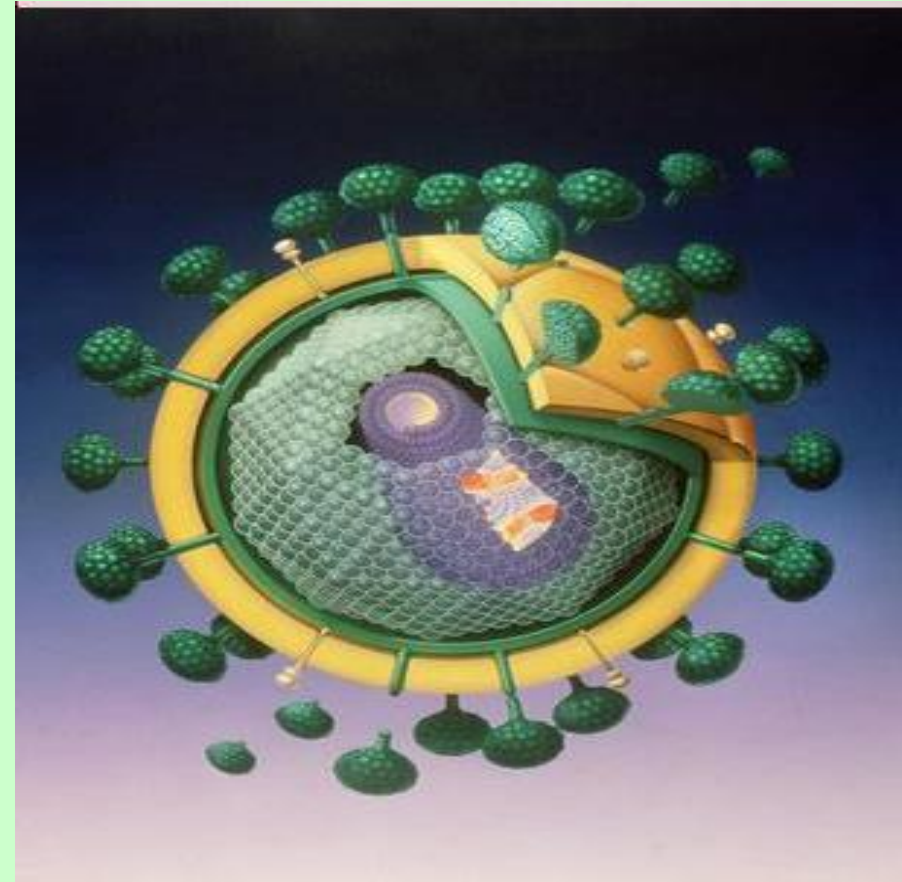


AIDS and AIDS-associated diseases



- **HIV infection** is a slowly progressing anthroponous infectious disease, with a predominantly percutaneous transmission, characterized by specific damage to the immune system with the development of specific immunodeficiency, resulting in the human body becoming highly susceptible to opportunistic infections and tumors that ultimately lead to the death of the patient.
- **AIDS** - the final stage of HIV infection
- **AIDS - The Acquired Immune Deficiency Syndrome**

Historical reference

- 1980 - USA - "Weekly Herald of Morbidity and Mortality"
young age,
pneumocystis pneumonia,
Kaposi's sarcoma,
homosexuals.
1983 - L. Montagnier (Paris), 1984 - R. Gallo (USA) - isolated HTZV- |||
1982 - Registered in Europe.
1987 - 1.5 million infected.
1991 - 10 million infected, 1 million - patients.

Theories of origin

- 1. Evolutionary (anthropogenic).
- 2. Zoonotic (ancient).
- 3. Artificial.

Etiology of HIV

- The family of retroviruses (Retroviridae),
 - Subfamily of slow viruses (Lentivirus).
 - RNA-containing virus
-
- There are described 2 serotypes of the virus: HIV-1 and HIV-2, differing in structural and antigenic characteristics.

The greatest epidemiological importance is HIV-1, which dominates the modern pandemic.

- The strains of the human immunodeficiency virus of the first serotype are divided into three groups: M, N, O.

Enzymes - reverse transcriptase, integrase and protease



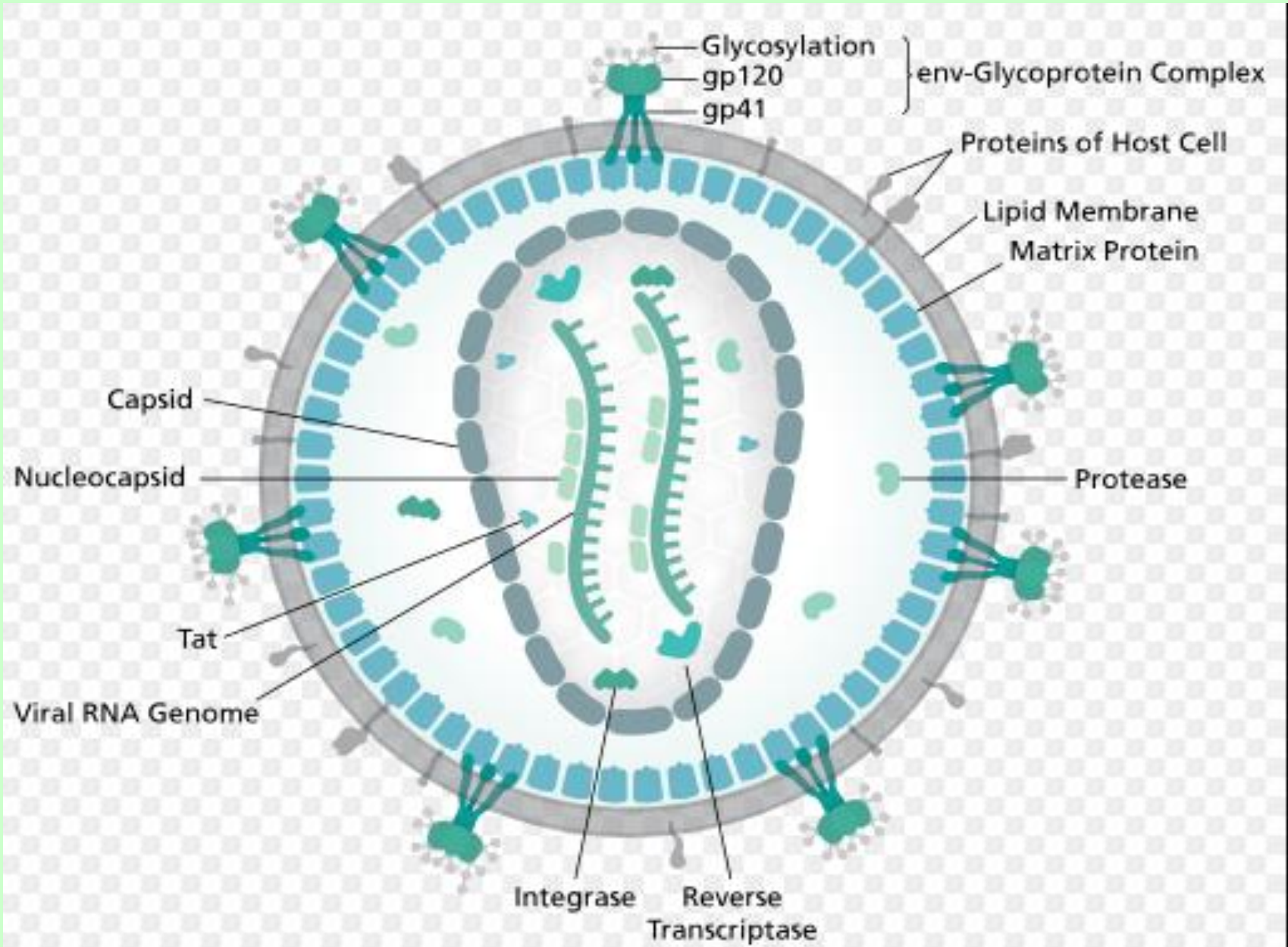
9 HIV-1 genes (pol-polymerase proteins, gag-core proteins, env-shell proteins)

The diameter of the HIV virion is 100 nm

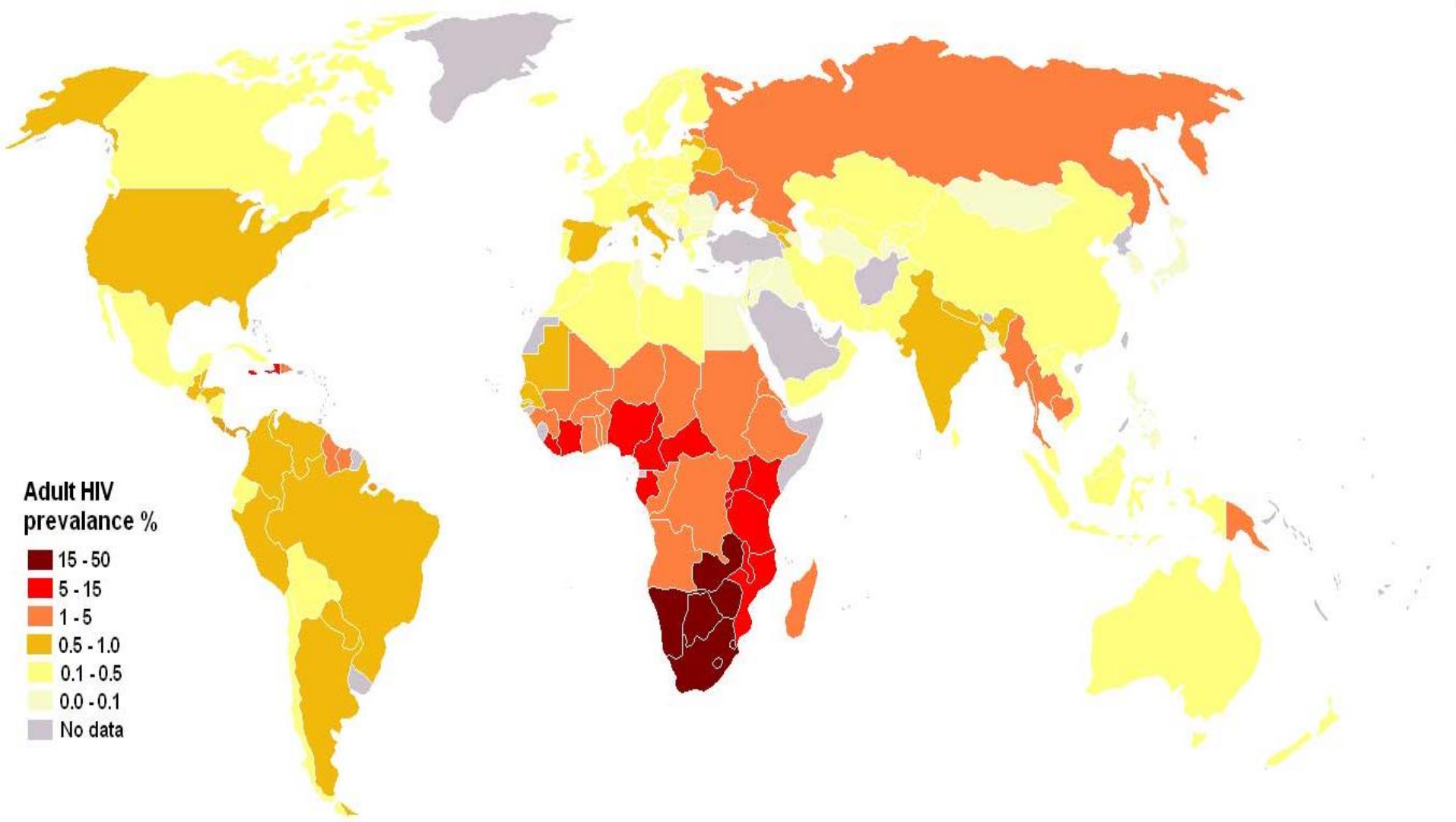
membrane and +72 glycoprotein complex

In the capsid from the protein p24 - 2 strands of RNA

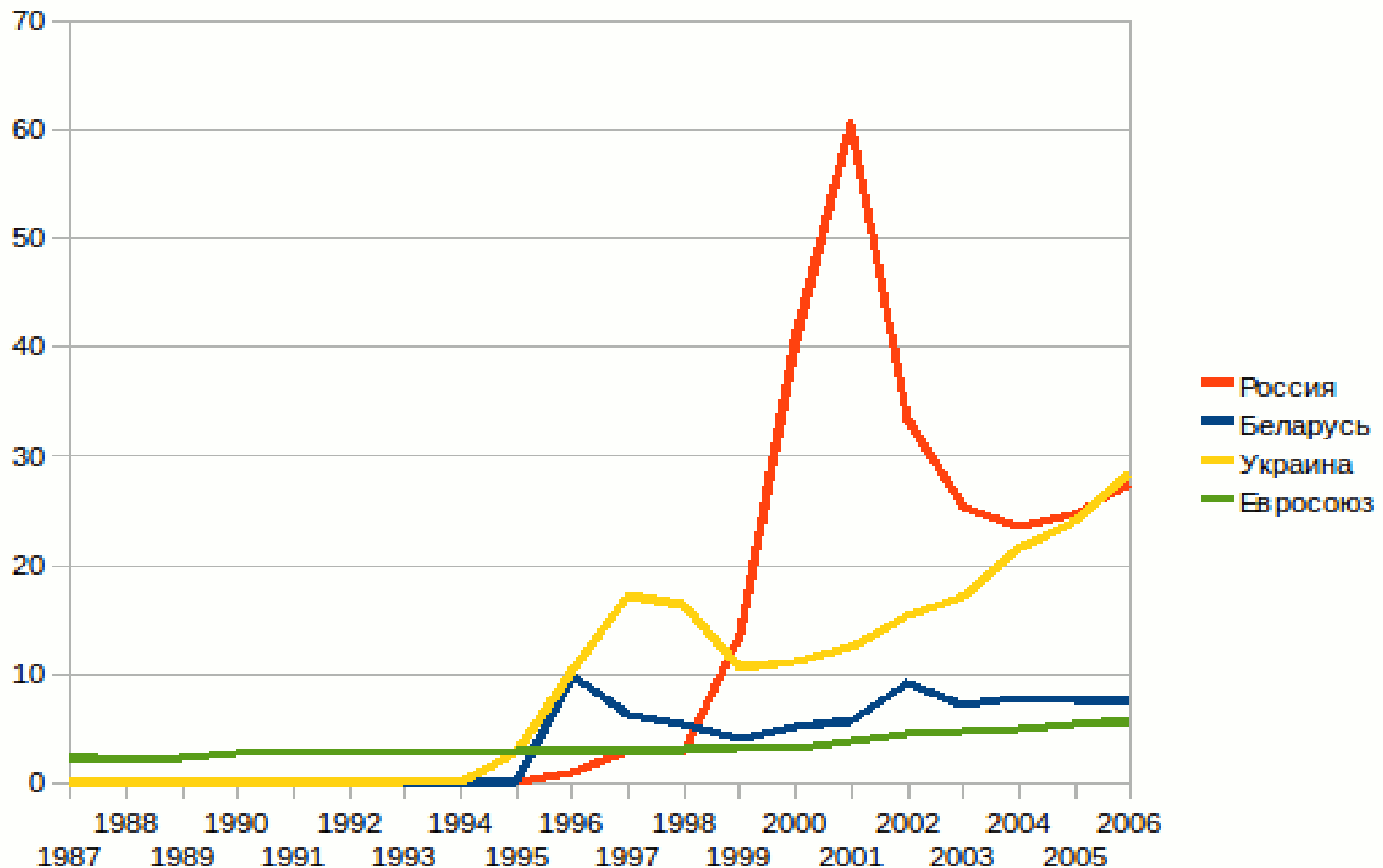
Diagram of HIV virion



Prevalence in the world



The total number of cases of detection of HIV-positive people in Belarus, Russia, Ukraine and EU countries, patients per 100 thousand population per year



Epidemiology

- Source of infectious agent
HIV-infected person, who is at any stage of the disease, including during the incubation period;
Virus carriers.
Every 8-19 months the total number of patients in the world doubles
The number of virus carriers in the world is 39 million.

The human immunodeficiency virus can be found in all biological fluids (blood, sperm, vaginal secretion, breast milk, saliva, tears, sweat, etc.), overcomes the transplacental barrier.

Despite the fact that the virus is isolated from all biological fluids

epidemiologically significant (most dangerous):
Blood, semen, secret of the cervix!

Mechanisms of infection:

- contact (70-80%),
- blood transfusion (3-5%),
- artifactual (5-10%),
- vertical (5-10%)

The ways of implementing the mechanisms of transmission of the pathogen:

sexual,

transplacental,

parenteral (injection, transfusion, transplantation).

Infection occurs in various ways (Khaitov)

Transmission paths	Probability of infection with a single exposure, %	Contribution to the spread of the epidemic, %
Sexual contacts	0,1 - 1,0	70 - 80
Transfusion of blood and drugs from it	> 90	3 - 5
Parenteral (contaminated medical and other instruments)	0,5 - 1,0	5 - 10
Wounds of medical staff contaminated with tools	< 0,5	< 0,01
Perinatal (pregnancy, childbirth) infection	30	5 - 10

- **Vertical mechanism** of HIV transmission is realized in 25-35 % of cases in infected pregnant women. Infection of the child can occur during the act of delivery, as well as breastfeeding, and the transmission of the virus goes not only from the infected mother to the child, but also from the infected child to the nursing woman.
- Transmission of HIV by airborne, food, water, transmission ways is not proved.

Contingents of possible risk of infection

- Homosexuals,
- Bisexual,
- "injecting drug users",
- recipients of blood and its products,
- prostitutes, vagabonds, supporters of free love,
- staff of hotels, air lines of international transport,
- servicemen, sailors, immigrants, refugees, seasonal workers, tourists.

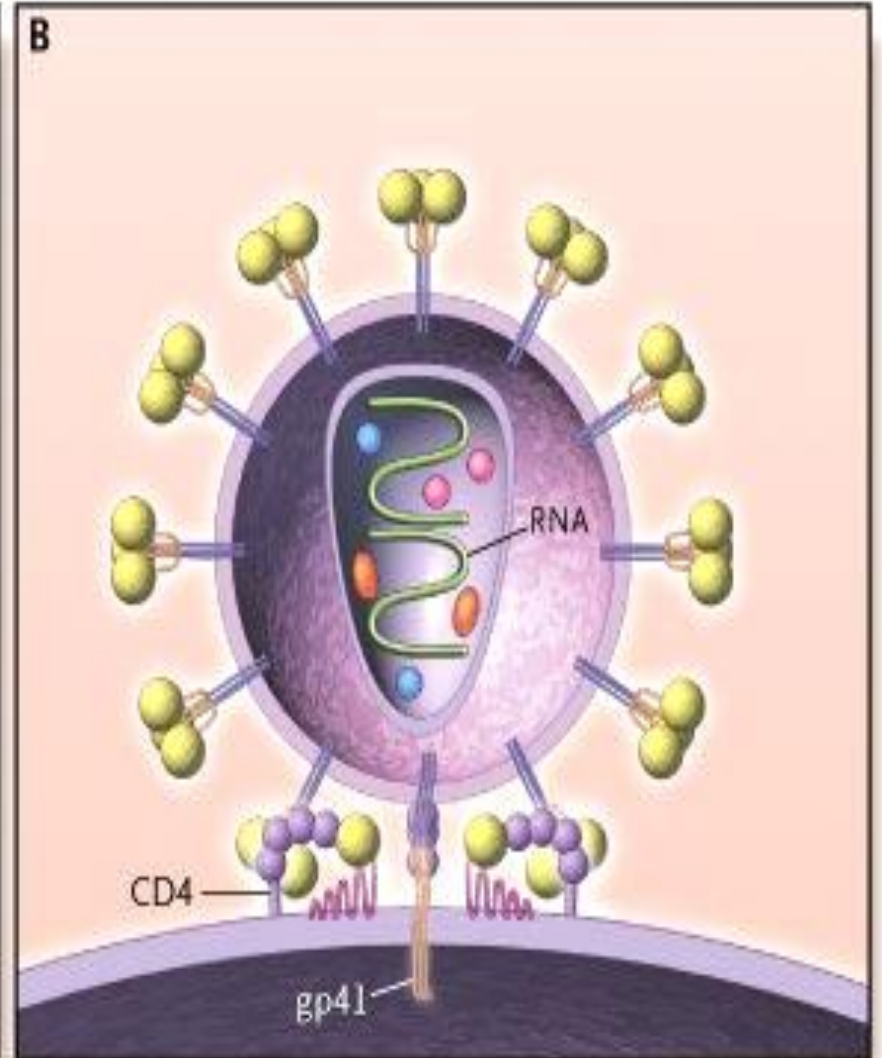
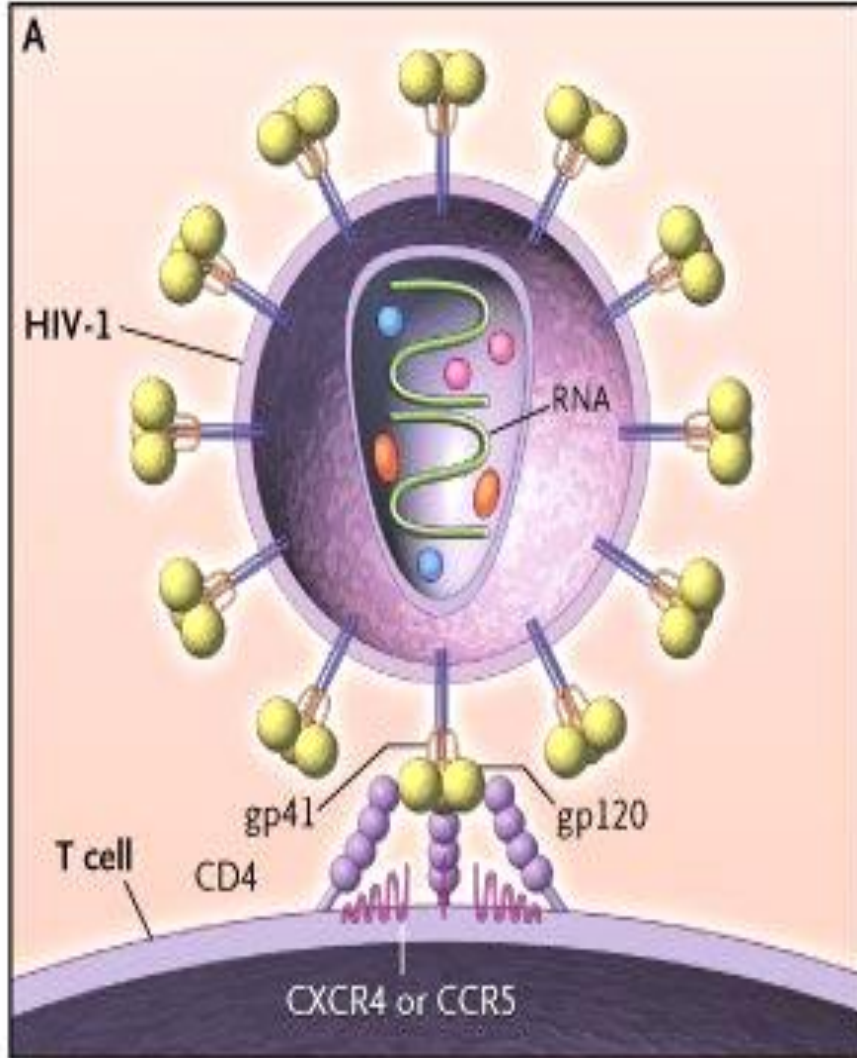
It has been established that occupational infection can occur as a result of accidental injections with sharp medical instruments, contaminated pathogens, less often when blood contacts mucous membranes or the skin and mucous membranes.

The epidemic process

- Characterized by the spread of HIV infection on all continents, an increase in the number of registered infected individuals, patients and AIDS deaths. Until the mid-1990s, the main mode of HIV transmission was sexual, which determined the nature of the epidemic process of HIV infection.
- Since the second half of 1996, the first place is "injecting" - among drug addicts who practice intravenous injection of psychoactive substances. The peculiarity of infection is a long incubation period, it can last from 2-7 weeks to 3 months, in some cases - up to 1 year.

Pathogenesis of HIV infection

- Penetration into the body
- The defeat of target cells (CD4, macrophages, follicular dendritic cells of lymph nodes, NS, epithelium)
- The life cycle of HIV
 - binding of gp 120 to CD 4 and co-receptors
 - virus penetration into the cell
 - reverse transcription
 - assembly of the viral RNA template with proviral DNA, integration with cell DNA
 - the synthesis of proteins and the assembly of virions
- Cell activation
- Multiple replication
- Cell death
- Oppression (perversion) of the immune response: violation of the immune response, decreased killer activity, decreased production of cytokines, auto-allergic processes



Classification of HIV infection (WHO, 1994)

- The incubation period (2-3 weeks - 1-2 months).
- Acute infection (1-2 weeks - 1 month).
- Asymptomatic carriage (1-3 months - 2-3 years).
- Persistent generalized lymphadenopathy (PGL) - 6 months - 2 years.
- Pre AIDS or AIDS-associated complex.
- AIDS

Stage of acute disease

Fever - 96%

Lymphadenopathy - 74%

Pharyngitis - 70%

Rash - 70%

- Erythematous, maculopapular on the face, trunk rarely on the limbs including the palms and soles

- Ulcerous lesions of the mucous oropharynx and genital organs

Myalgia or arthralgia - 54%

Diarrhea - 32%

Headache - 14%, Nausea and vomiting - 27%

Hepatosplenomegaly - 14%

Loss in weight - 13%

Candidiasis of the oral cavity - 12%

Neurologic symptoms - 12%

- Meningoencephalitis or serous meningitis

- Peripheral neuropathy, neuritis, radiculopathy

- Paresis of the facial nerve

- Syndrome Hyena-Barre

- Violation of the cognitive sphere, psychosis

Classification of CDC (1994)

Category A (CD-cell more than 500 cells) includes asymptomatic HIV infection, PGL and acute stage of HIV infection.

Category B (CD-cells 499-200) corresponds to the stage of AIDS.

Category C (CD cells less than 199 cells) corresponds to the stage of AIDS.

Clinical classification of the stage of HIV infection in adults and adolescents (WHO, 2006).

ACUTE HIV INFECTION

Asymptomatic

Acute retroviral syndrome

I clinical stage

- Asymptomatic current
- Persistent generalized lymphadenopathy

II clinical stage

- Recurrent bacterial infections (sinusitis, otitis media, tonsillitis, pharyngitis - 2 or more episodes for 6 months)
- Shingles
- Angular Cheilitis
- Recurrent aphthous stomatitis (2 or more episodes for 6 months)
- Seborrheic dermatitis
- Fungal nail infections

III clinical stage

- Unmotivated chronic diarrhea for more than 1 month
- Candidiasis of the mouth (thrush)
- Hairy leukoplakia of the oral mucosa
- Acute necrotizing ulcerative stomatitis, gingivitis or necrotizing ulcerative periodontitis
- Severe bacterial infections (pneumonia, meningitis, empyema, purulent myositis, arthritis or osteomyelitis, bacteremia, severe pelvic inflammatory disease, etc.)

IV clinical stage

- Pulmonary tuberculosis
- Pneumocystis pneumonia
- Toxoplasmosis
- Diarrhea cryptosporidial etiology
- Chronic isosporosis
- Extrapulmonary cryptococcosis
- Cytomegalovirus infection with the defeat of any organs, except for the liver, spleen or lymph nodes (retinitis).

IV clinical stage

- Infection caused by the herpes simplex virus with internal organs damage or chronic (more than a month) lesion of the skin and mucous membranes.
- Progressive multifocal leukoencephalopathy.
- Disseminated mycoses (histoplasmosis, coccidioidomycosis).
- Candidiasis of the esophagus, trachea, bronchi or lungs.
- Visceral leishmaniasis
- HIV cachexia
- Recurrent bacter. pneumonia

IV clinical stage

- Disseminated infection caused by atypical species of mycobacteria.
- Recurrent salmonella bacteraemia, caused by non-typhoid salmonella
- Extrapulmonary tuberculosis
- HIV-encephalopathy, HIV-cardiopathy, HIV-nephropathy
- Lymphoma
- Kaposi's Sarcoma

Classification of AIDS

- Pulmonary form.
- Neuro / psycho AIDS
- Gastrointestinal form.
- Visceral form (generalized infection)
- Lesion of mucous membranes and skin
- Undifferentiated

Lung lesions in AIDS

- TUBERCULOSIS
- PNEUMOCYAL PNEUMONIA
- BACTERIAL PNEUMONIA
 - Hemophilus Influenza,
 - Staphylococcus Aureus,
 - Streptococcus Pneumoniae,
 - Pseudomonas Aerogenosae,
 - E. Coli, Klebsiella Sp., Acinetobacter Sp.
- Fungal lesions of the lungs (Candidiasis, Aspergillosis)
- LEGIONELLOSE
- SARCOM KAPOSHI, LYMPHOMA.

Tuberculosis. Features of the clinical course.

OFTEN:

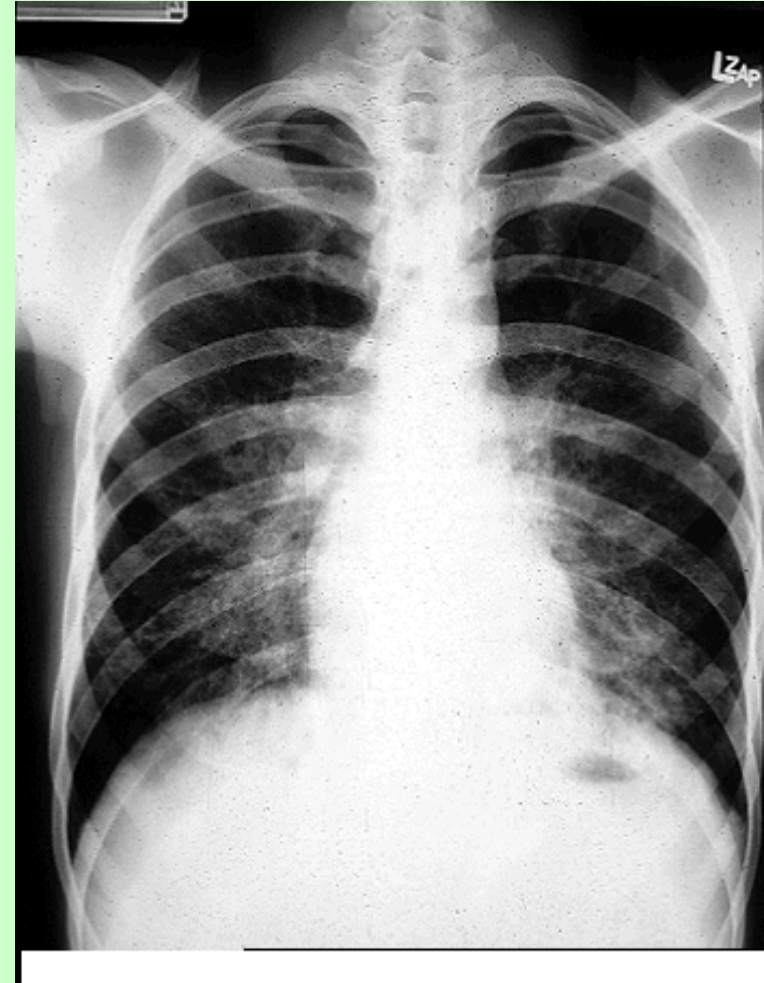
1. ADVANCED ADENOPATHY
2. AVAILABILITY OF ADVANTAGEOUS INTERSTITIAL CHANGES
3. EDUCATION OF THE PLEASURE OUTPUT
4. DEVELOPMENT OF BACTERIEMIA
5. INSTEAD OF MILIARY STRAINS DIFFUSION CLOSE-SHADOW SHADOWS.
6. DISSEMINATED DISSEMINATED CURRENT

RARELY:

1. HAZARD OF THE UPPER DEPARTMENTS
2. FORMATION OF THE CAVITY OF DECOMPOSITION, CUPER

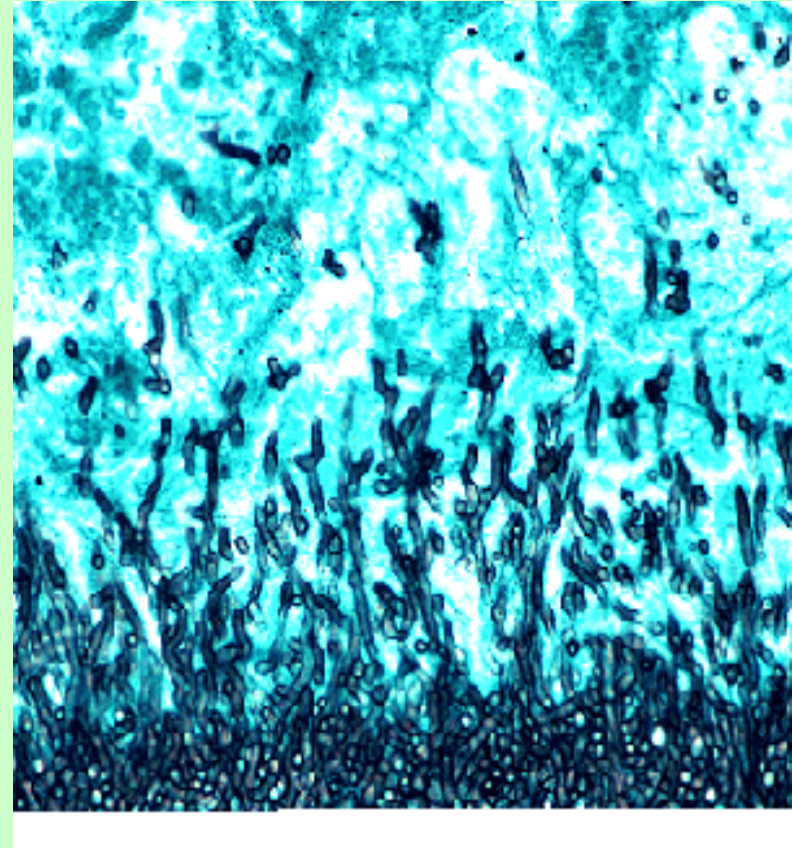
Pneumocystis pneumonia

- *Pneumocystis jiroveci*
The classic triad of symptoms is dry cough, low-grade fever and shortness of breath when exercising. Rapid decompensation, respiratory failure requiring mechanical ventilation.



Aspergillosis

- The most frequent pathogen is *Aspergillus fumigatus*.
- Fever, cough, shortness of breath, chest pain (hemoptysis).
- On CT scan - bilateral multiple nodules
- The defeat of other organs (CNS, kidney, liver)



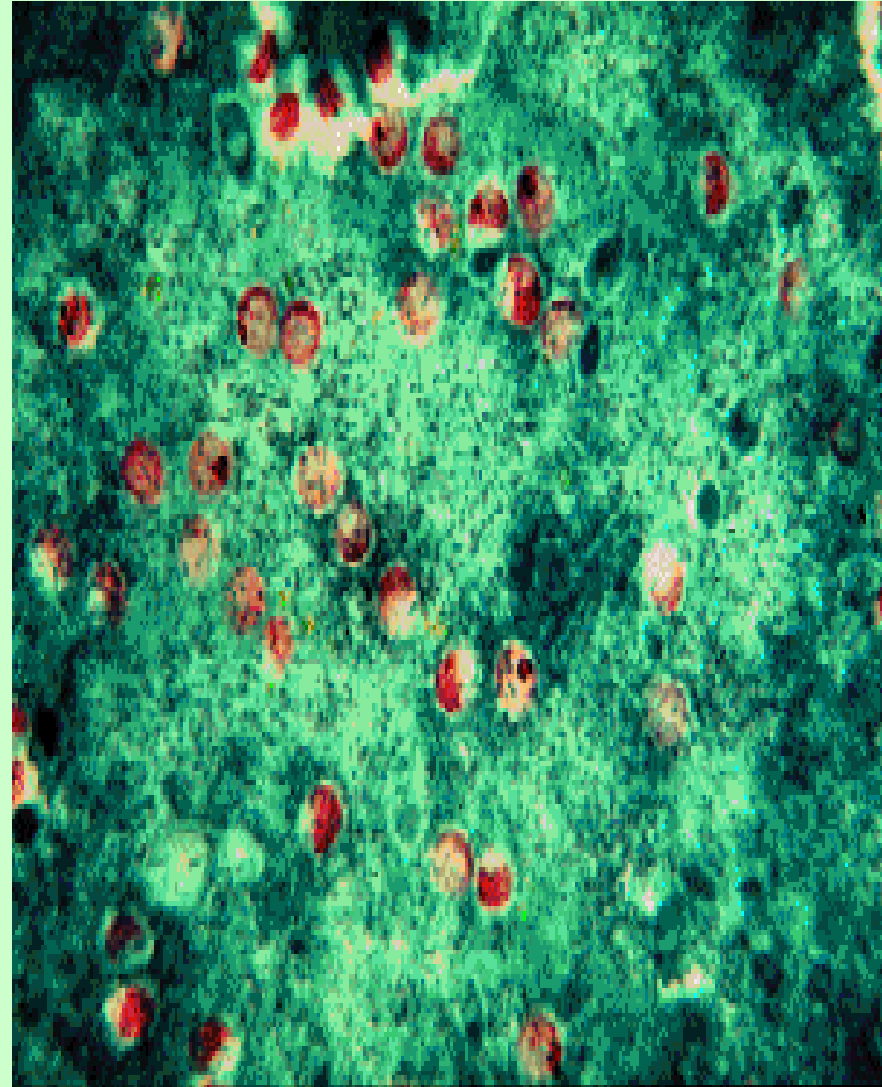
Cryptosporidiosis

Cryptosporidium parvum

Parasitic intestinal disease

Watery diarrhea up to 20
times a day

Dehydration, loss of
electrolytes



- **Primary CNS lesions:**
- HIV-encephalopathy (dementia),
- Vascular AIDS vacuolar myelopathy (myelitis)
- sensory polyneuropathy (distal monopolyradiculoneuritis)
- encephalopolyradiculopathy
- **Secondary lesions of the central nervous system:**
- progressive multifocal leukoencephalopathy with extrapyramidal hyperkineses and dementia (papovirus)
- meningitis and meningoencephalitis (toxoplasmosis, cryptococcosis, herpetic, tuberculosis),
- Brain abscess (toxoplasmosis, cryptococcosis, bacterium.),
- cerebral vasculitis with infarction (toxoplasmosis, herpetic),
- lymphoma of the brain (primary and secondary).

Disseminated form

Kaposi's Sarcoma (HZA-Dr-5)

Herpes

B-cell lymphoma

Squamous cell carcinoma

Melanoma

Candidiasis

Impetigo

Hairy leukoplakia, abscesses, etc.

Bacillary angiomatosis

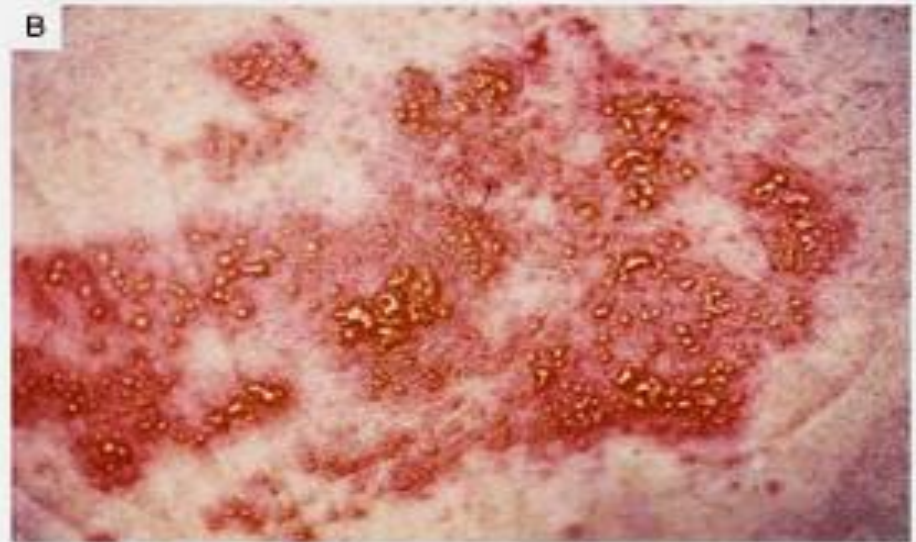
Eye lesions

Symptom "cotton marks"

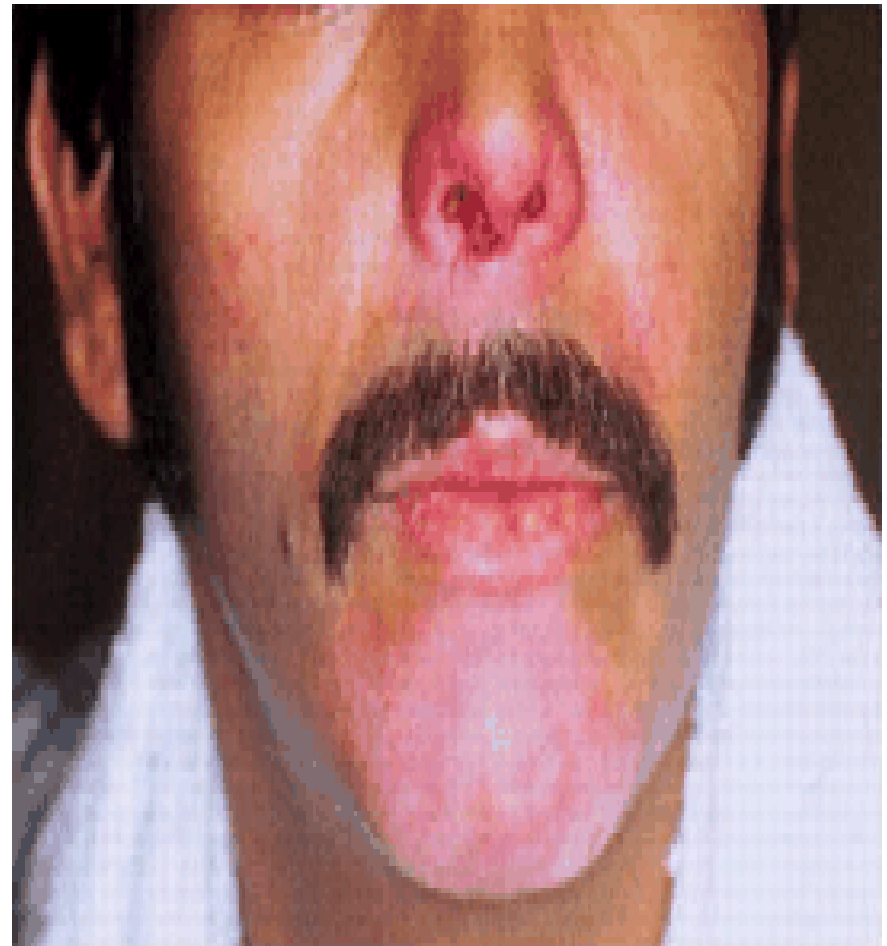
Chorioretinitis, conjunctivitis

Ischemia and hemorrhages in the layer of nerve fibers

Herpes zoster



Herpetic lesions of the skin and mucous membranes caused by HSV-1



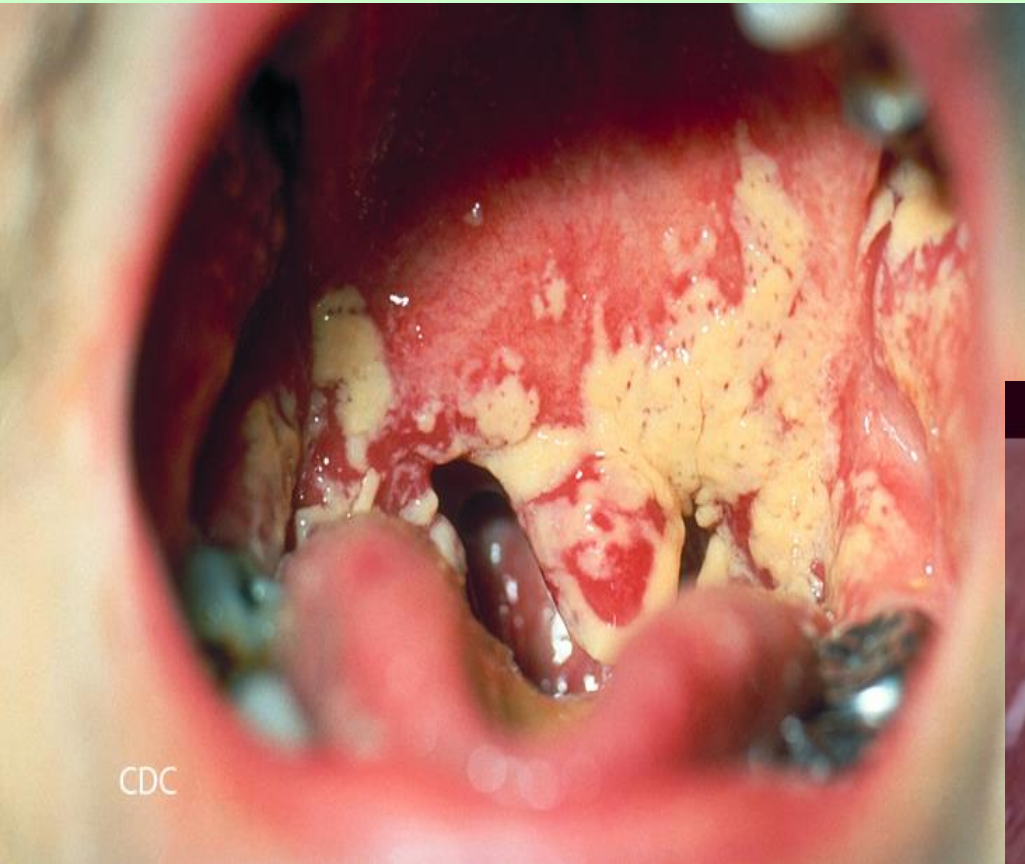
Kaposi's Sarcoma

The most frequent malignant tumor in HIV-infected patients.

Spindle-shaped cells from the endothelium of lymphatic vessels. Red-violet spots or vesicles, expanding, edema, lymphostasis.



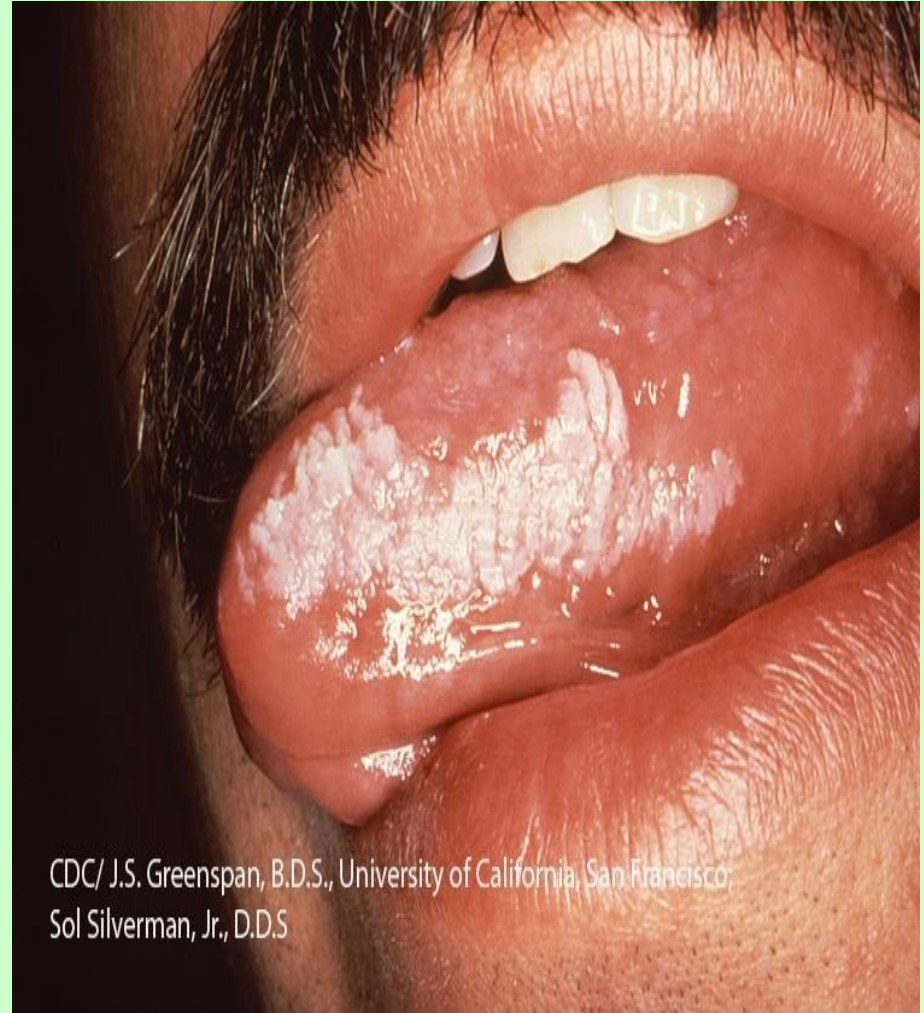
Candidiasis of the oropharynx



Dr. Reznik DDS, Presented at RWCA Clinical Conference, June 2005

Hairy tongue leukoplakia

- Co-infection of HIV.
- Convex white patches in the marginal zone of the tongue, vertical grooves



CDC/ J.S. Greenspan, B.D.S., University of California, San Francisco;
Sol Silverman, Jr., D.D.S

Bacillary angiomatosis



Clinical indications for HIV testing

- fever more than 1 month;
- diarrhea more than 1 month;
- unexplained weight loss of 10% or more;
- pneumonia - prolonged, relapsing or not standardized therapy;
- persistent cough more than 1 month;
- prolonged, recurrent viral, bacterial, parasitic diseases;
- Sepsis;
- enlargement of lymph nodes of 2 or more groups more than 1 month;
- subacute encephalitis;
- dementia in previously healthy individuals.

Directions of diagnosis

- Virological,
- molecular-genetic (PCR) and
- Serological (ELISA, immune blotting) methods.

The standard and most accessible procedure is the detection of antibodies to HIV in ELISA with subsequent confirmation of their specificity in the immune blotting reaction.

Changes in laboratory indicators

- Anemia, pancytopenia (leukopenia, thrombocytopenia), acceleration of ESR
- reduction of CD-4 positive lymphocytes
- an increase in CD-8 positive lymphocytes
- increase in viral load
- reduction of cellular immunity
- hypoalbuminemia, hypergammaglobulinemia
- increase in the number of CIC in the blood in patients
- The appearance and increase in the number of autoantibodies to the DNA of the liver, connective tissue, brain,

Virological diagnostics

Definition of antibodies:

RIF (immunofluorescence reaction)

ELISA (enzyme immunoassay) is the determination of total antibodies to HIV proteins

Immunoblotting is the determination of antibodies to core proteins (p17, p24, p55); shell proteins (gp41, gp120, gp160); enzymes (p31, p51, p66)

Definition of the virus:

Determination of proviral DNA and HIV RNA by PCR

Specificity of ELISA and immunoblot - 98%

CD4 + indices for HIV infection

The norm is 600-1500 / μL

PGL (1 st.) - 500-600 / μL

AIDS (2-3 st.) - 200-500 / μL

AIDS (4 st.) - <200 / μL ("early AIDS" - 50-200 / μL , "late" - <50 / μL)

The positive result of the study with the use of ELISA is not the final criterion for assessing the condition and the prognosis of the disease, it makes it possible to establish with a certain degree of probability the fact of infection! In 3 - 5% of cases, false-negative results are possible:

- a) if infection has occurred relatively recently and the level of antibodies is still very low,

- b) in the terminal stage of the disease, characterized by severe damage to the immune system with a profound disruption of the antibody formation process.

Immunoblotting (confirmatory test)

electrophoresis, the HIV proteins are separated, transferred to a nitrocellulose membrane, then treated with the test serum

If there are specific antibodies to HIV proteins in the serum, a visible precipitate forms.

Molecular biological methods

Detection of the virus DNA.

Polymerase chain reaction (PCR)

The method allows to detect the genome of HIV, built into the genome of affected lymphocytes. This is possible in the presence of viral genes in only 1 out of 5,000 cells, even in the absence of antibodies in the blood or at an insufficient level for detection by existing standard methods.

Preventive actions

WHO identifies four main areas of activity, aimed at combating the HIV epidemic and its consequences:

Prevention of sexual transmission of HIV, including elements such as training in safe sexual behavior, the distribution of condoms, the treatment of other STDs, training in behavior aimed at the conscious treatment of these diseases;

Preventing the transmission of HIV through the blood by supplying safe preparations made from blood.

Prevention of perinatal transmission of HIV through the dissemination of information on the prevention of HIV transmission by providing medical care, including counseling for women infected with HIV, and chemoprophylaxis;

Organization of medical care and social support for people with HIV, their families and others.

Work to prevent the spread of HIV is regulated by legal documents and, according to the WHO recommendation, should include the following levels of HIV prevention

- The primary level is limiting the number of cases of AIDS and HIV infection by influencing specific causal factors that contribute to an increased risk of the disease. At this stage, prevention is carried out by the promotion of safe sex, mass screening using ELISA test systems.

Secondary level - early identification of patients with HIV infection, for which they perform screening among risk groups and clinical examination according to clinical indications (ELISA, immune blotting); treatment of patients with HIV infection.

Tertiary level - dispensary observation and rehabilitation of HIV / AIDS cases.

Prevention of HIV infection among medical personnel

- performing any manipulations of a medical nature, the health-care worker should be dressed in a robe, cap, disposable mask (and, if necessary, glasses or protective shields), replacement shoes, outside of the department, laboratories, manipulation rooms, etc.; all manipulations in which contamination of the hands with blood, blood serum or other biological fluids can occur occur in double rubber medical gloves. In the process of work, gloves are treated with 70% alcohol or any other disinfecting drugs having a virucidal effect;

- In case of damage to the skin, immediately disinfect the gloves with a disinfectant solution and remove them, squeeze out blood from the wound; then under running water, thoroughly wash your hands with soap, treat them with 70% alcohol and grease the wound with a 5% solution of iodine. If the hands are contaminated with blood, immediately treat them for at least 30 with a tampon moistened with a skin antiseptic approved for use (70% alcohol, 3% chloramine solution, iodonate, sterillium, octeniderm, octenidept, chlorhexidine, etc.), wash them twice warm running water with soap and dry with an individual towel (napkin);

- in the presence of wounds on the hands, exudative skin lesions or dermatitis, the health worker is removed from the care of patients and the contact with objects for care of him for the period of the disease. If necessary, all damaged skin areas should be closed; the surface of the work tables at the end of the working day (and in case of contamination with blood - immediately) is treated with disinfectants that have virucidal properties. If the surface is contaminated with blood or blood serum, the procedures are performed twice: immediately and with an interval of 15 minutes;

- Before work it is necessary to put on goggles or plastic shields, a face mask; disposable gloves are mandatory; Use disposable tools only once; a health worker should treat blood and other body fluids as potentially infectious material.

Activities in the epidemic outbreak

- When an HIV-infected person is identified, an interview (counseling) is conducted with him to find out the cause of infection, the health consequences, the possibility of treatment.

With identified partners, they talk about ways to prevent HIV infection.

Invite partners to undergo a voluntary survey.

All data on HIV-infected people and their partners are treated as medical secrets, and the responsibility of medical workers is provided for its disclosure.

Epidemiological surveillance

- Obligatory registration and registration of HIV-infected persons;
Registration and recording of the number of people surveyed and the causes of infection.
All information is subject to analysis by sex, age, social status, territory of infection, risk factors, ways of infection.
As a result, identify the risk groups, risk areas, causes and conditions of infection, ways of spreading the infection.

Rights and duties of HIV-positive people

- The state guarantees all HIV-infected people access to medical examination for the detection of HIV infection, including anonymously;
free provision of all types of qualified and specialized medical care.
The state guarantees regular information to the population, including through the mass media, about available methods of HIV prevention.
It guarantees the observance of all rights and freedoms for HIV-infected people without restriction of their movement around the country, admission to study and work.

For infection with HIV infection, criminal liability is provided.

Indications for the onset of antiretroviral therapy

- CD4 <350 cells / μ l, regardless of the presence of symptoms
- Any AIDS-indicator disease
 - Pregnancy, regardless of immunological, virologic or clinical indicators
 - HIV-associated nephropathy
 - Co-infection with HBV / HIV in the presence of indications for the treatment of HBV (drugs with double activity)

Purpose of antiretroviral therapy

Reduction of viral load

Until neo. level for a maximum term (years)

Prevent development of HIV resistance and progression

Restoration of immunity

Quantities and functions of CD4 cells

Prevent opportunistic infections and HIV progression

Reduction of morbidity and mortality

Improving the quality of life

HIV prevention

Antiretroviral drugs

- Nucleoside reverse transcriptase inhibitors

Zidovudine Stavudine

Lamivudine Didanosine

Abacavir Emtricitabine

- Nucleotide reverse transcriptase inhibitors

Tenofovir

- Non-nucleoside reverse transcriptase inhibitors

Efavirenz Nevirapine

- **Protease Inhibitors**

Fosamprenavir Lopinavir

Atazanavir Tipranavir

Darunavir Nelfinavir

Saquinavir indinavir

Ritonavir

Integrase inhibitors - Raltegravir

Fusi inhibitors - Enfuvirtide

CCR5 antagonists - Marowork

First-line antiretroviral therapy regimens in Ukraine

- Tenofovir + Emtricitabine + Efavirenz
Tenofovir + Emtricitabine + Lopinavir

Alternative ART regimens

Zidovudine + Lamivudine + Nevirapine (or
Fosamprenavir + Ritonavir)

Abacavir / Lamivudine + Nevirapine (or
Fosamprenavir + Ritonavir)

Patterns of ART with limited application of

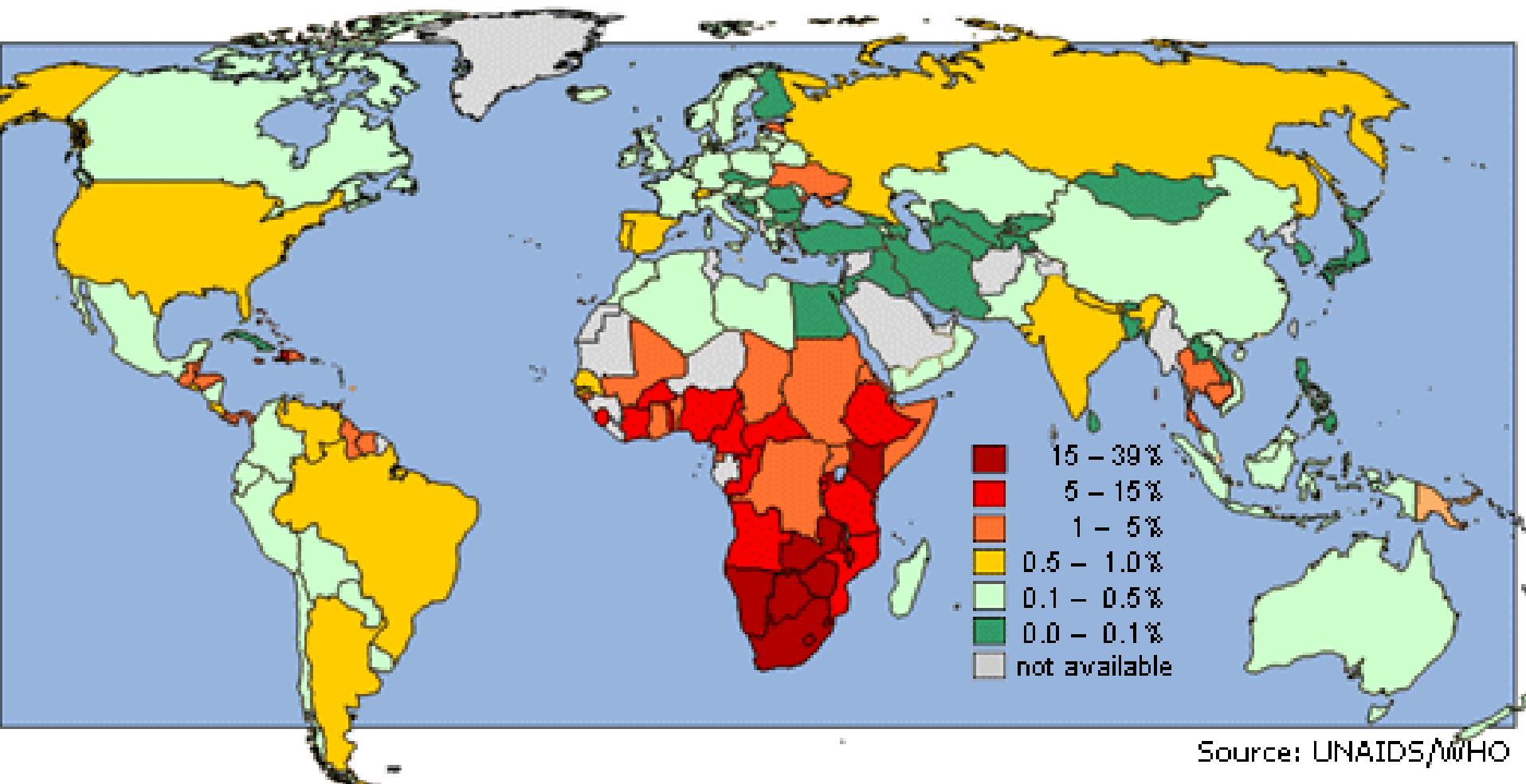
Didanosine + Lamivudine + NNRTI (or IP)

Stavudine + Lamivudine + NNRTI (or IP)

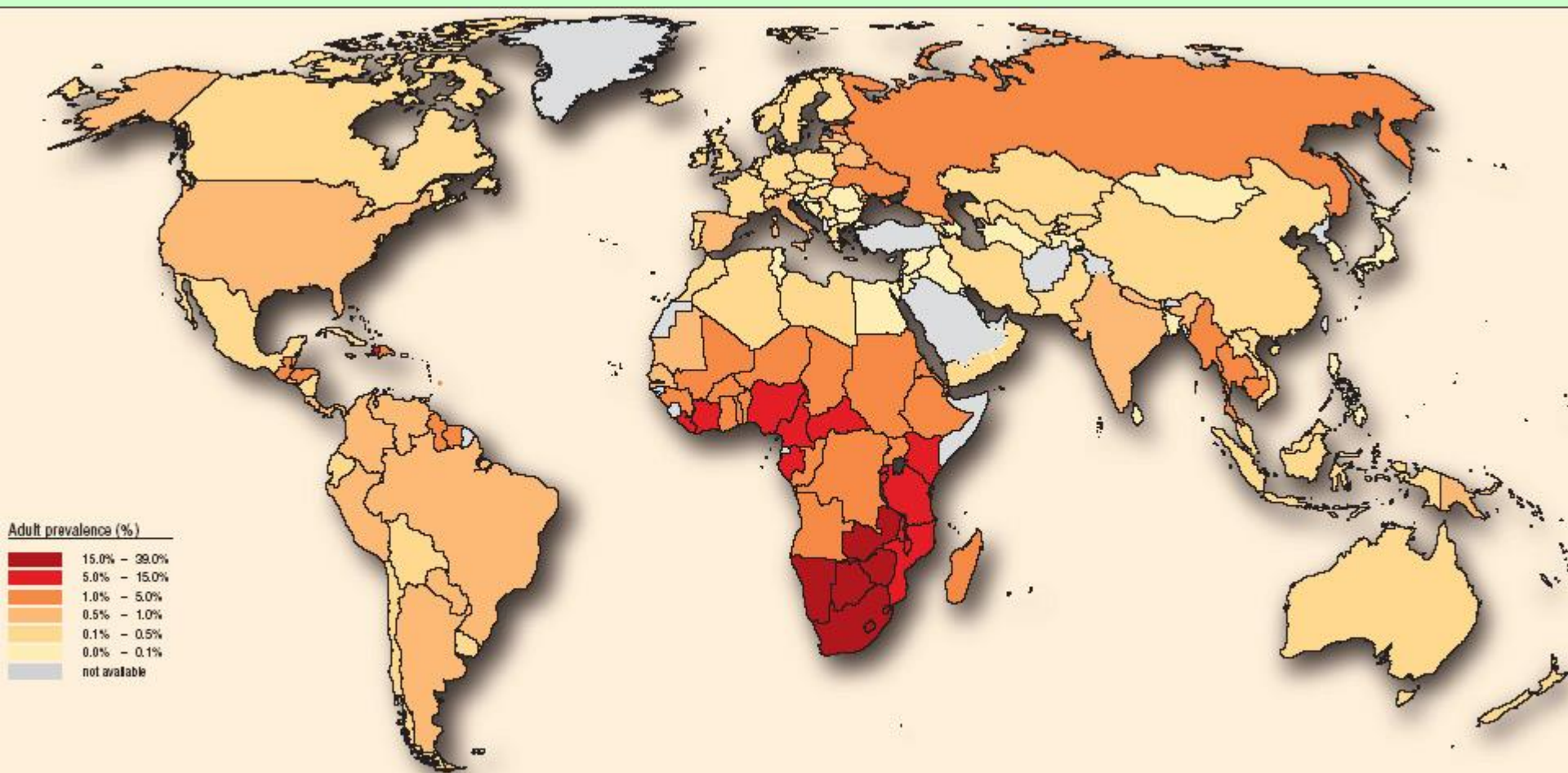
NNRTI-based ART regimens

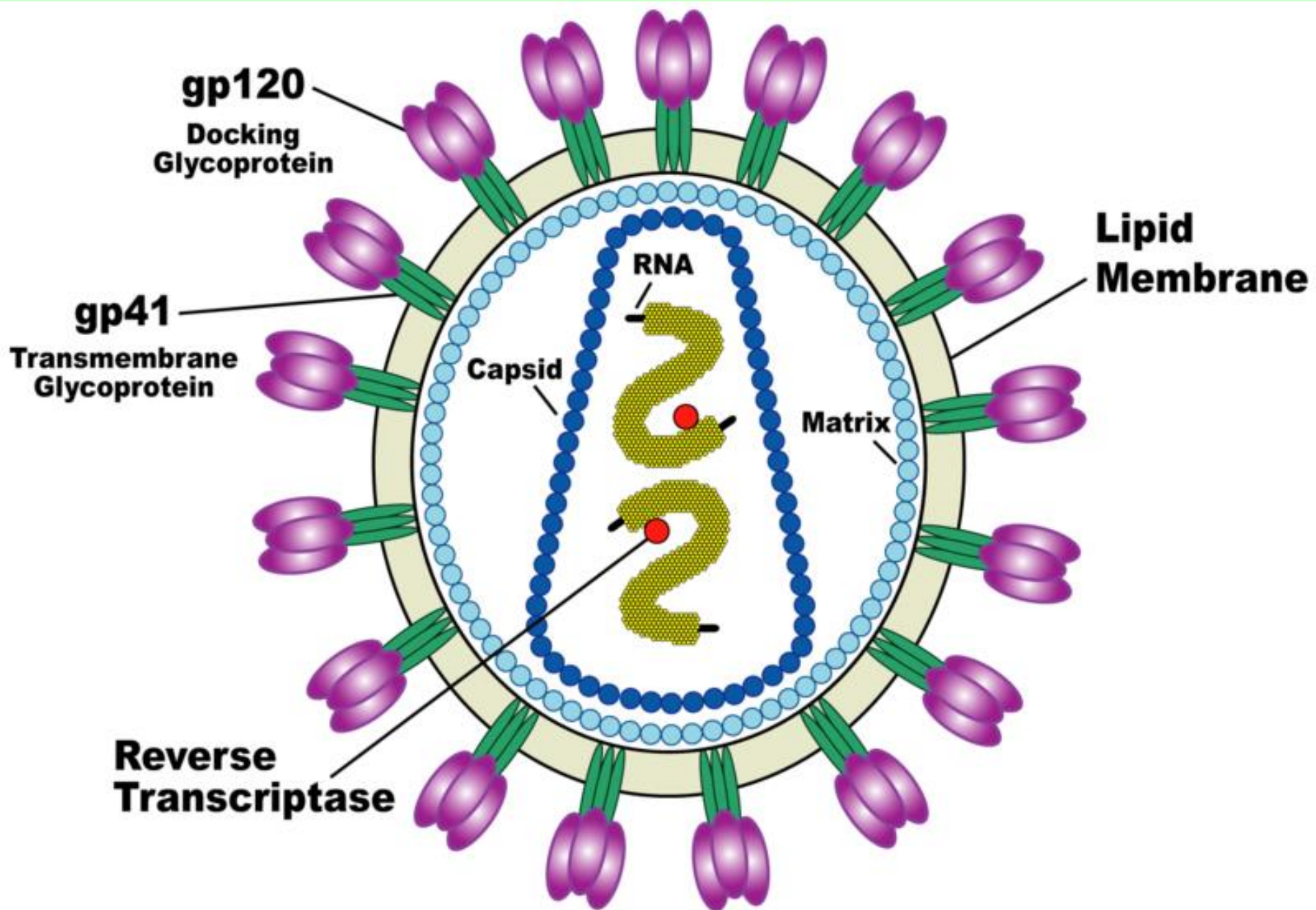
- High efficiency for EFV regardless of the initial HV
- Comb. form - atripla (EFV / TDF / FTC) 1 tab / day, no dependence on food intake
- It can be used with rifampicin (EFV), it is impossible with pregnancy, mental disorders
- Stable antiviral effect
- Preservation of the choice and use of IP in the future.

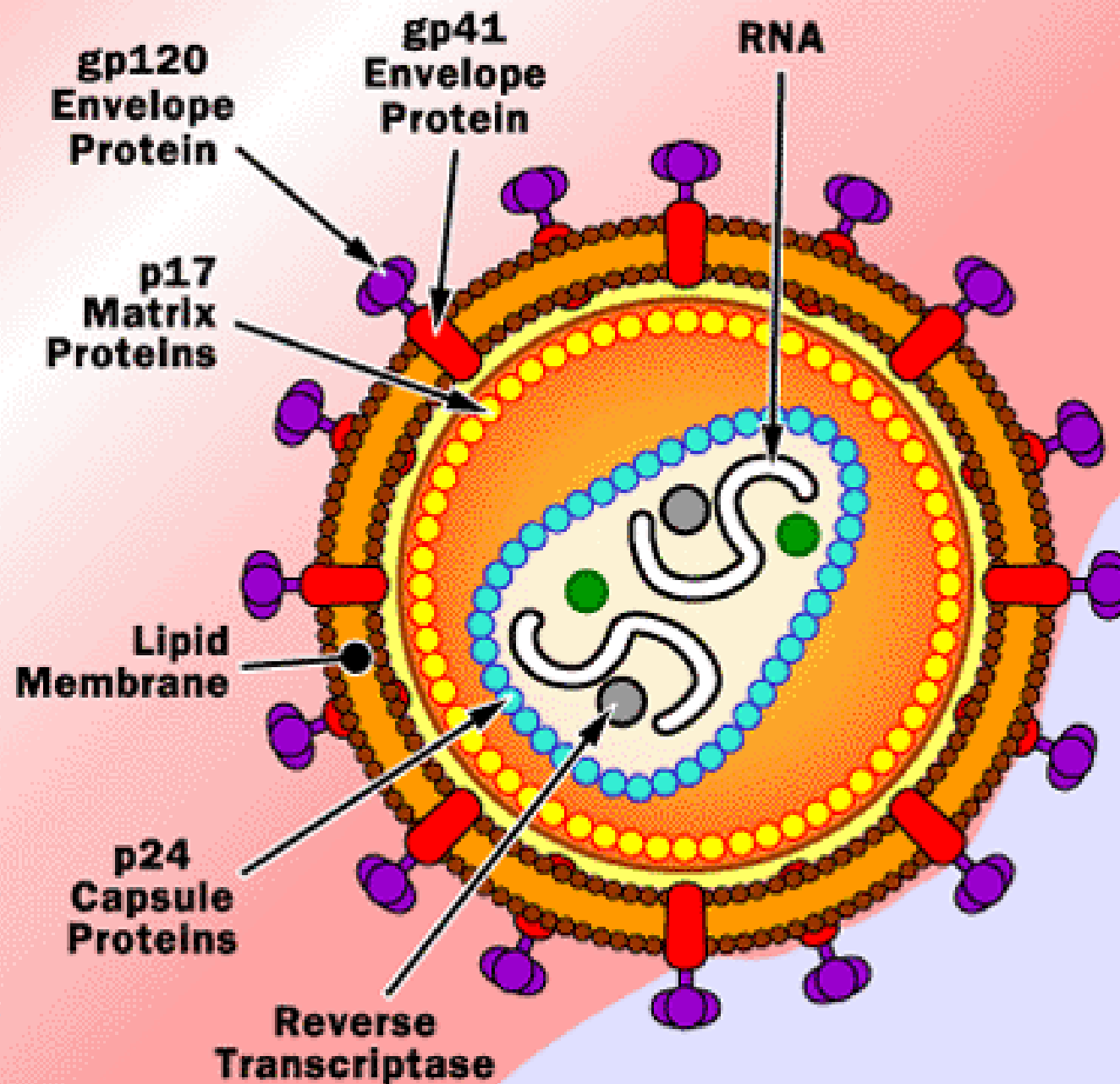
HIV prevalence in adults, end 2001



Source: UNAIDS/WHO

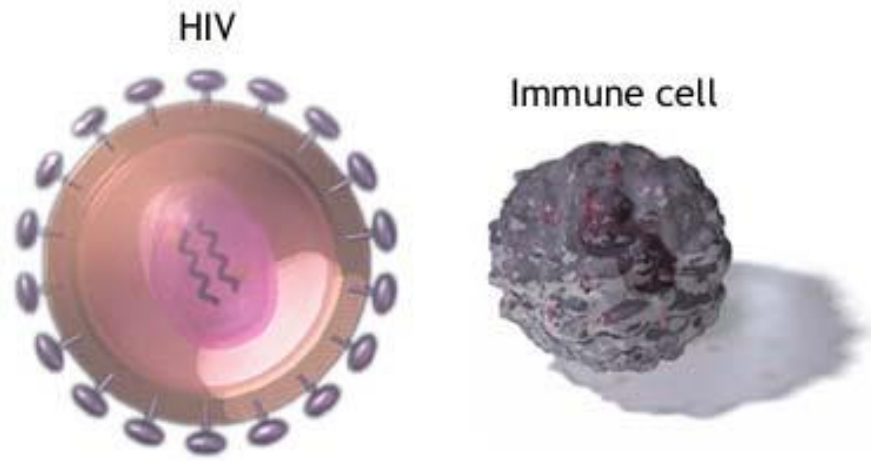






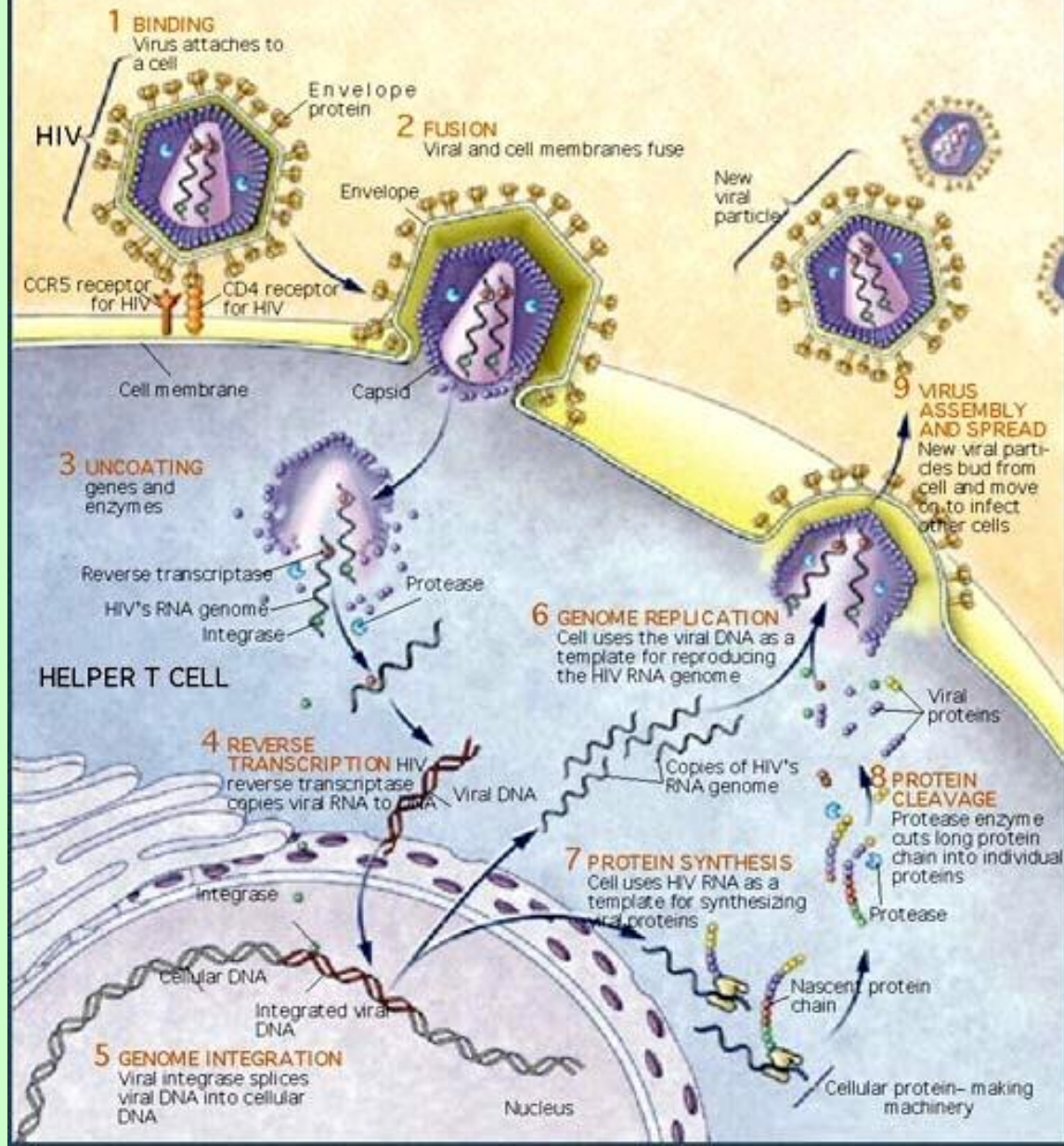
©2001 HowStuffWorks

Anatomy of the AIDS Virus

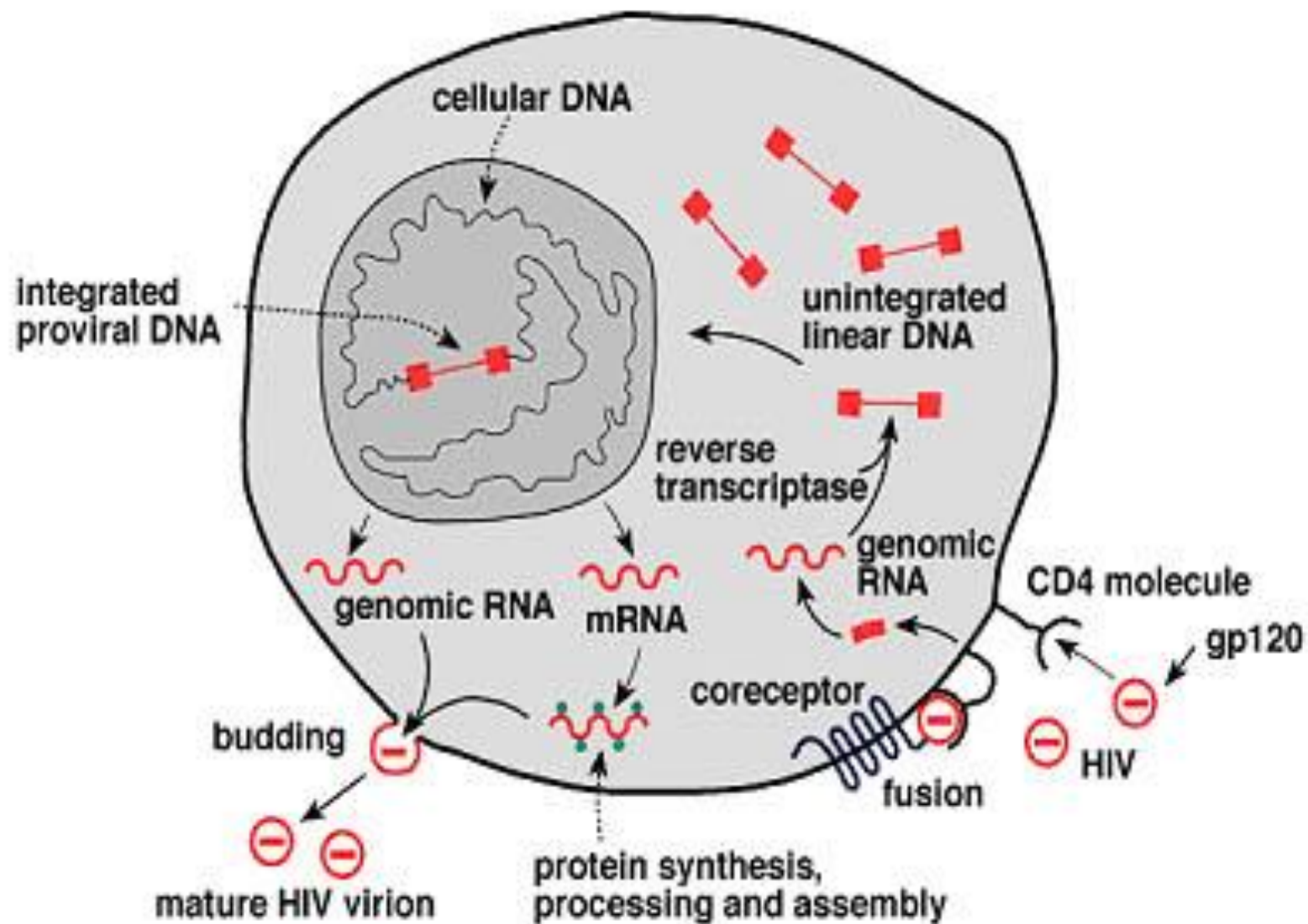


HIV LIFE CYCLE, deciphered with the help of genomic analyses, is unusually complex in its details, but all viruses undergo the same basic steps to infect cells and repro-

duce. They enter a cell (bind to it and inject their genes into the interior), copy their genes and proteins (by co-opting the cell's machinery and raw materials), and pack



Replication Cycle of HIV



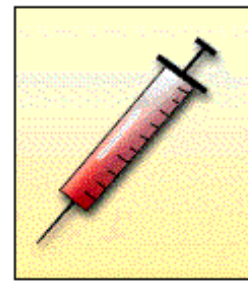


Unprotected
sexual intercourse
with an infected partner



Vertical
transmission
(from mother
to child)

- in utero
- during delivery
- breastmilk



Injection drug use
(rare: infected
blood/blood products)

The most common methods of transmission of HIV are:



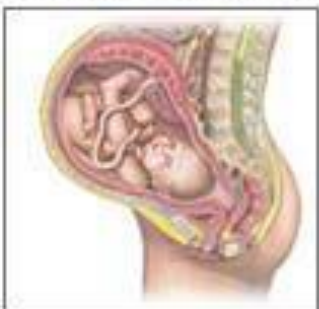
Unprotected
sex with an
infected
partner



Sharing
needles
with
infected
person

HIV INFECTION

Almost eliminated as risk factors for HIV transmission are:



Transmission
from infected
mother to
fetus

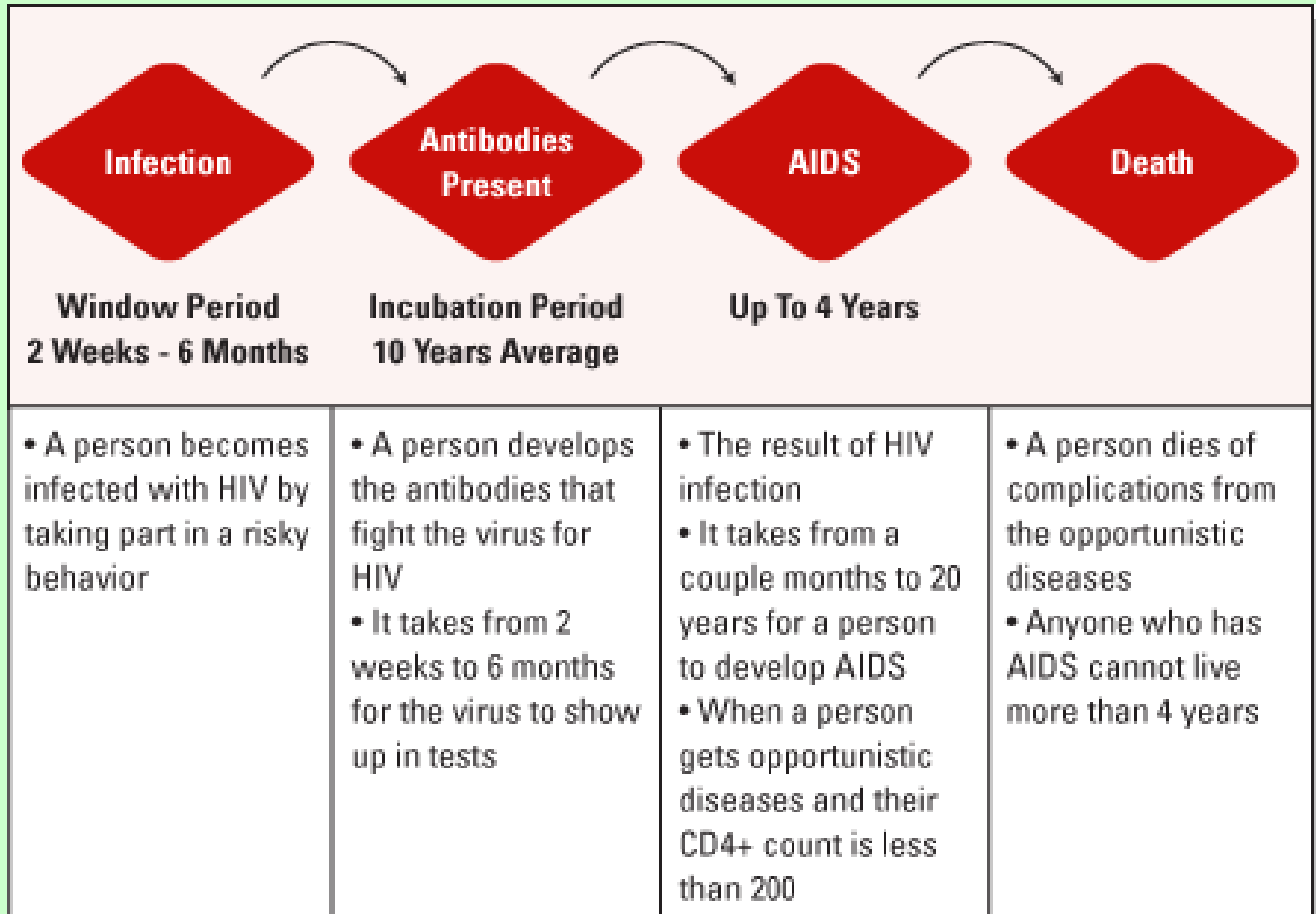


Infection
from blood
products

Opportunistic infections such as pneumocystosis or malignancies such as Kaposi's sarcoma can signal the final stage of HIV infection, AIDS



Stages of HIV Infection





SOMEBODY LIVES WITH HIV, NOBODY WANTS TO PLAY WITH HIM. BE LIKE NOBODY.



PROGRESSIVE AND
HUMAN
RIGHTS
MOVEMENT