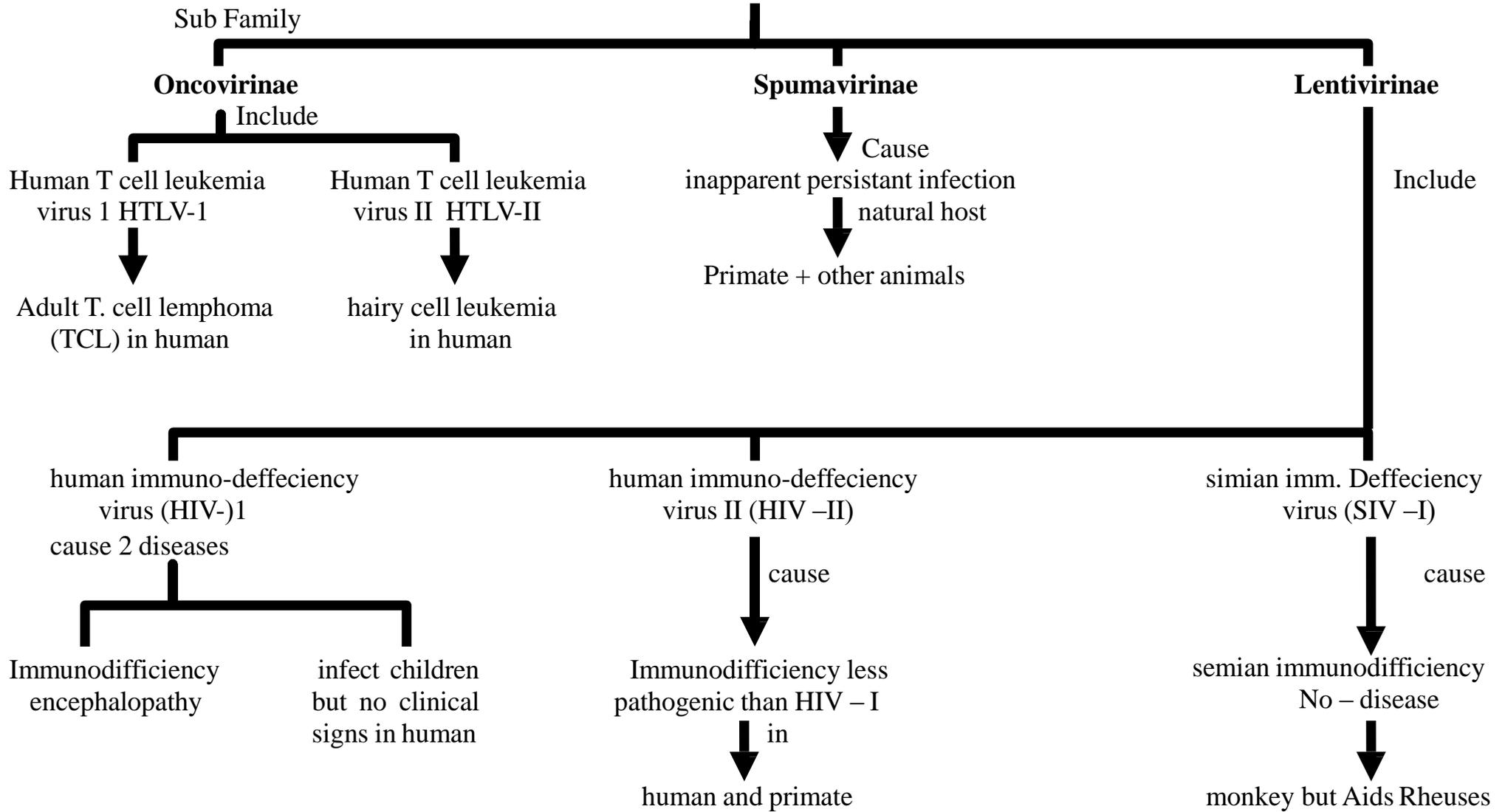
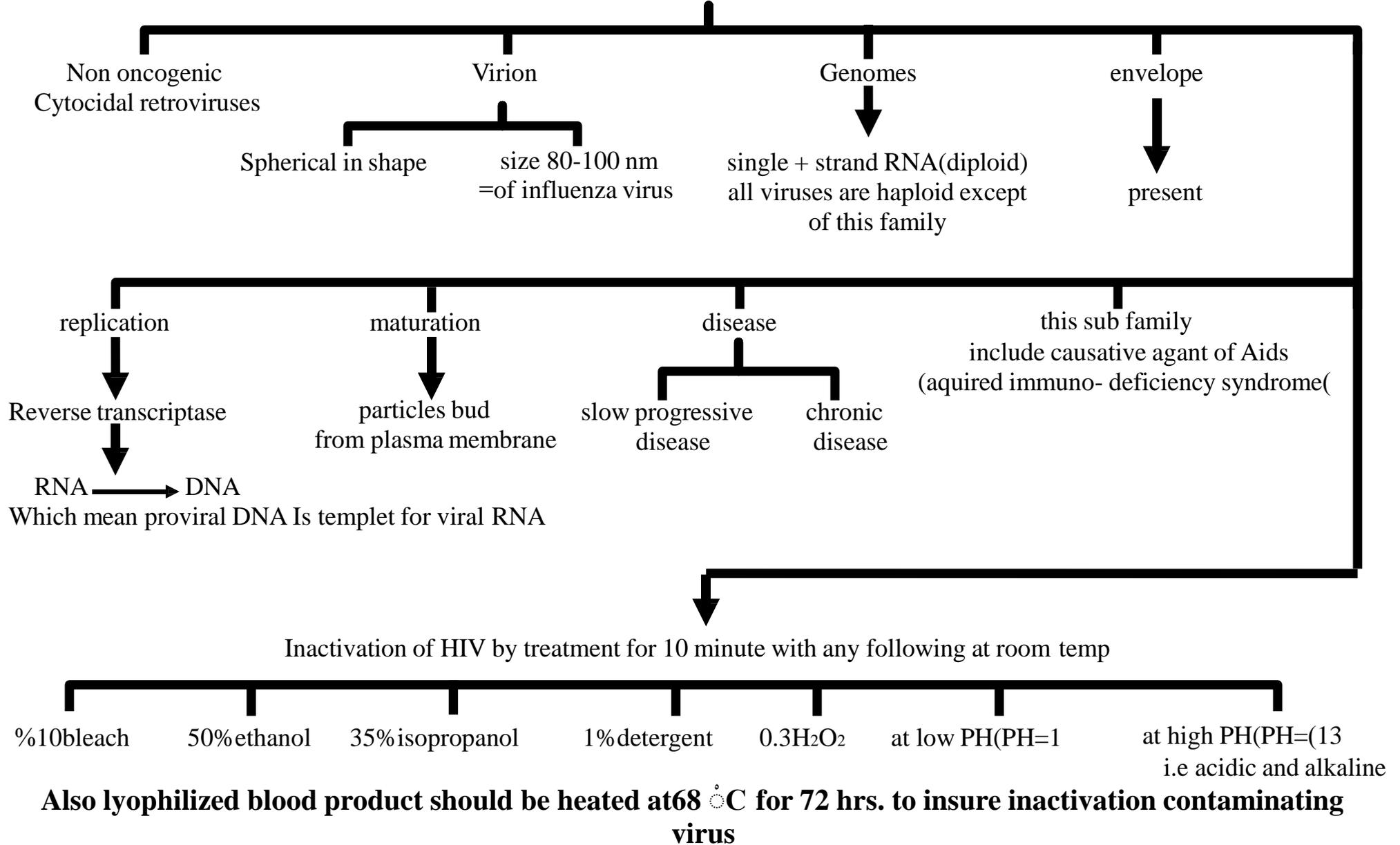


Professor Dr. Mothana Ali Khalil. Medical Virology Retroviruses
including Human immunodeficiency viruses (HIV) causing of AIDS

Classification



Properties of Lentiviruses



Structure of HIV

HIV have

3 Structural gene (or protein)

6 Regulatory gene for replication and pathogenesis

(1) gag (group specific antigen)
viral protease cleavage

(2) pol protease cleavage

matrix antigen P18 (MA)
Core (CA) P24
Nucleocapsid (NC) P9

Reverse transcriptase (RT) P66
Integrase (IN) P11
Protease (PR) P160

Based on ENV-gene sequence divided

(3) ENV

Cellular protease

HIV-1 Divide to 3 type
HIV-2 divided

M N O

surface (SU)
gp 120

)glycoprotein(

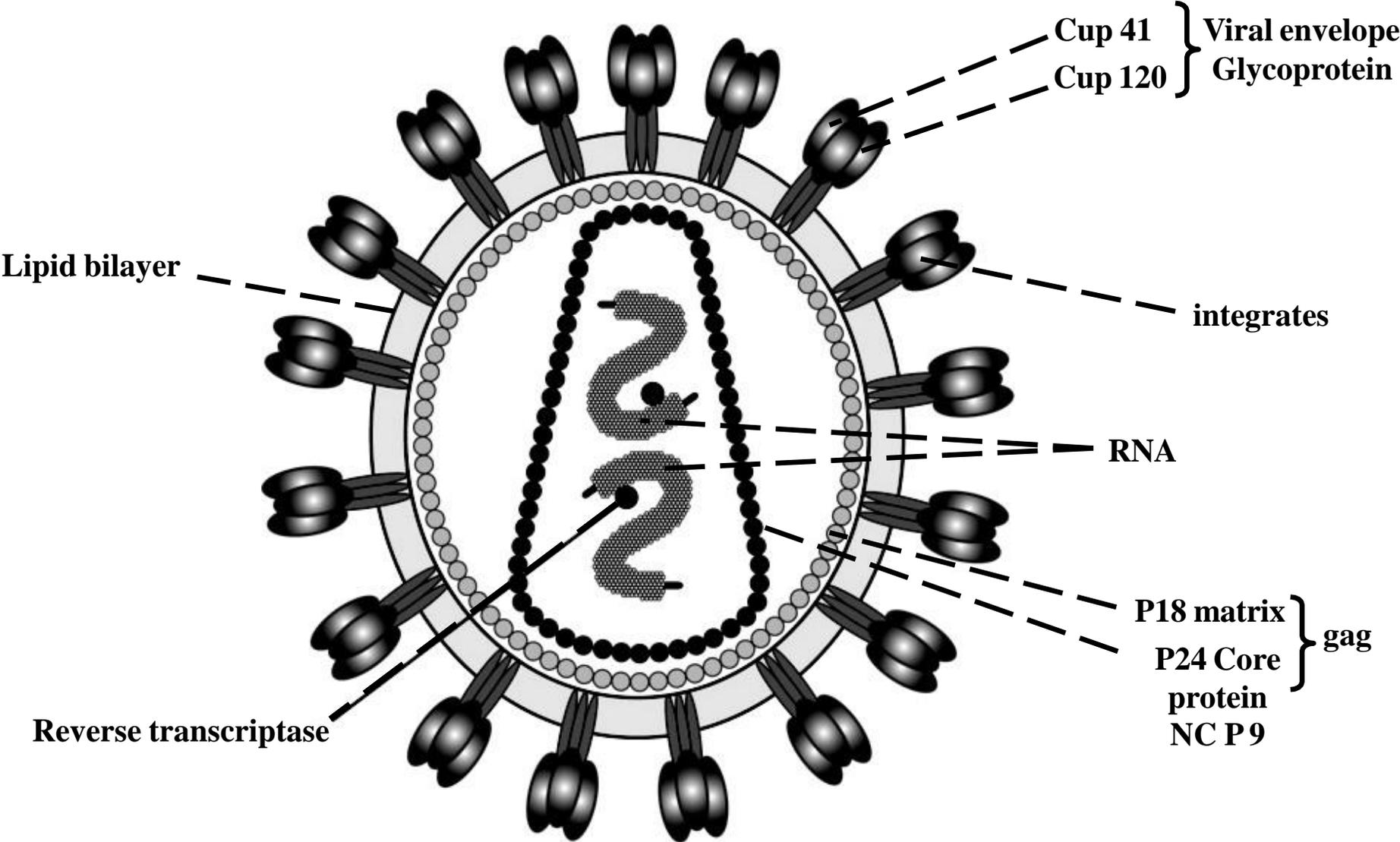
Trans membrane (TM)
gp 41

6 sup types found in west Africa

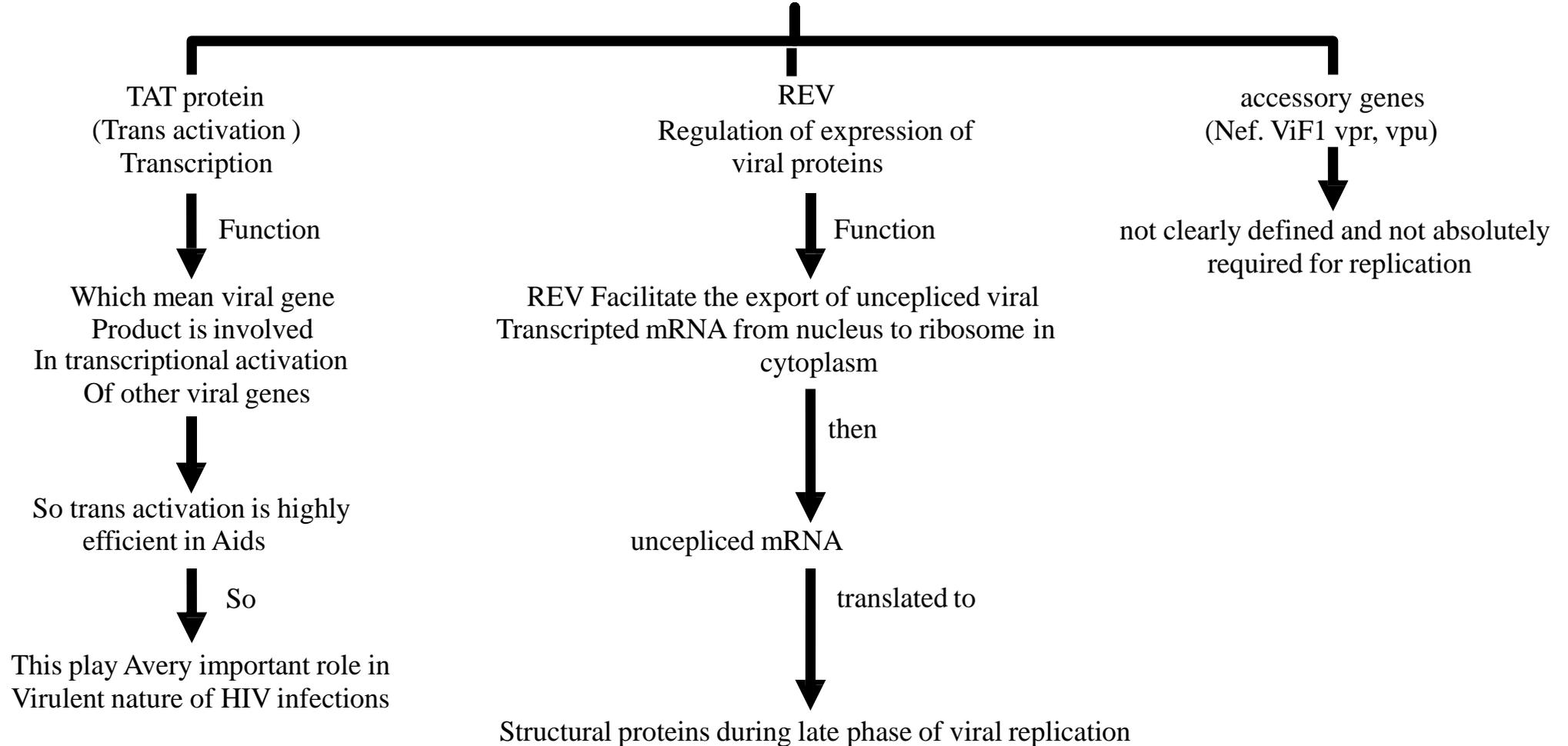
Further divided to 11 sup type (A-K)

%40 of the frequency of HIV-1, HIV-2 are Identical

Acquired immunodeficiency syndrome (AIDS(



Regulatory genes for replication and pathogenesis are 6 genes + up to six additional genes regulate viral expression and important for pathogenesis in vitro



Cell tropism

Infection with HIV required binding of gp 120 to two receptors on the host cell

And those receptors are

(1) CD 4+ receptor
Which is a high affinity
Receptor for HIV

and

(2) chemokine
receptor (core receptor)

These receptors are usually found in

CD4+ T - cell Which contains or express high levels of CD4 (1) and also express (2) core receptor

So it is considered as a main target cell to HIV

- Other cells like Macrophage, Monocyte, dendritic cell, some rectal lining cells express or contain low levels of CD4+ and also core receptor so infected by HIV
- Macrophage and Monocyte play a major role in the dissemination and pathogenesis of HIV

To

Brain (occur by Monocyte and macrophage)

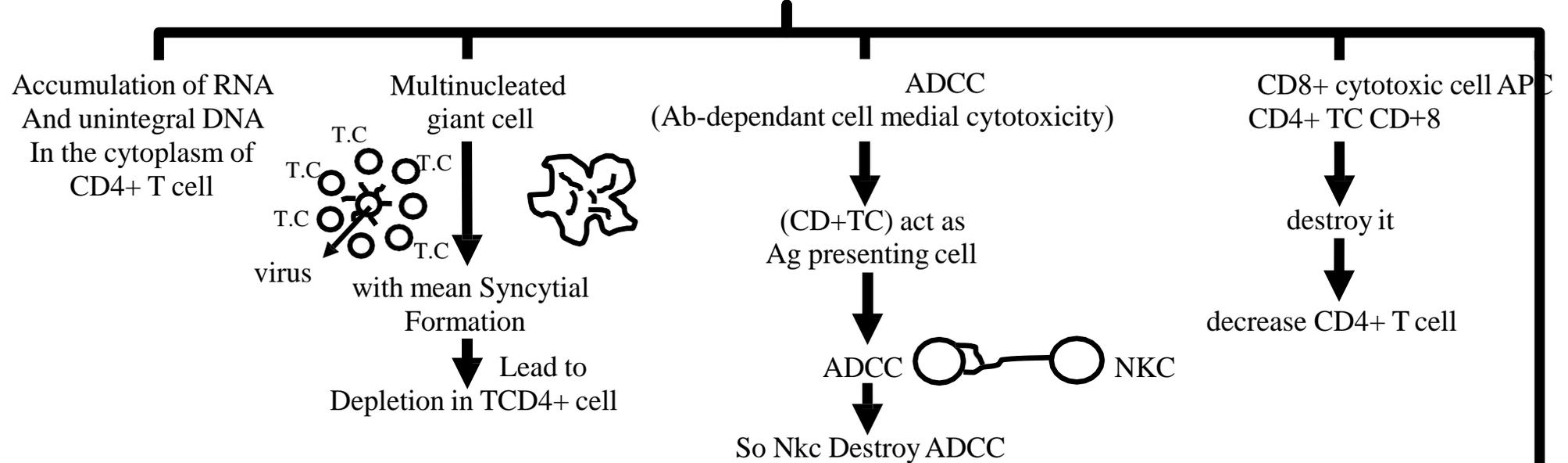
Infect pulmonary alveolar cell

Neuro psychiatric Manifestation

interstitial pneumonitis

Immune dysfunction

The depletion and functional impairment of CD4+ T cell subst. occurs due to

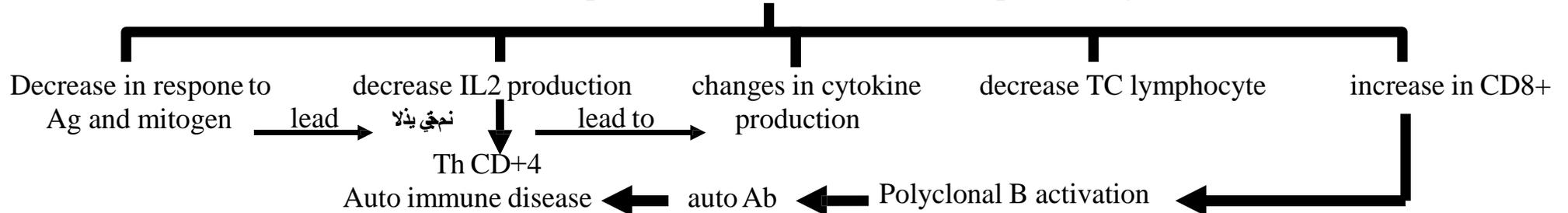


HIV induce T cell Apoptosis viral budding
 ↓ Lead to
 Cell weaking and lysis

W mean during budding of HIV when release from CD4+ cell
 ↓
 weakness and lysis of cell → apoptosis

Not only T cell destroyed during HIV infection but also production of new T cell from thymus ,bone marrow is inhibited

All of these lead to depletion of CD4+ T cell and this depletion may cause



AIDS



Selective loss of helper/ inducer CD4+ cell

lead to

(1) Diminished in vivo T. Cell function

Diminished vitro T. cell function

decrease ability to
specific Ab

decrease ability to
remove virus
infected cells

decrease ability to
remove malignant
cell

decrease ability to
response to chemical
Ags decrease T cell

lead to

response to mitogen (PHA)

Decease CD4/CD8 ratio

Lead to

Polyclonal B cell activation

Serum level of IgG, IgA

Spontaneous antibody producing

B-lymphocyte

Auto – antibody formation

Auto immune disease

Rout of transmission

sexual contact

transfer by

perinatal Transmission

semen

cervical fluid

Infected Blood

and

blood product

from mother

to neonate by

Trans placentally

via breast milk

at birth (passage of the children
Through infected Canal(

Also Some research about saliva at tears transmission

Individual at risk

Promiscuous
Homosexual Men

Heterosexual
(Asia, Africa)

Intravenous
drug abusers

Hemophilia

offspring infected
mother

health care
person, dentist

Course of HIV infection 3 stages

(1) Primary infection stage 1.p 3-4 weeks

(2) clinical latency stage

(3) late stage

Acute stage With characterized by

Mononucleosis
Like picture of
Fever

sore throat

generalized
Lymphadenopathy

Rash

Leucopenia In
50-75 % of
patients

Viraemia last for
8-12 week

*virus is widely
*disseminated through
this time
*lymphocytic organ become seeded

*there is significant drop in CD4+ T cell

Ab to HIV appear 3-4
week after infection

last for 3 month

Middle stage
Last 10 year
in Which patient
is asymptomatic

viraemia is
low or absent

CD4
rebound

HIV infected cell persist
in lymph nodes

during this stage occur
syndrome called AIDS
related complex W occur
during latent period W
charact. by

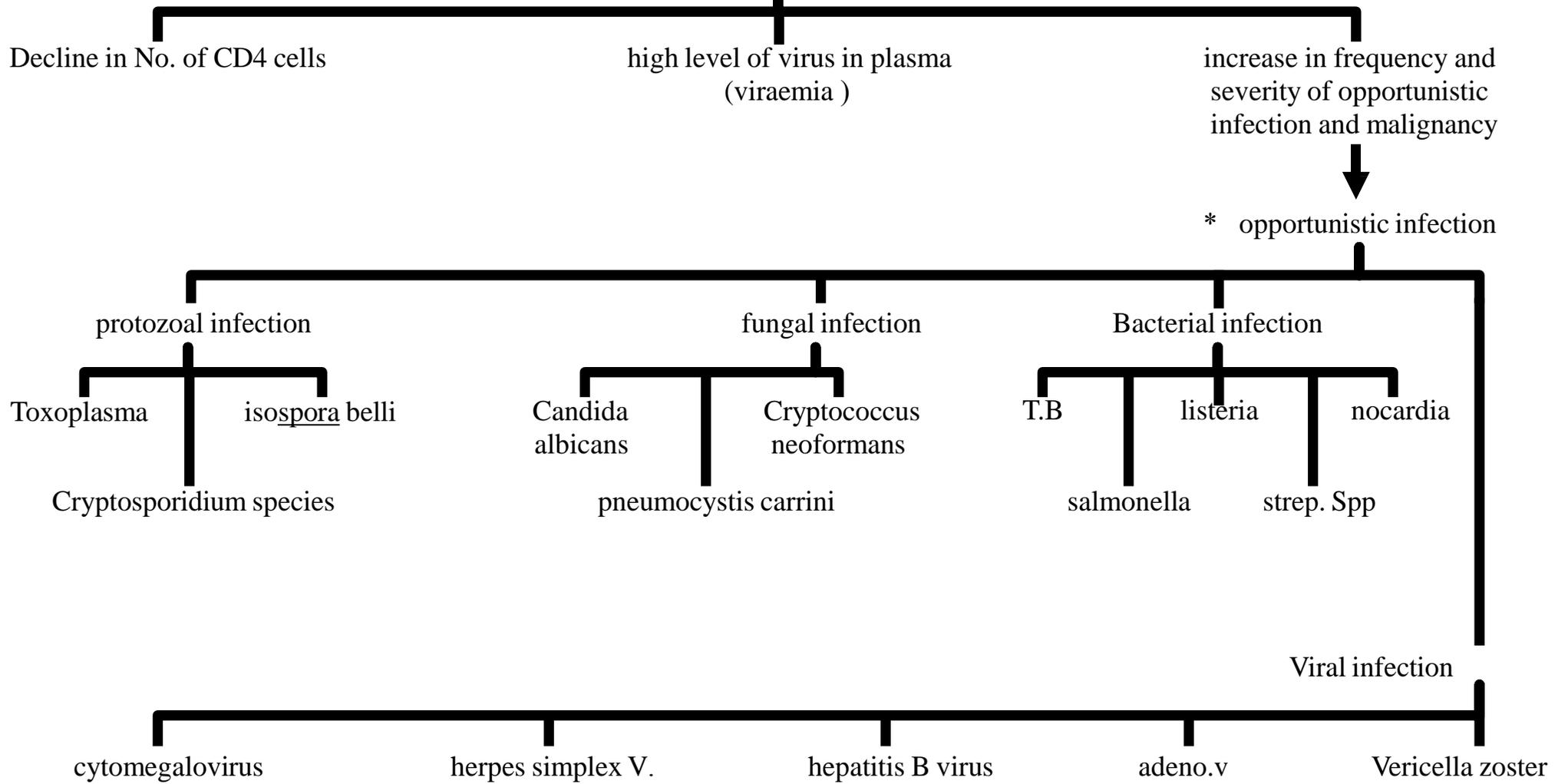
persistent fatigue

weight loss

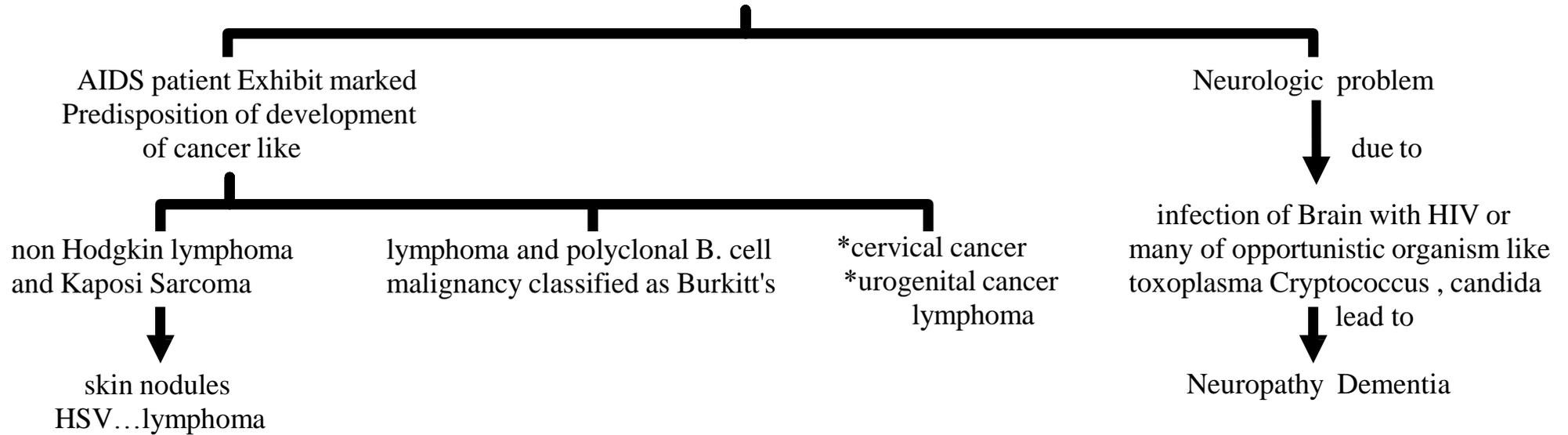
lymphadenopathy

lead to AIDS

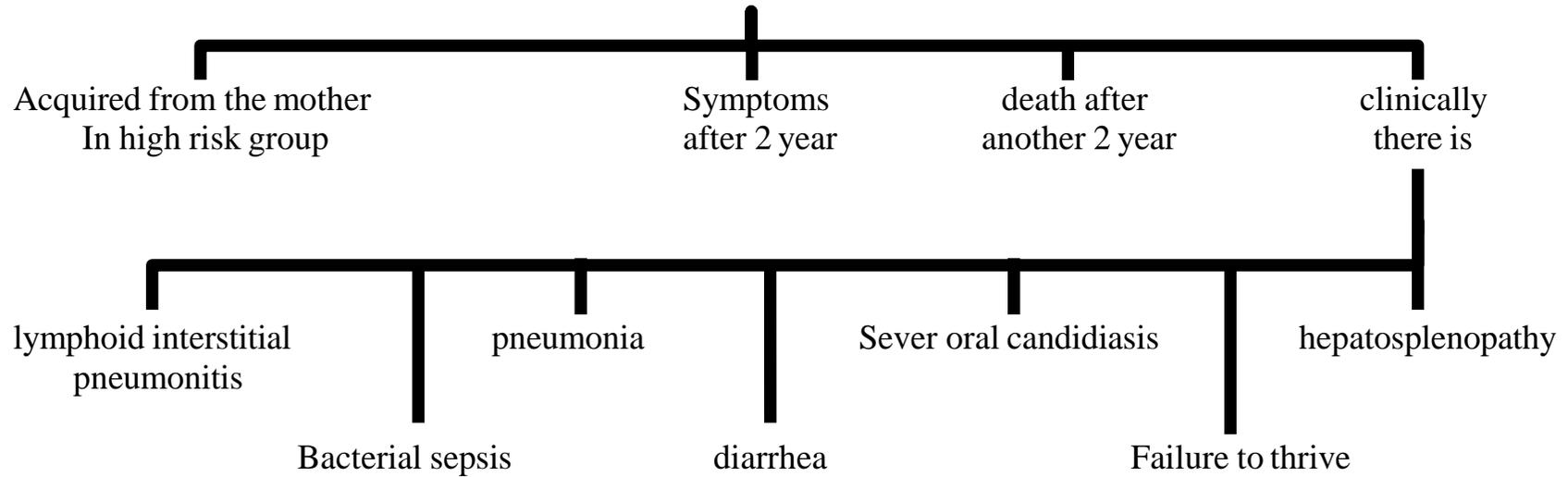
Late Stage of AIDS



• **Cancer**



• **Pediatric AIDS**



- Its not know yet the chieve immune respone that protect from infection With HIV because this virus highly mutant lead to highly antigenic variation →
- Most infected individual produce neutralizing antibodies against HIV envelope gps W appear to be the major targets for antibody neutral Bation



These neutral bind Ab can measure in vitro by inhibiting HIV infection of susceptible T. lymphocyte cell line (tissue culture(

Virus infection is quantified by

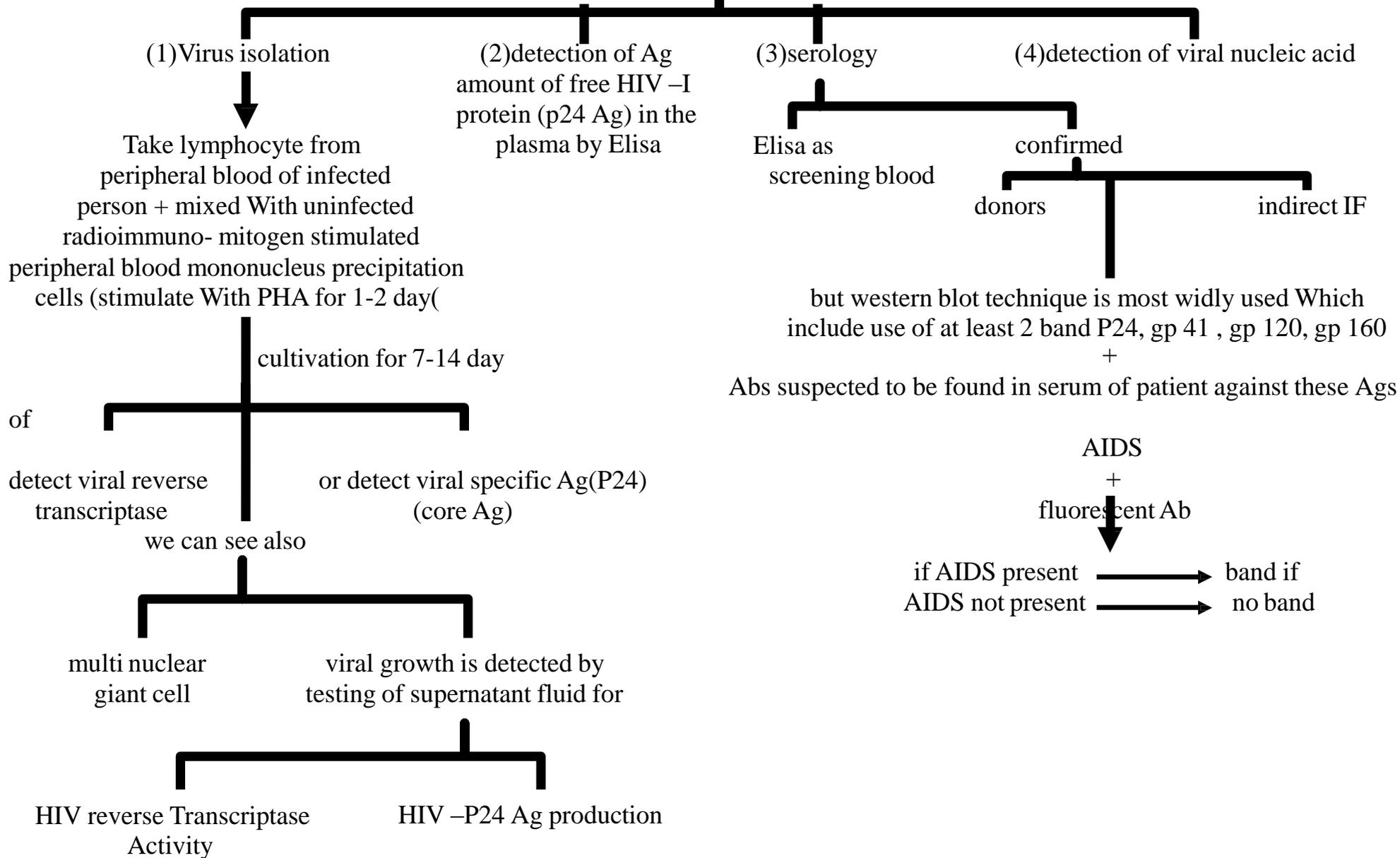


Directly by measuring of reverse Transcriptase W produce from the Virus particles

indirect immuno flurescent assay W measure the percentage of infected cell

reverse transcriptase polymerase chain reaction (RT.PCR(Or branched chain DNA Amplification W measure HIV nucleic acid

Lab.dx.



(4)Detection of the viral nucleic acid by

(1)polymerase chain reaction mean detection of HIV DNA in infected cell (pro viral DNA)

or

Viral RNA in plasma (viral load)

a branched chain DNA amplification test

use for detection low level of HIV in donor blood (RNA level) because

RNA levels are important predictive for disease Progress – and valuable tools to monitor the Effectiveness of antiviral therapy

Plasma viral lead

The amount of HIV – the blood (viraemia) in of asignificant prognosis value because there is continuous correlation of the viral replication and cell killing in each patient

So

Measurement of plasma viral load of the patient after 6 month after infection – give idea to predict the subsequent risk of development of AIDS for several years later.

plasma HIV RNA level can be determined by using variety commercially available test

know of plasma viral load give idea about

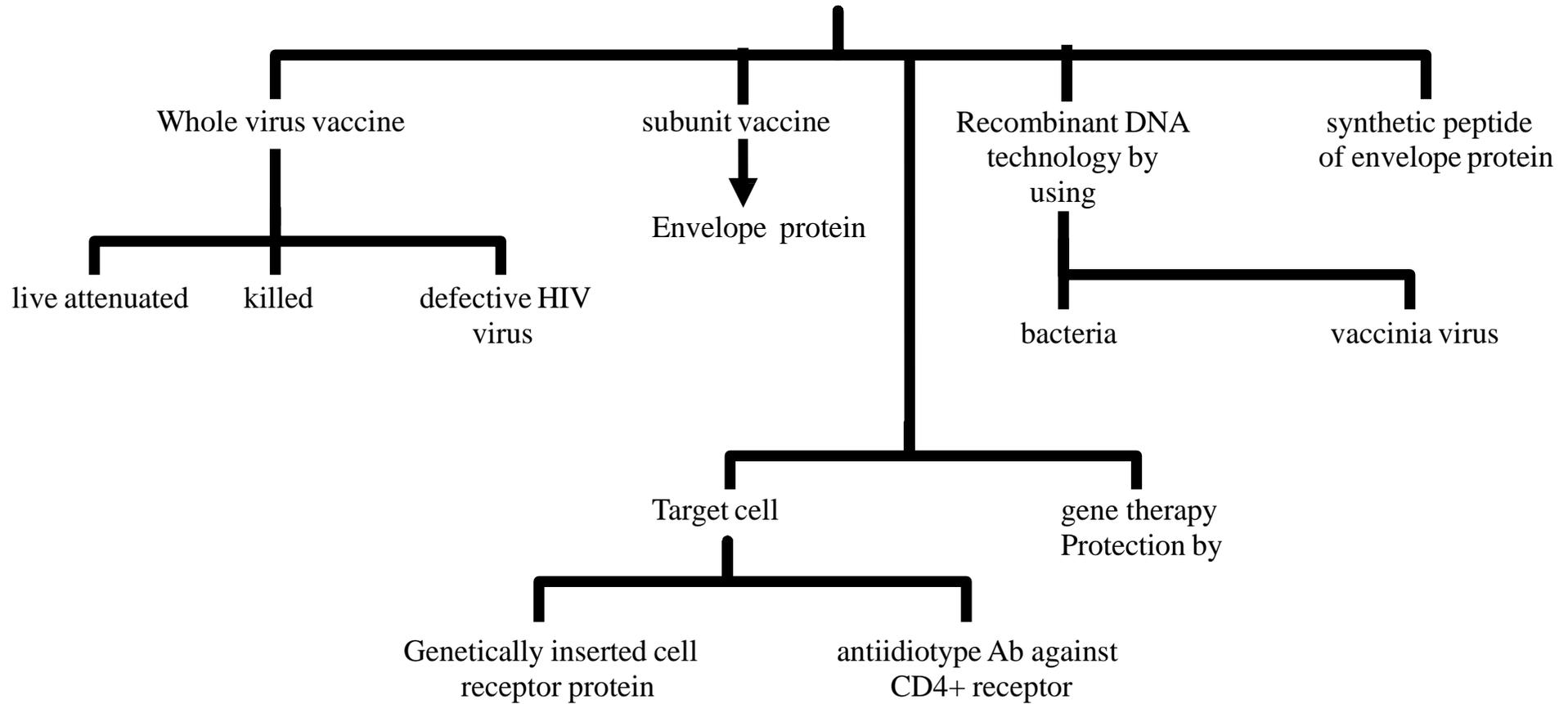
risk of development of disease

important to know the effectiveness of antiviral therapy

notice

measurement of CD4+ lymphocyte give idea about short term risk of Development of oppurt. infection.

Prevention (vaccines)



Antiviral drugs

