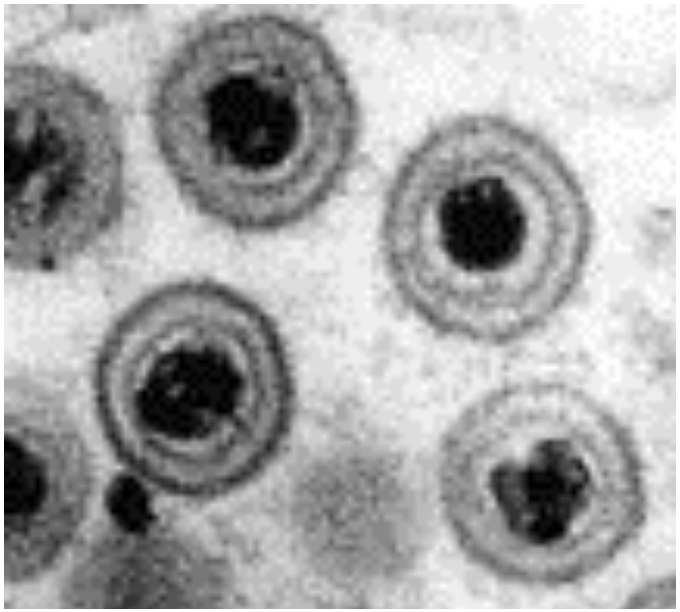
Family: Retroviridae

Retro (reverse, backward) = reverse transcriptase

(RNA-dependent DNA polymerase).

- Some retroviruses produce tumors,
  - ➢ particularly leukemias and sarcomas.
  - ➢ Latent infection (integrate with cellular DNA).
- Members of the genus lentivirus produce:
  - ➢ slow demyelinating neurologic disease and arthritis,
  - ➢ generalized chronic debilitating disease,
  - ➢ acquired immunodeficiency syndromes = AIDS (HIV).

General Properties:

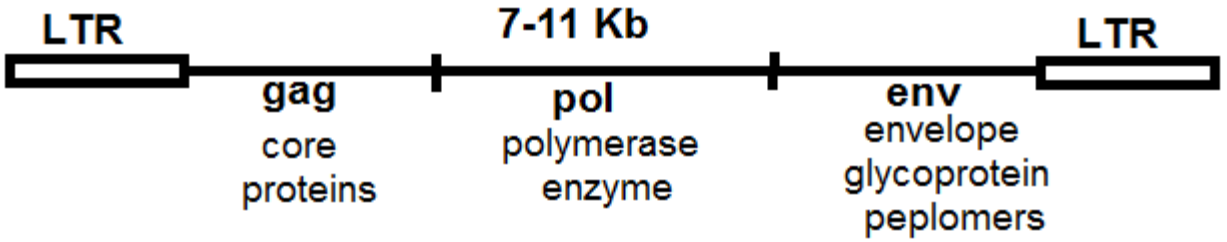


- Morphological Characters:

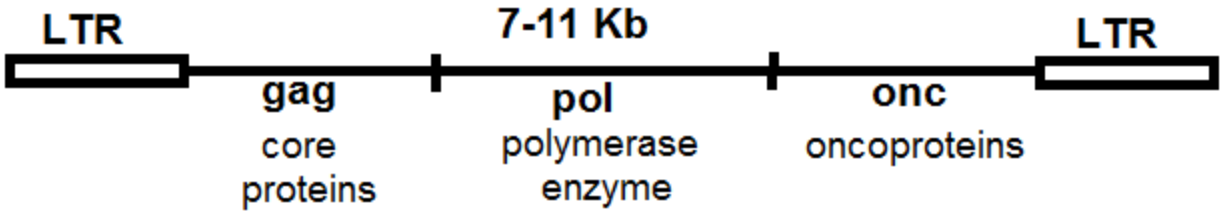
- Shape: spherical shaped.
- Size: 80-100 nm in diameter.
- The virions are enveloped with inner most genome-nucleoprotein complex with helical symmetry and an icosahedral capsid.

Virus structure:

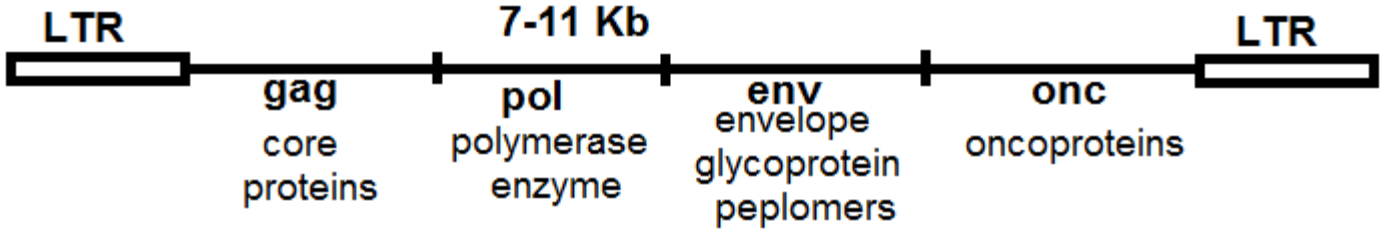
- **Genome structure and organization:** The genome is diploid (dimmer, 2 molecules of linear positive-sense ssRNA), each is 7-11 kb in size.



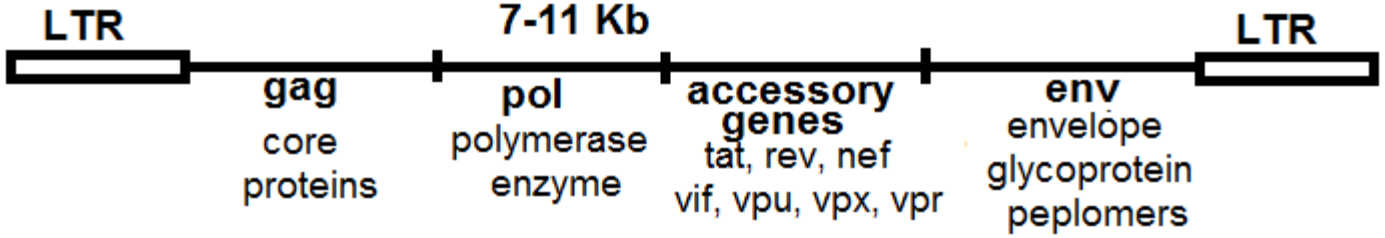
Genetically non defective lymphoid leucosis v.



Genetically and replication defective acute leukemia v.

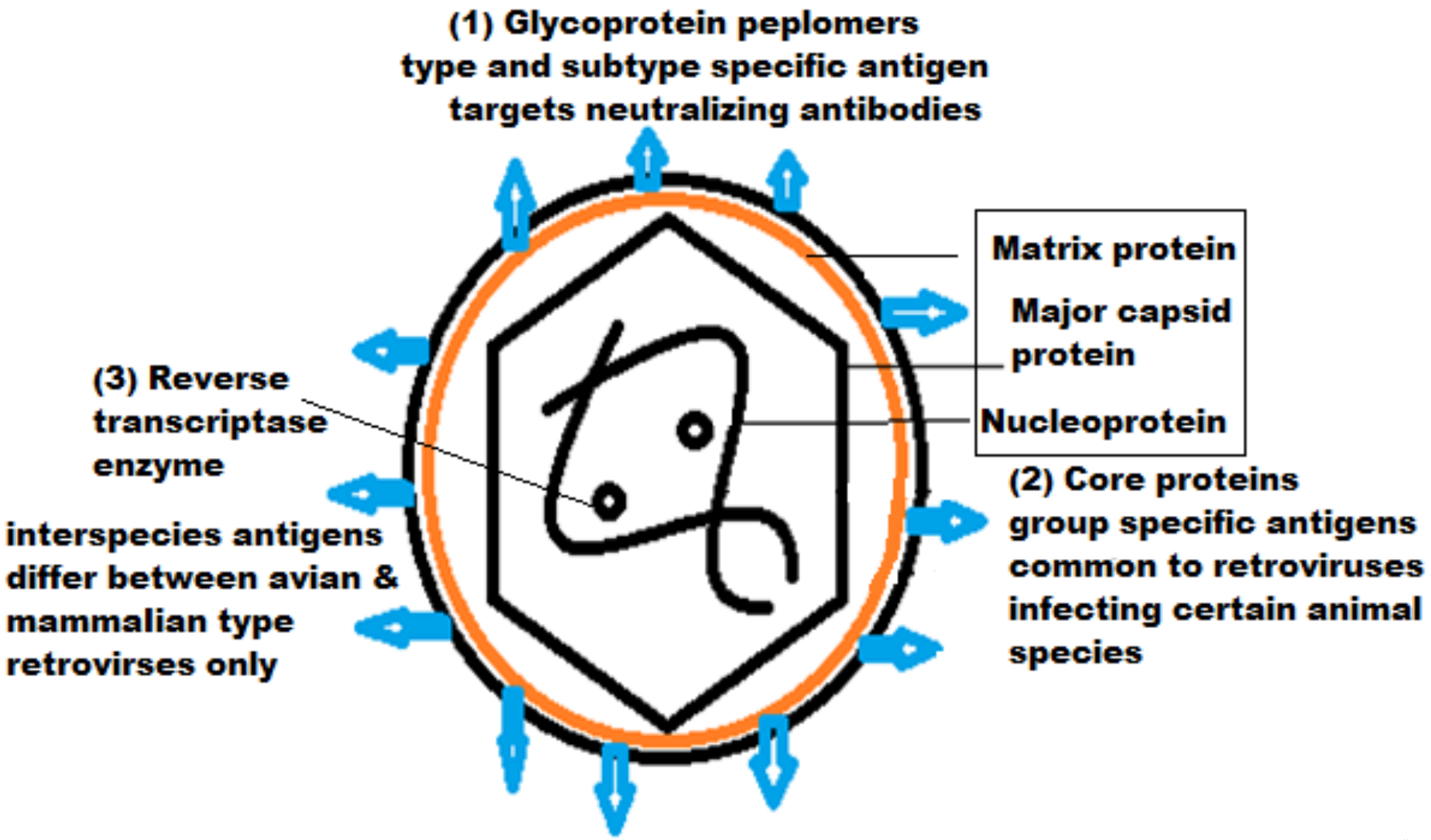


Genetically non defective Rous sarcoma v.



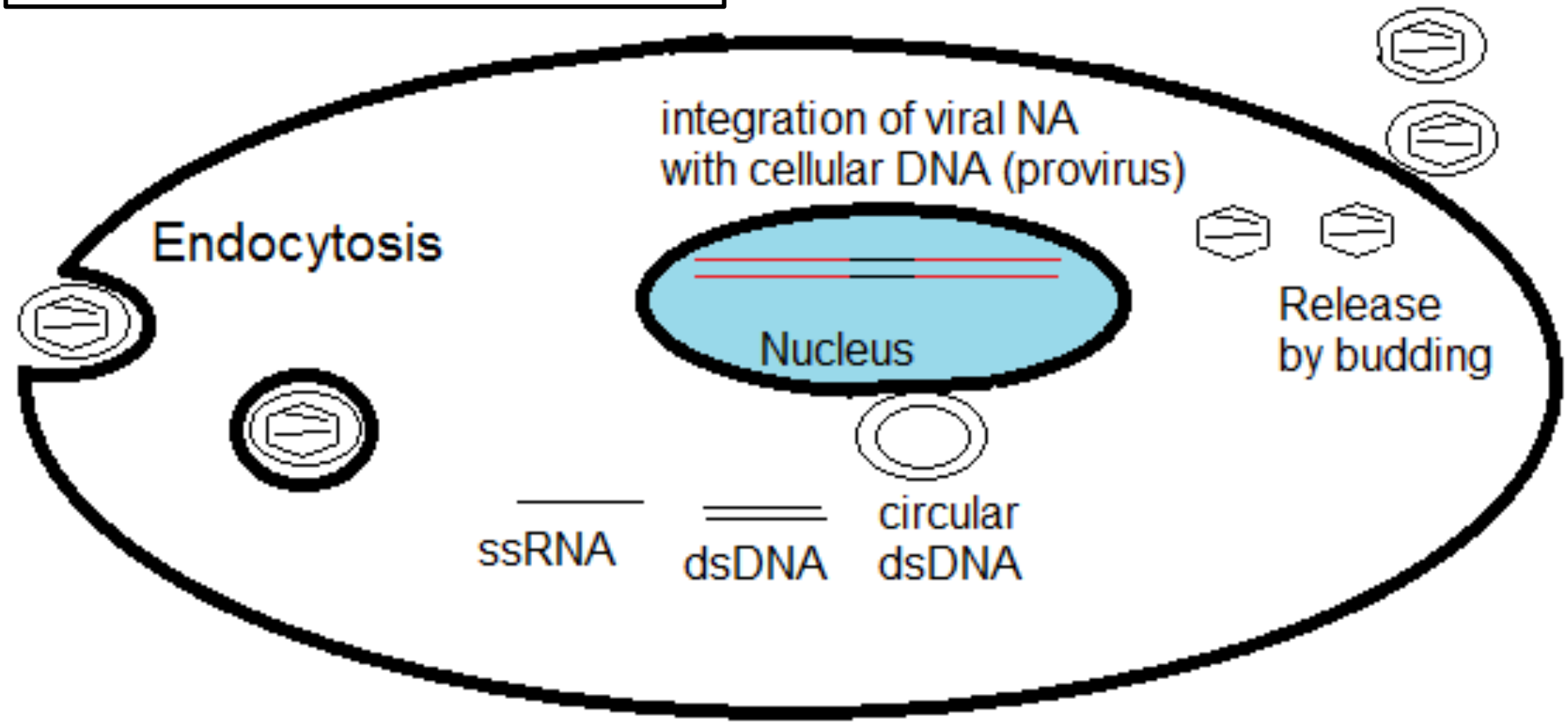
Lentiviruses

- Protein structure and antigenic characters:



Biological characters
Replication Cycle:

virions assemble at and bud from plasma membrane



Retrovirus is unique in several respects:

1. It is the only diploid genome.

2. It is + ve sense ssRNA genome that not act as mRNA soon after infection.

3. Viral RNA synthesized & processed by host cell mRNA - processing machinery.

Effect of physico-chemical agents:

The viral envelope has high lipid content; and virions can be disrupted with loss of infectivity by exposure to ethyl ether, chloroform and detergents.

The virions are relatively thermo labile, rapidly inactivated at higher temperatures (4 hours at 37°C, 10 min at 50°C and 1 min at 60°C).

The virions retain full infectivity for several years at temperature below – 70 °C & they are stable within the pH range 5-9.

*Classification: The family is divided into 7 genera:

Subfamily	Genus	Virus
Subfamily Orthoretrovirinae	Alpharetrovirus	Avian leucosis virus, Avian sarcoma virus Avian myeloblastosis virus Rous sarcoma virus
	Betaretrovirus	Ovine pulmonary adenomatosis virus
	Gammaretrovirus	Feline leukemia virus
	Deltaretrovirus	Bovine leukemia virus
	Epsilonretrovirus	Wall eye dermal sarcoma virus
	Lentivirus	Human Immunodeficiency viruses (HIV) Bovine Immunodeficiency viruses (BIV) Equine Infectious Anemia virus (EIA)
Subfamily Spumaretrovirinae	Spumavirus	Bovine, Feline and Humans Foamy viruses

Avian leucosis and Sarcoma viruses (ALSV)

Avian leucosis / sarcoma viruses (ALSV) are retroviruses induce a variety of benign & malignant neoplasm in domestic fowl.

ALSV of the chicken is classified into the 5 subgroups

A, B, C,D and E based on:

-Differences in their viral envelop glycoprotein antigens, which determine neutralization properties,

-The host range in chicken cells of different phenotypes,

-Viral interference patterns.

In general, viruses within a subgroup have the same coat antigens in serum neutralization tests, infect cells of the same phenotype and interfere with each other in interference tests at tissue culture.

Laboratory diagnosis

*** Sampling:**

- Viral Samples:

Serum, plasma, Buffy coat cells

tumor tissue (Nodules in bursa, liver, spleen & other visceral organs),

cloacal swabs, egg albumen & embryos (stored at - 70°C).

- **Serum samples: for detection of neutralizing serum antibodies .**

***Virus isolation:**

(1) One day old chick inoculated by two methods:

Subcutaneous in the wing web (RSV cause tumor at wing web).

Intraperitoneal (Leucosis v. cause tumor at visceral organs).

(2) Fertile egg inoculated by two methods:

by CAM route RSV induce the formation of foci on CAM

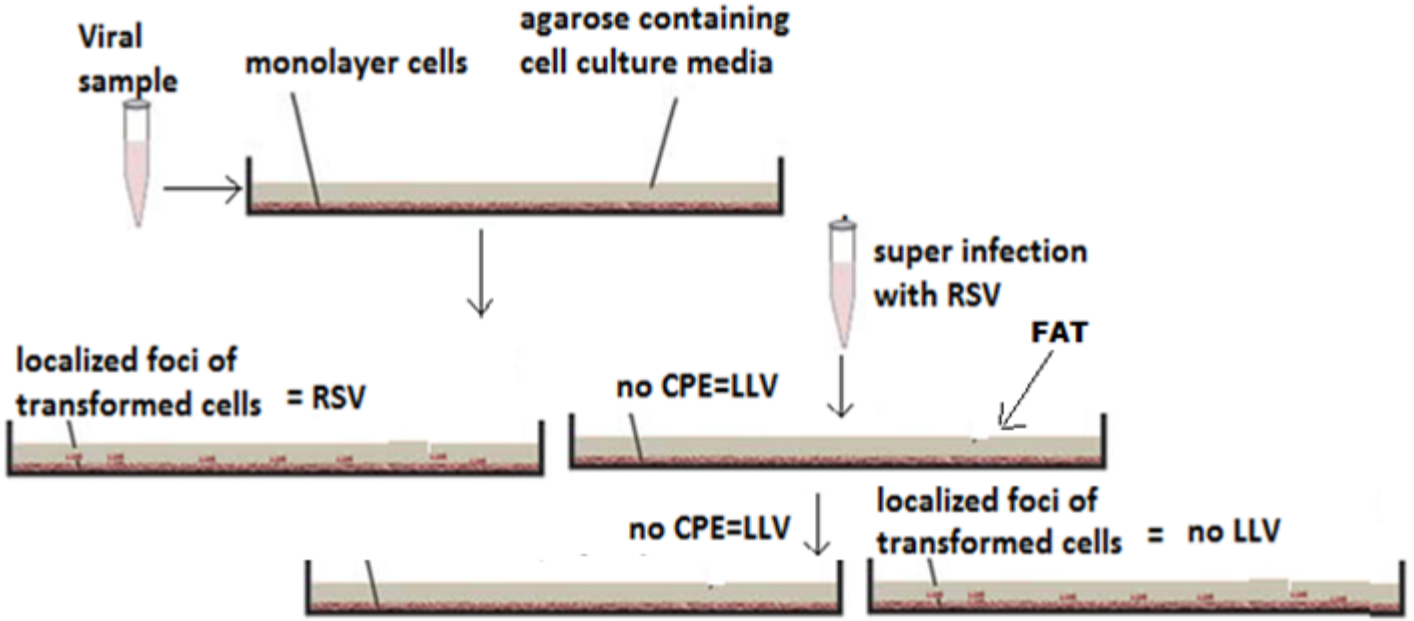
by Yolk sac route LLV induce tumors of visceral organs of egg embryo

(3)Cell culture: eg. CEF and CER cell lines,

CPE = Cell transformation appear in 7 - 10 days with RSV,

No CPE (no cell changes with LLV) so apply interference test.

Interference test: (LLV is able to block cellular receptors for RSV)



* Identification:

A- Serological identification:

Virus Neutralization Test (VNT) : using specific antiserum.

Fluorescent Antibody Technique (FAT) using conjugated specific antiserum.

B- Non Serological identification:

RT-PCR: using primers specific for G gene.

Electron Microscope examination: detect specific morphological characters.

*Control: No vaccines are available.