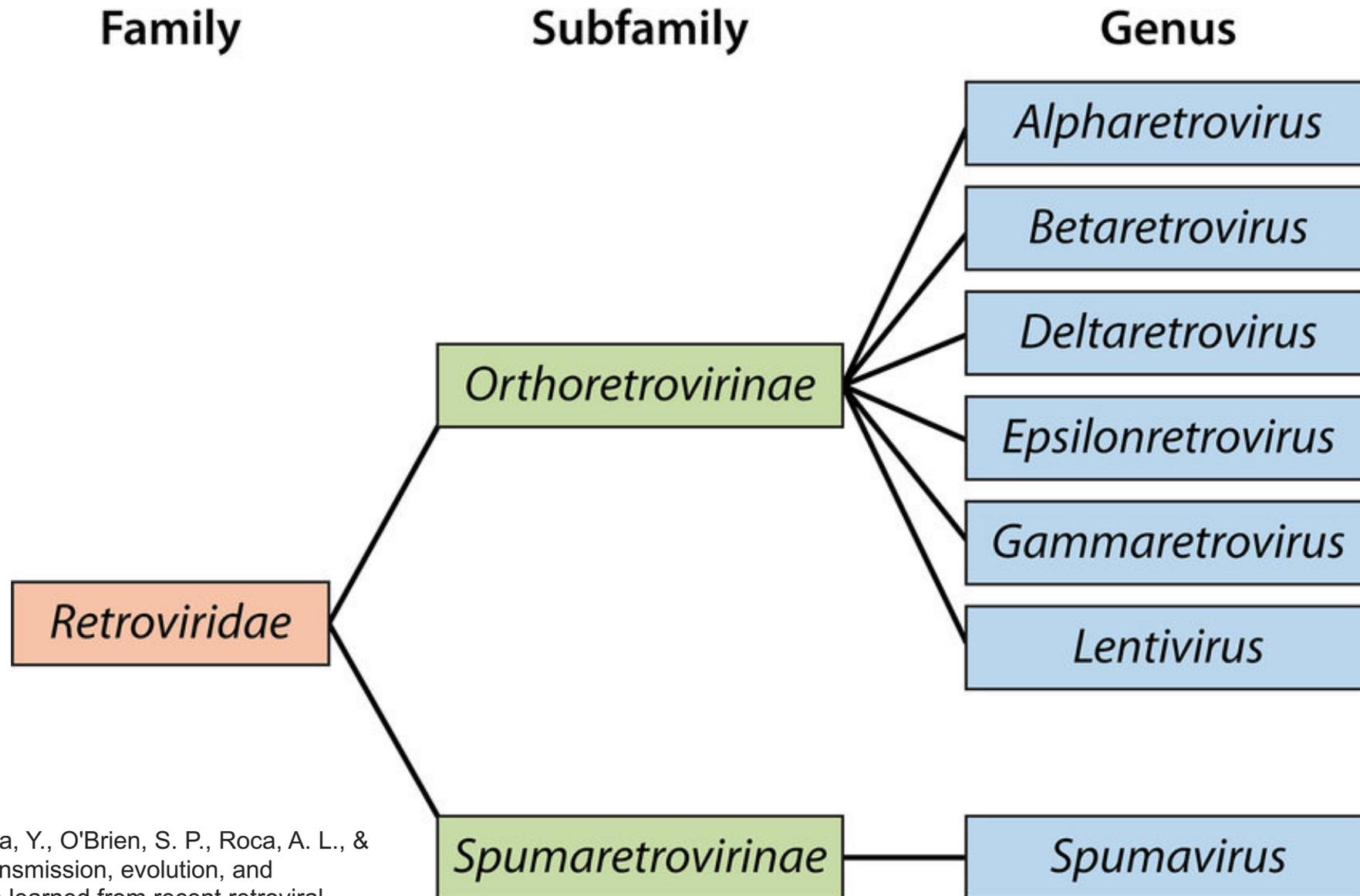




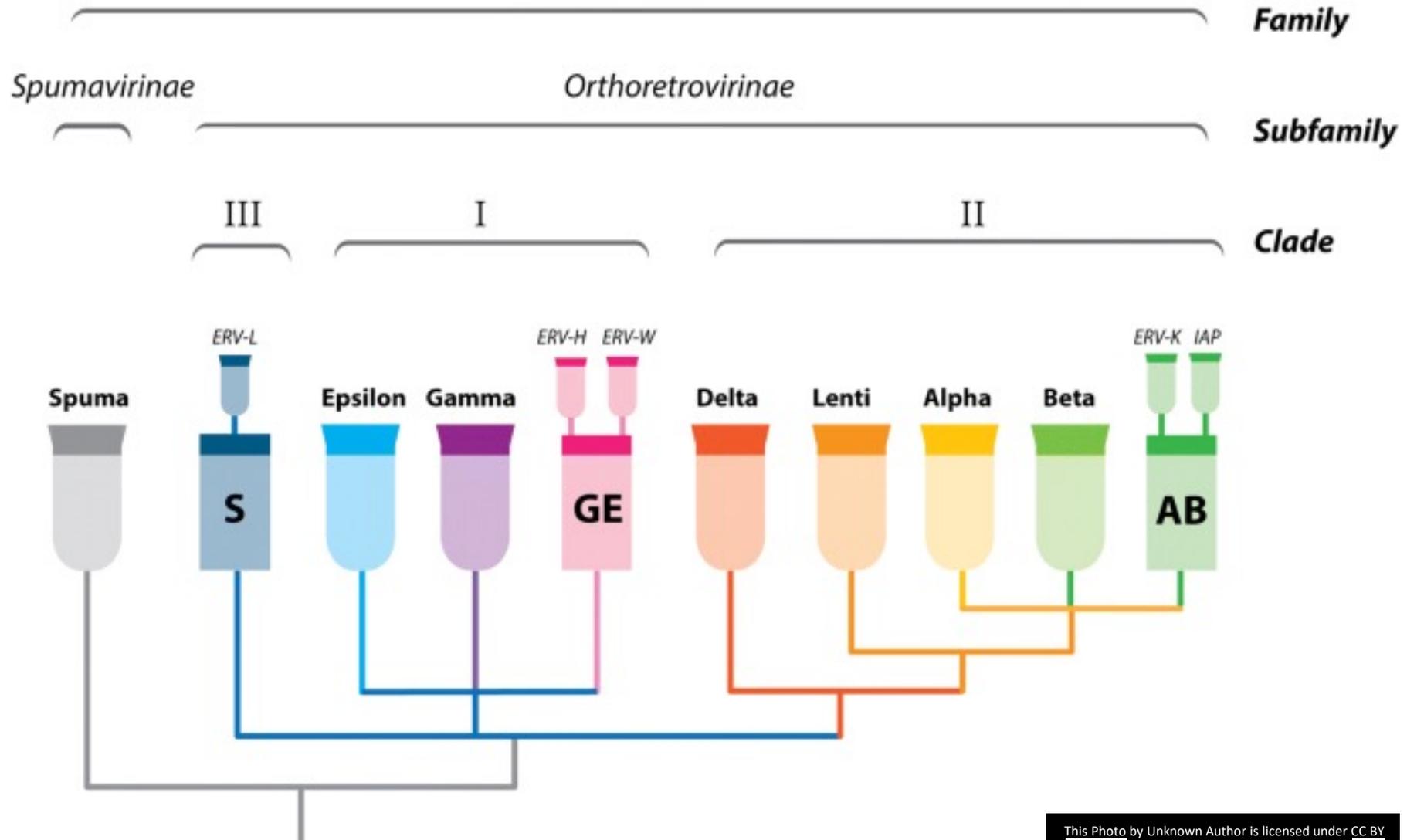
# RETROVIRIDAE

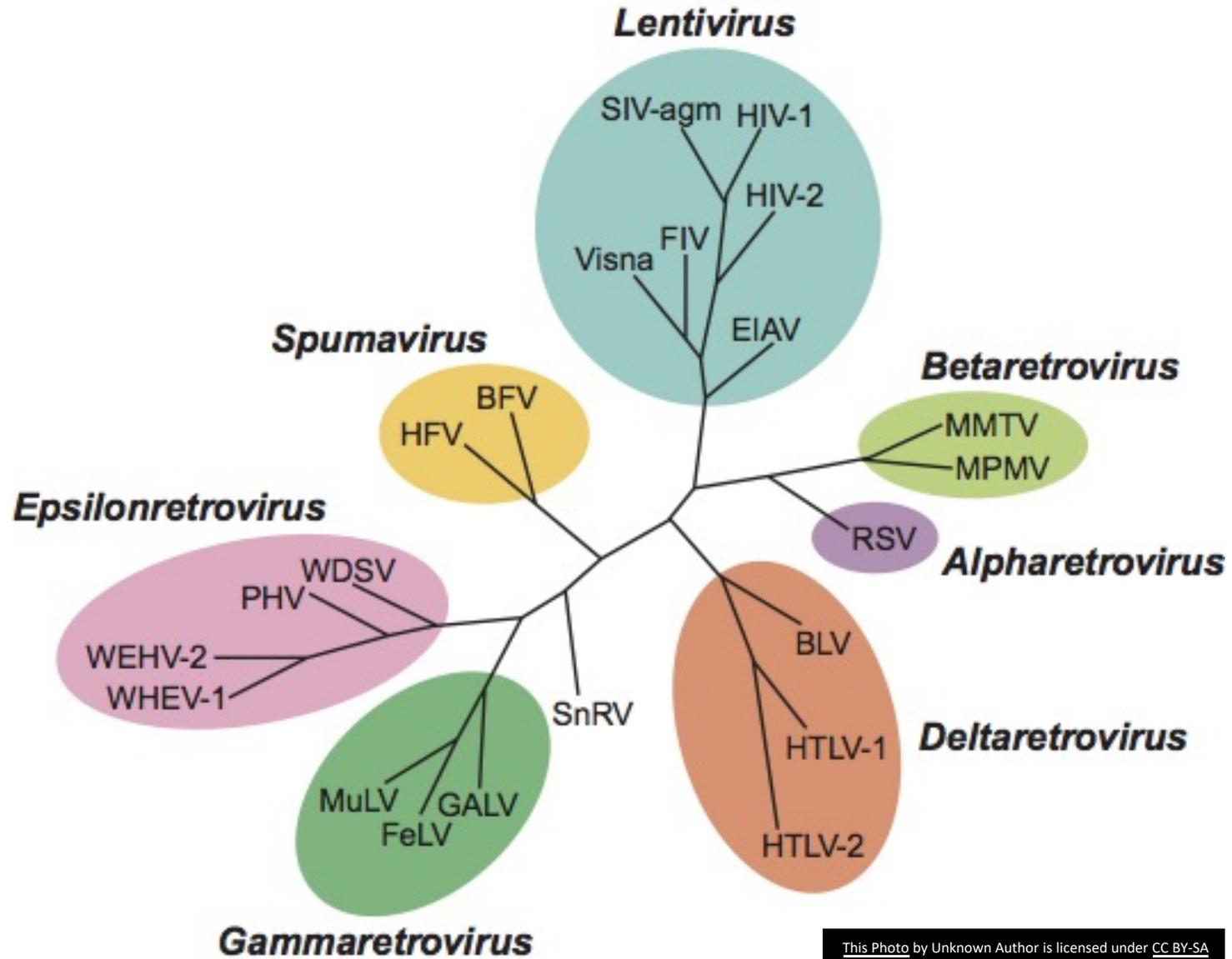
Zeynep AKKUTAY-YOLDAR, Associate Professor



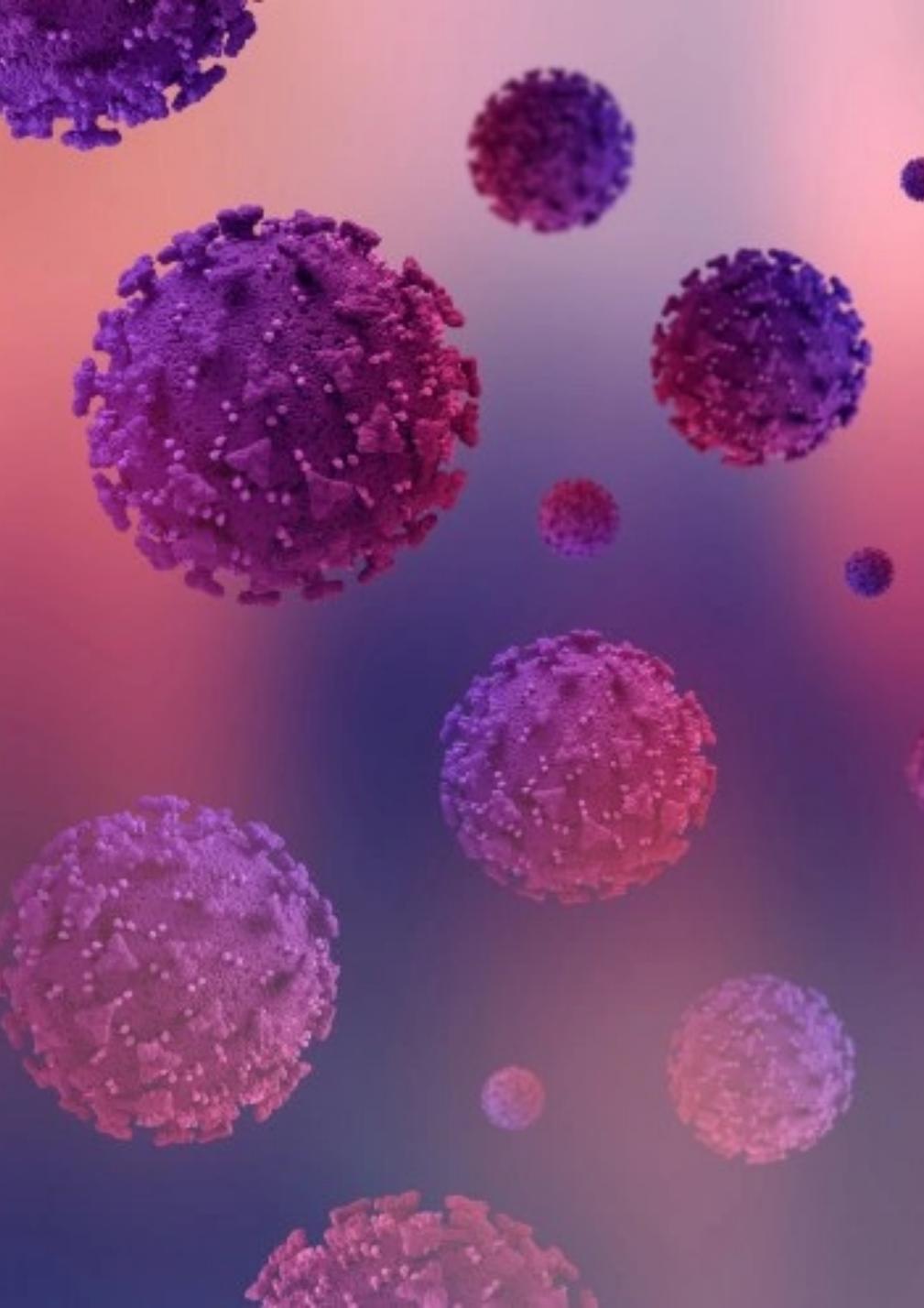
Greenwood, A. D., Ishida, Y., O'Brien, S. P., Roca, A. L., & Eiden, M. V. (2018). Transmission, evolution, and endogenization: lessons learned from recent retroviral invasions. *Microbiology and molecular biology reviews*, 82(1), e00044-17.

# Retroviridae





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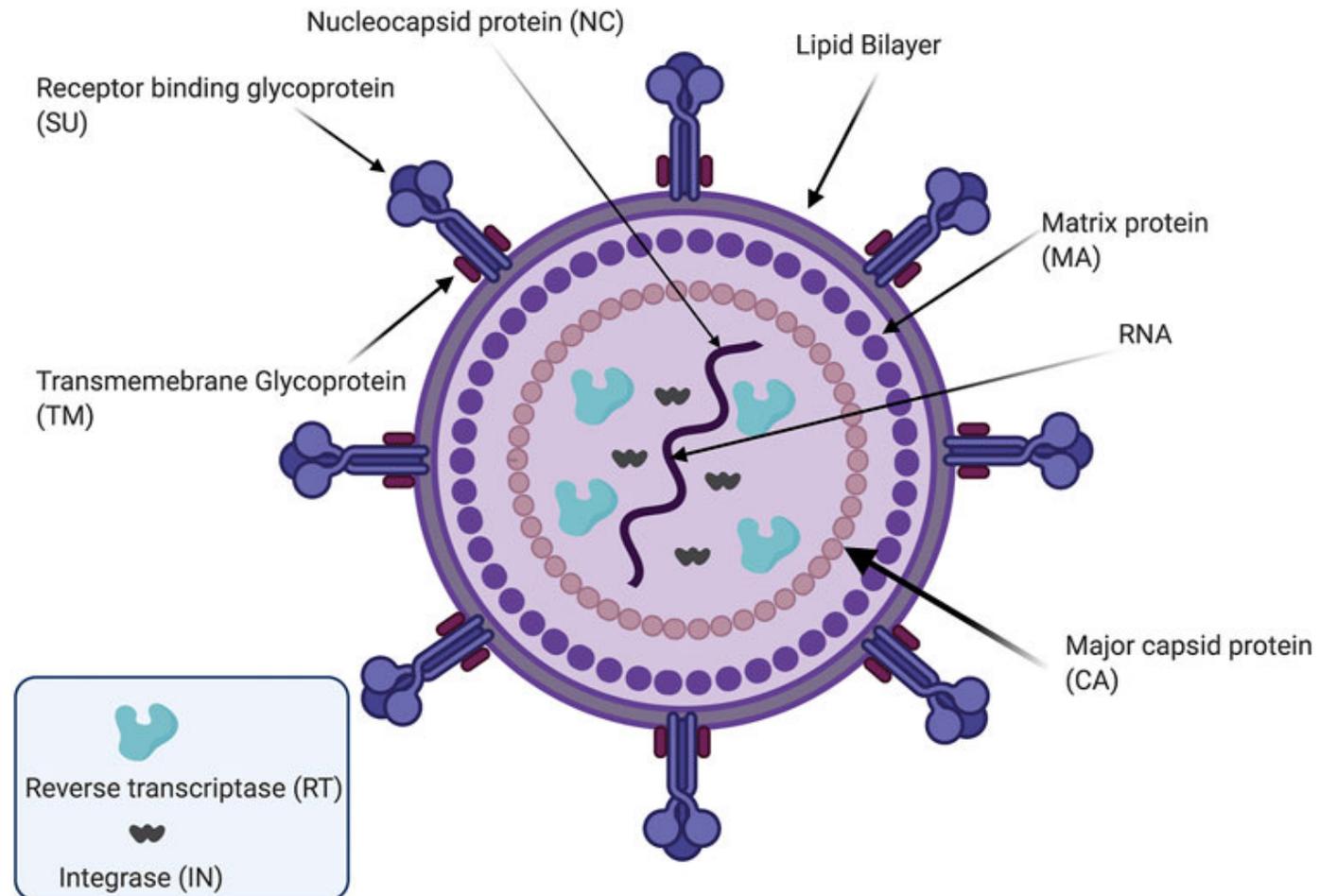


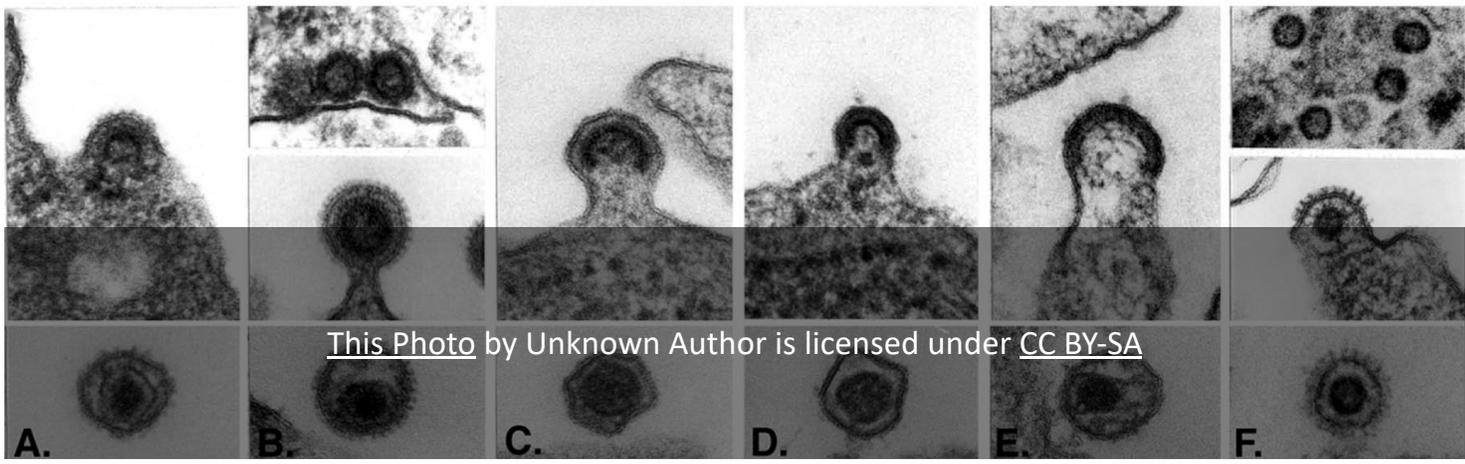
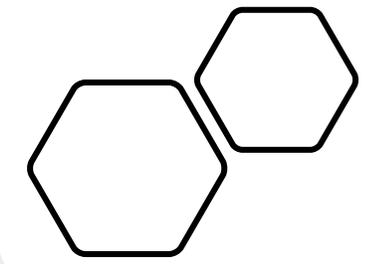
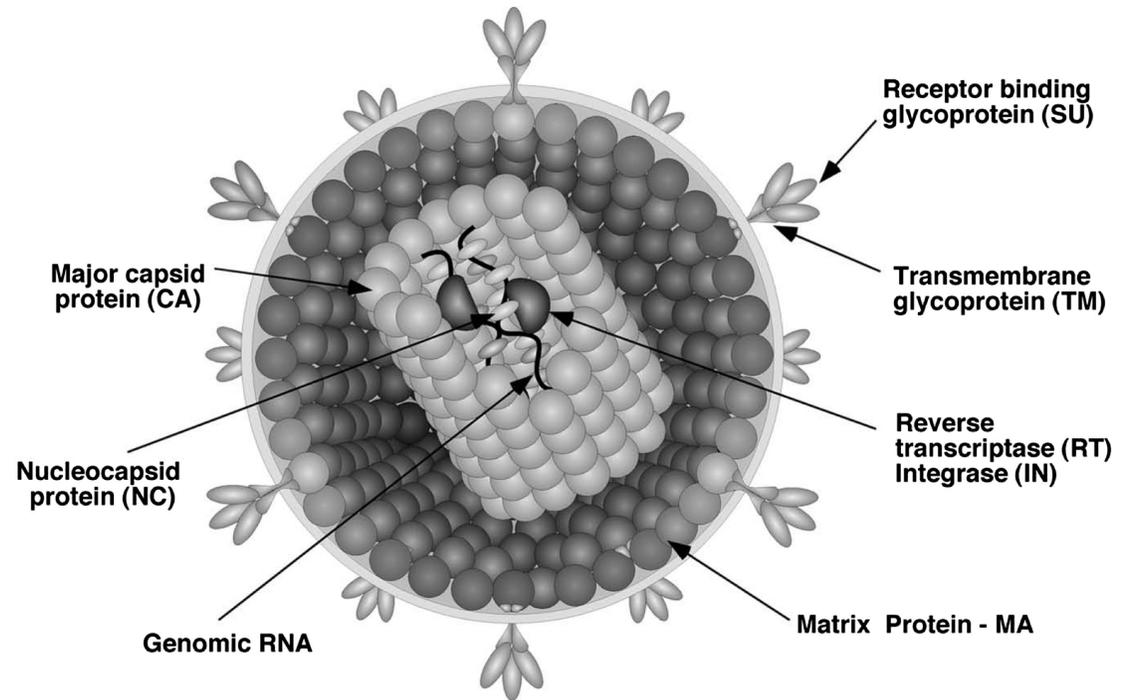
## Retroviruses we are going to learn are:

- ***Gammaretrovirus:***
  - *Feline leukaemia virus (FeLV)*
- ***Deltaretrovirus:***
  - *Bovine leukosis virus (BLV)*
  
- ***Lentiviruses:***
  - Feline immunodeficiency virus
  - Bovine immunodeficiency virus
  - Visna-Maedi (Maedi-Visna) virus (of sheep) (V-MV)
  - Caprine-arthritis-encephalitis virus
  - Equine infectious anaemia virus (EIA)
  - Human immunodeficiency virus

# Structure

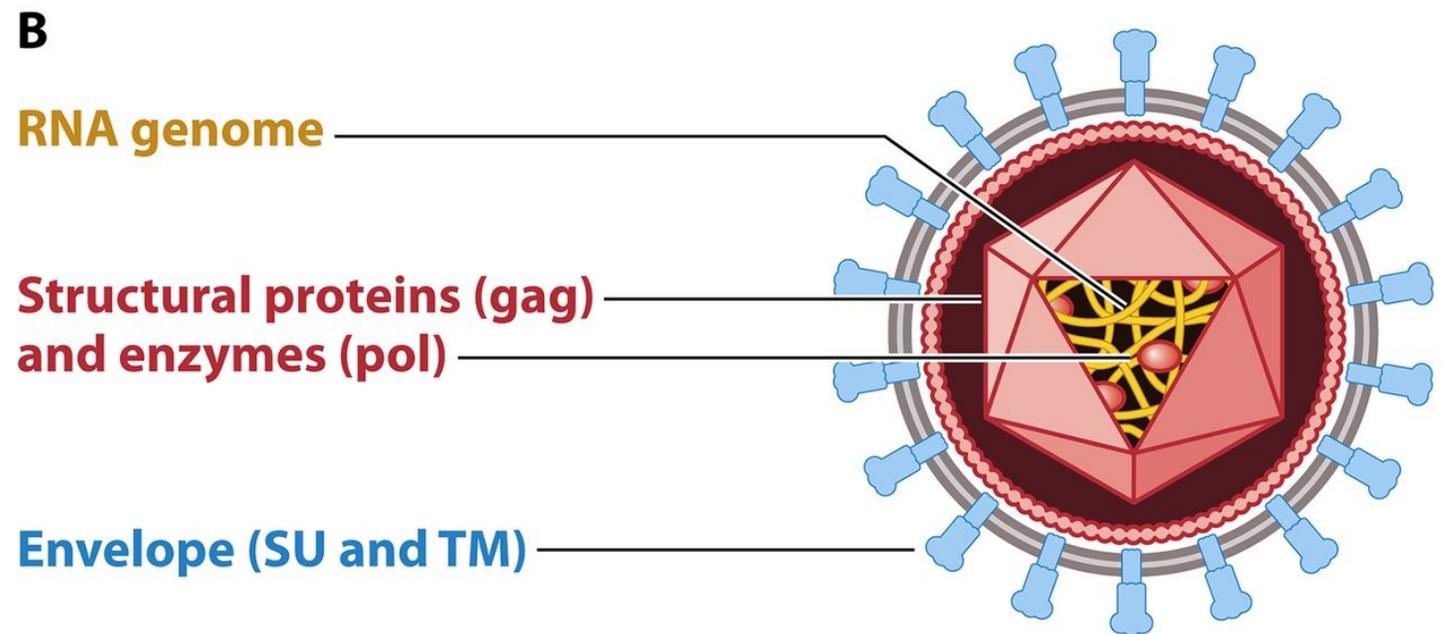
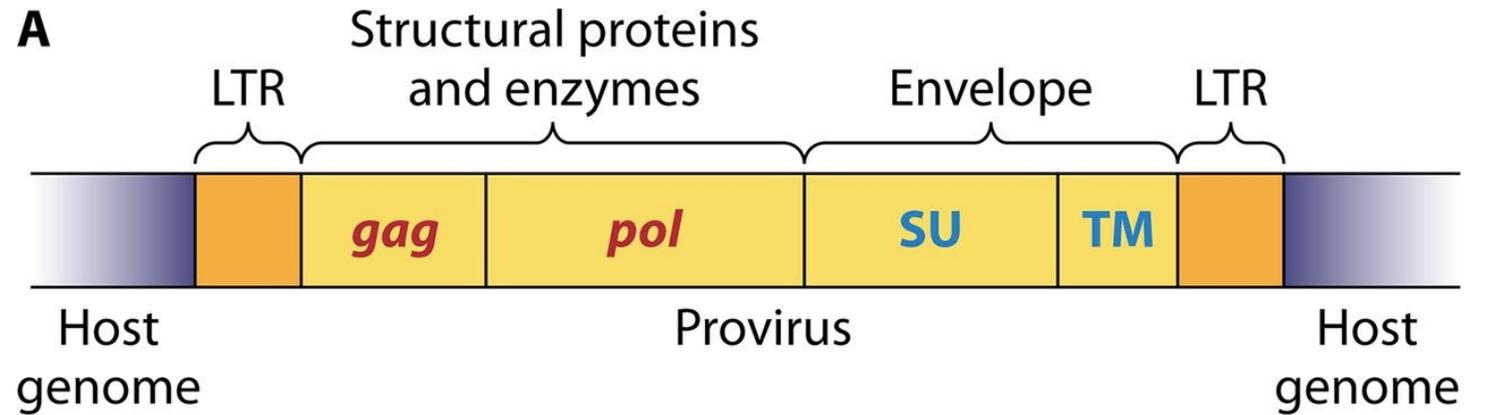
- Icosahedral or cone-shaped, depending on genus.
- The RNA genome has 3 *genes*, *gag*, *pol* and *env*.
- *Gag* (group-specific antigen coding gene) encodes the capsid proteins and the proteases which cleave them and the envelope spikes;
- *pol* encodes the reverse transcriptase enzyme; and the integrase.
- *env* encodes the envelope spikes.





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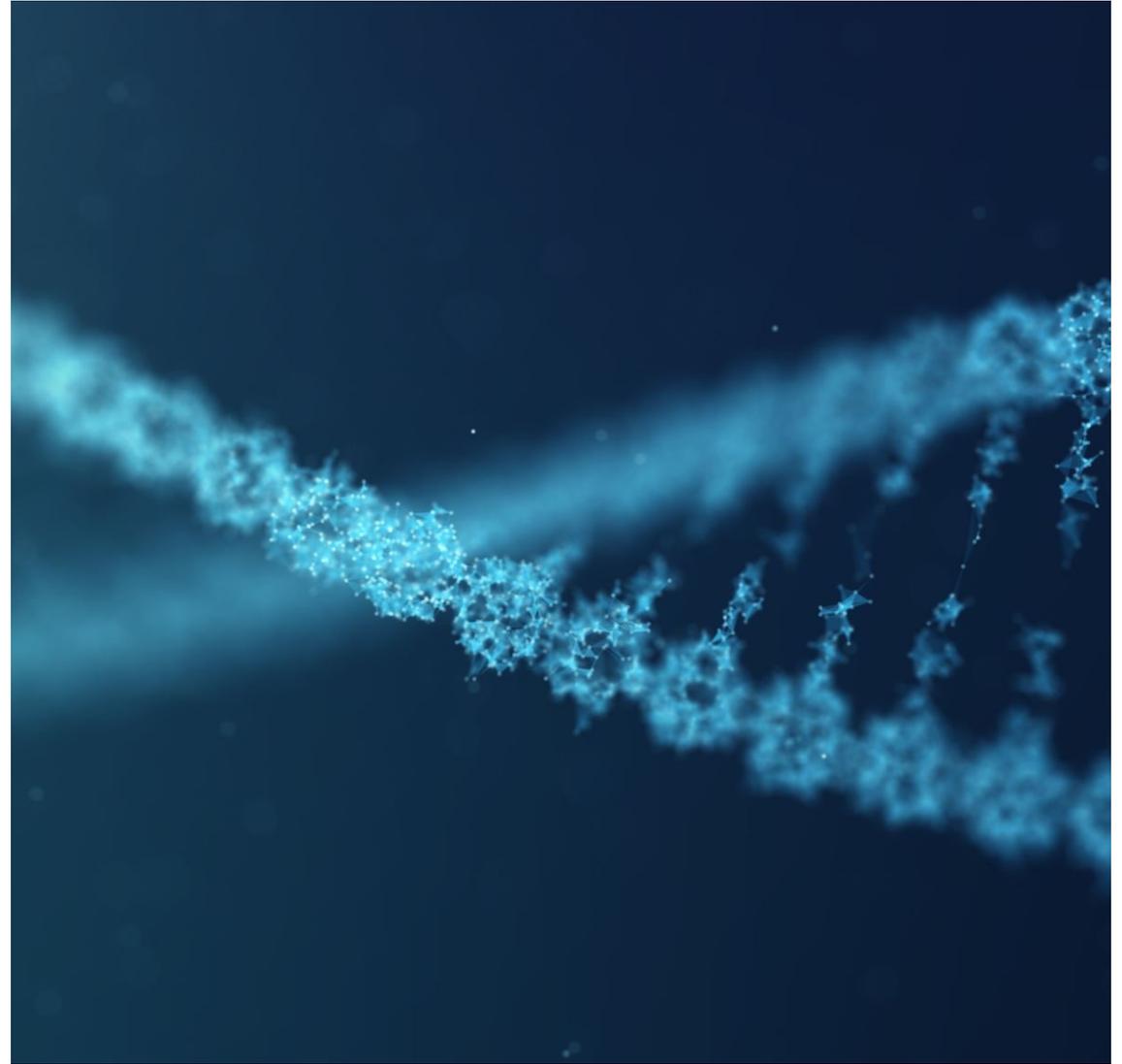
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- Greenwood, A. D., Ishida, Y., O'Brien, S. P., Roca, A. L., & Eiden, M. V. (2018). Transmission, evolution, and endogenization: lessons learned from recent retroviral invasions. *Microbiology and molecular biology reviews*, 82(1), e00044-17.

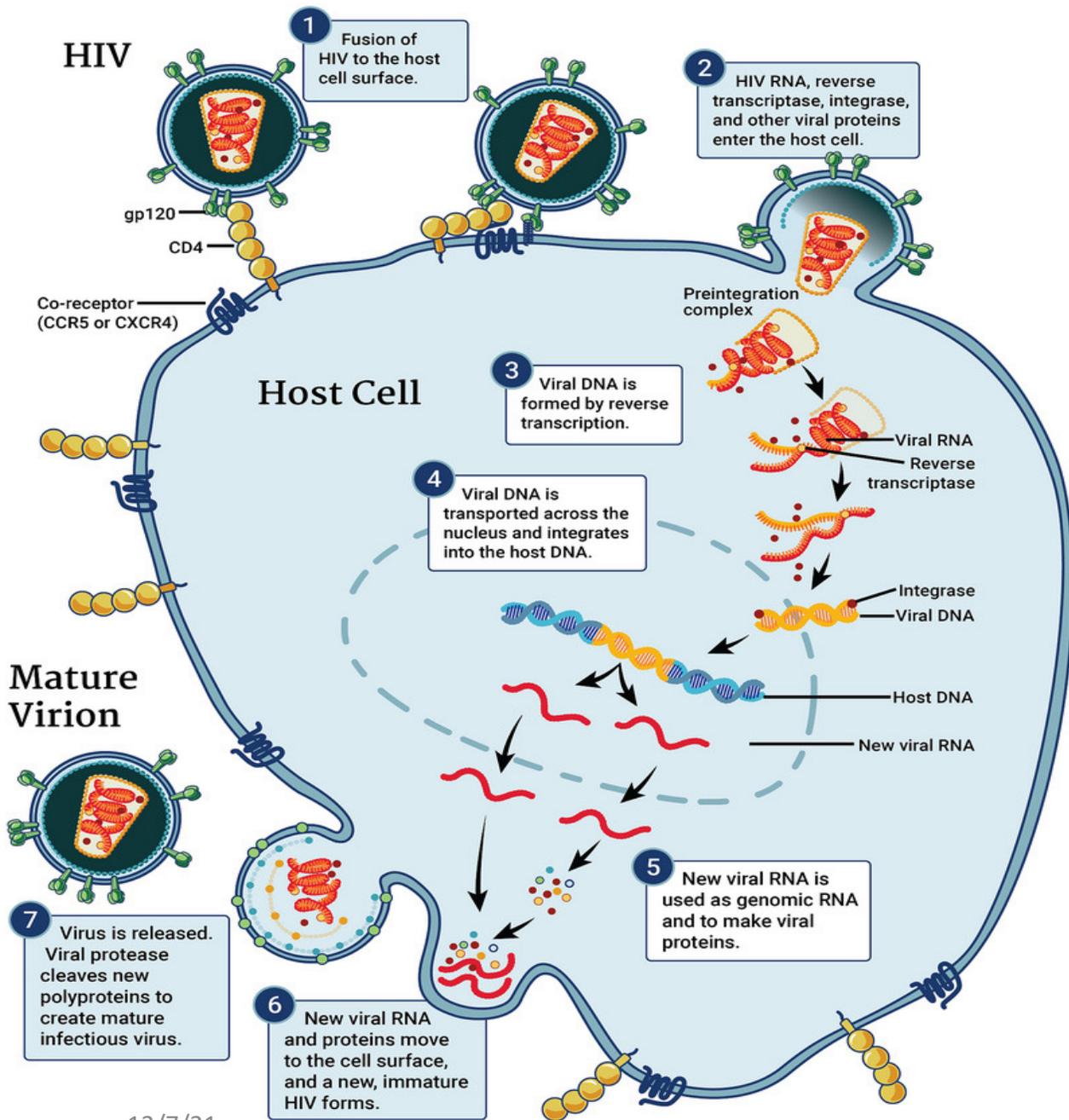


# Replication

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- The virus only survives for a **few hours outside the host.**
- Single stranded nucleic + RNA is transcribed to (-) DNA by the reverse transcriptase protein which is released during uncoating.
- (-)DNA becomes circular double stranded DNA which is integrated into host cell chromosomes by a second viral enzyme, a DNA integrase.
- Chromosomal proviral DNA then codes for viral proteins and viral RNA using cellular enzymes and organelles.





This infographic illustrates the HIV replication cycle, which begins when HIV fuses with the surface of the host cell. A capsid containing the virus's genome and proteins then enters the cell. The shell of the capsid disintegrates, and the HIV protein called reverse transcriptase transcribes the viral RNA into DNA. The viral DNA is transported across the nucleus, where the HIV protein integrase integrates the HIV DNA into the host's DNA. The host's normal transcription machinery transcribes HIV DNA into multiple copies of new HIV RNA. Some of this RNA becomes the genome of a new virus, while the cell uses other copies of the RNA to make new HIV proteins. The new viral RNA and HIV proteins move to the surface of the cell, where a new, immature HIV forms. Finally, the virus is released from the cell, and the HIV protein called protease cleaves newly synthesized polyproteins to create a mature infectious virus.

NIAID [www.niaid.nih.gov/diseases-conditions/hiv-replication-cycle](http://www.niaid.nih.gov/diseases-conditions/hiv-replication-cycle)