

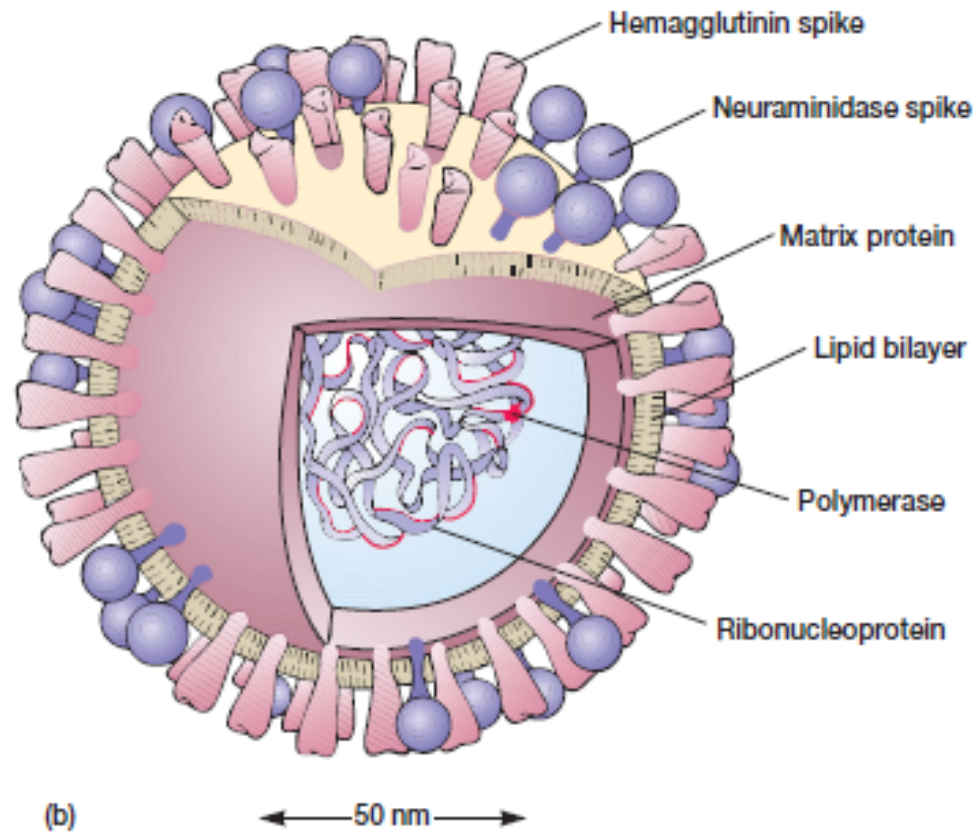
Retroviridae Replication Strategy

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Retroviruses

- **Retroviruses such as the human immunodeficiency virus** possess ss RNA genomes but differ from other RNA viruses in that they synthesize mRNA and replicate their genome by means of DNA intermediates.
- The virus has an RNA dependent DNA polymerase or **reverse transcriptase (RT) that** copies the +RNA genome to form a –DNA copy.
- Interestingly, transfer RNA is carried by the virus and serves as the primer required for nucleic acid synthesis.
- The transformation of RNA into DNA takes place in two steps.
- First, reverse transcriptase copies the +RNA to form a RNA-DNA hybrid.
- Then the **ribonuclease H component of reverse transcriptase degrades** the +RNA strand to leave - DNA.
- After synthesizing –DNA, the reverse transcriptase copies this strand to produce a double-stranded DNA called **proviral DNA, which can direct the** synthesis of mRNA and new RNA virion genome copies.
- Notice that during this process genetic information is transferred from RNA to DNA rather than in the normal direction.

Human immunodeficiency virus



- The reproduction of retroviruses is remarkable in other ways as well.
- After proviral DNA has been manufactured, it is converted to a circular form and incorporated or integrated into the host cell chromosome.
- Virus products are only formed after integration.
- Sometimes these integrated viruses can change host cells into tumor cells.

(d) **Retroviruses** (Rous sarcoma virus, HIV)

