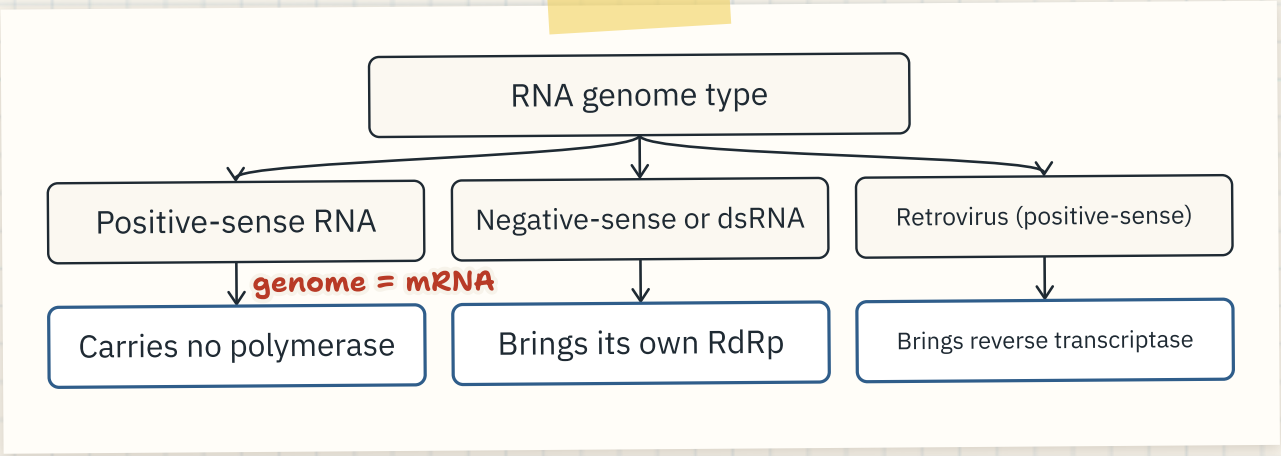
DNA vs RNA virus replication

Which enzyme must the virion carry?



Step by step

1. Most DNA viruses: nucleus, host RNA polymerase.
2. Poxviruses: cytoplasm, own DNA-dependent RNA polymerase.
3. Most RNA viruses: cytoplasm; influenza: nucleus.
4. Retroviruses: DNA copy integrates into the host chromosome.

Virus group	Virion carries
Adenovirus (most DNA viruses)	None: host nucleus
Poxviruses (cytoplasm)	DNA-dependent RNA pol
Poliovirus (positive-sense)	None: genome is mRNA
Influenza (negative-sense)	RNA-dependent RNA pol
Rotavirus (dsRNA)	RNA-dependent RNA pol
HIV (retrovirus)	Reverse transcriptase

Enzyme carried in the virion

THE RULE

Virion carries the enzyme the host cannot supply

Positive-sense RNA (not retroviruses) and most DNA viruses carry none.

Bring what the cell lacks

Cells make RNA from DNA, not RNA from RNA or DNA from RNA.

The virion brings anything else its genome needs.

Exam traps

- Retroviruses are positive-sense yet carry reverse transcriptase.
- Naked negative-sense RNA is silent; naked positive-sense RNA (not retroviral) can infect.
- Poxviruses (DNA) replicate in the cytoplasm; influenza (RNA) in the nucleus.

DNA vs RNA virus replication: which enzyme each genome needs

Video, written lesson, practice question and sources: medservatory.com/usmle-step-1/microbiology/dna-rna-virus-replication

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