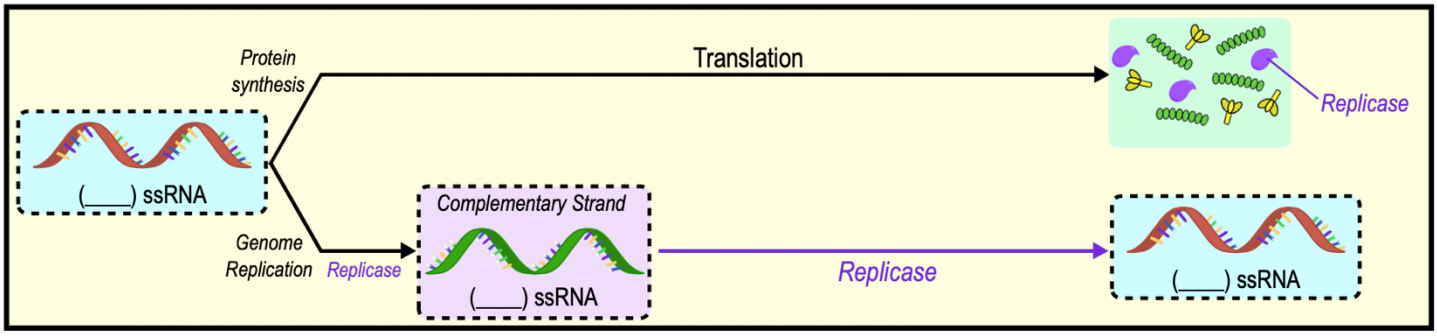
CONCEPT: ANIMAL VIRUSES: RNA VIRUS SYNTHESIS & REPLICATION

- The majority of RNA viruses replicate in the _____ of the host cell.
- RNA virus synthesis & replication requires a *viral RNA polymerase* often referred to as a _____.
  - □ **Replicase:** _____-dependent RNA polymerase that uses template _____ to synthesize new _____ molecules.

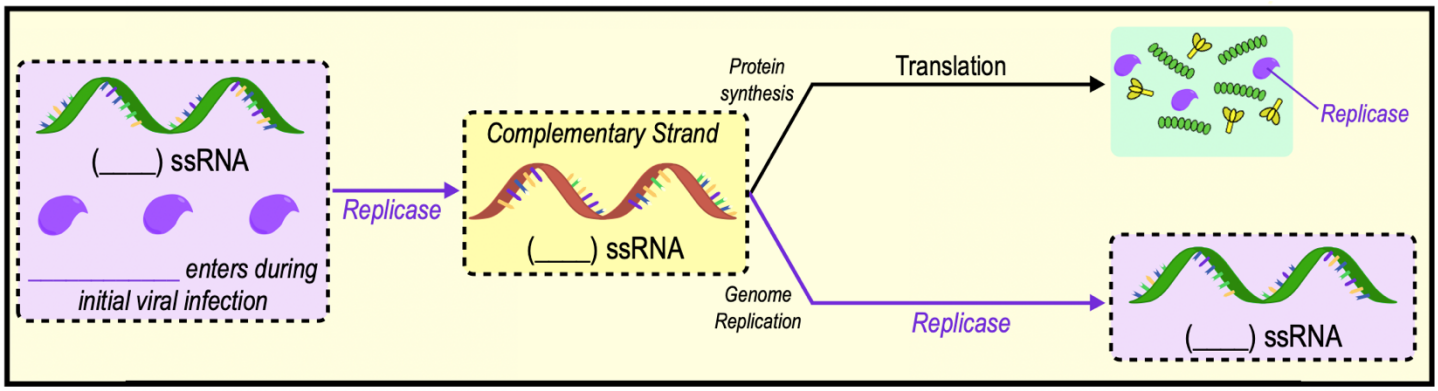
Synthesis & Replication of (+) Single-Stranded RNA (+ssRNA) Viruses

- *Recall:* **(+) ssRNA** is a *normal* _____ molecule that is *directly* translated by host ribosomes.
  - □ Viral replicase enzymes use the (+) ssRNA to make multiple copies of a *complementary* (___) ssRNA molecule.
  - □ _____ enzyme then uses the (–) ssRNA molecules as a *template* to replicate (+) ssRNA genomes.
    - □ NOTE: *Replicase* does _____ enter during initial viral infection (it's only translated *after* entry into cell).



Synthesis & Replication of (–) Single-Stranded RNA (–ssRNA) Viruses

- *Recall:* **(–) ssRNA** can _____ be directly translated but is used as a *template* to synthesize a (+) ssRNA molecule.
  - □ Since (–) ssRNA can't be translated to make replicase, *replicase* MUST _____ during *initial viral infection.*
  - □ Replicase uses the (–) ssRNA as a template to produces a (___) ssRNA molecule.
  - □ Newly synthesized (+) ssRNA is either *translated* _____ used as a template to *replicate* the (–) ssRNA genome.
  - □ When new viral particles assemble, _____ enzyme is packaged with the (–) ssRNA genome.



CONCEPT: ANIMAL VIRUSES: RNA VIRUS SYNTHESIS & REPLICATION

PRACTICE: A positive ssRNA virus:

a) Must first be converted to a mRNA before it can be translated.

b) Can be used to translate viral proteins.

c) Is used to synthesize dsRNA before replication.

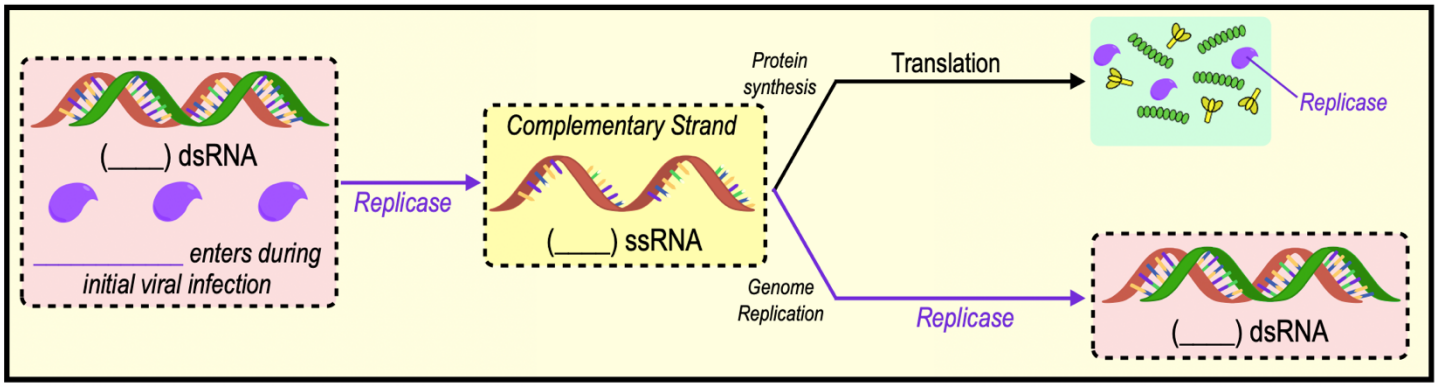
d) Is not recognized by host ribosomes.

Synthesis & Replication of Double-Stranded RNA (dsRNA) Viruses

●*Recall:* **(+/–) dsRNA** is double-stranded RNA that acts as a _____ to make (+) ssRNA for translation.

□ Similar to (–) ssRNA, _____ enzymes MUST enter with (+/-) dsRNA as part of the *initial viral infection.*

□ Replicase uses (+/–) dsRNA as a *template* to make (___) ssRNA that is translated or used to *replicate* dsRNA.



PRACTICE: A scientist in studying a specimen in the laboratory. The scientist wants to determine if the specimen is a virus. Which of the following would allow her to conclude that the specimen is NOT a virus?

a) The specimen has a protein coat.

b) The specimen does not have organelles.

c) The specimen is extremely small.

d) The specimen contains DNA and RNA.

PRACTICE: Virus X, a (-) ssRNA virus, cannot replicate its genome without bringing what into the host cell?

a) Replicase enzyme.

b) Duplicase enzyme.

c) RNA polymerase.

d) Protease.

PRACTICE: (+/-) dsRNA viruses are most similar to which other type of virus?

a) dsDNA viruses.

b) (+) ssRNA viruses.

c) (-) ssRNA viruses.

d) (+) ssDNA viruses.