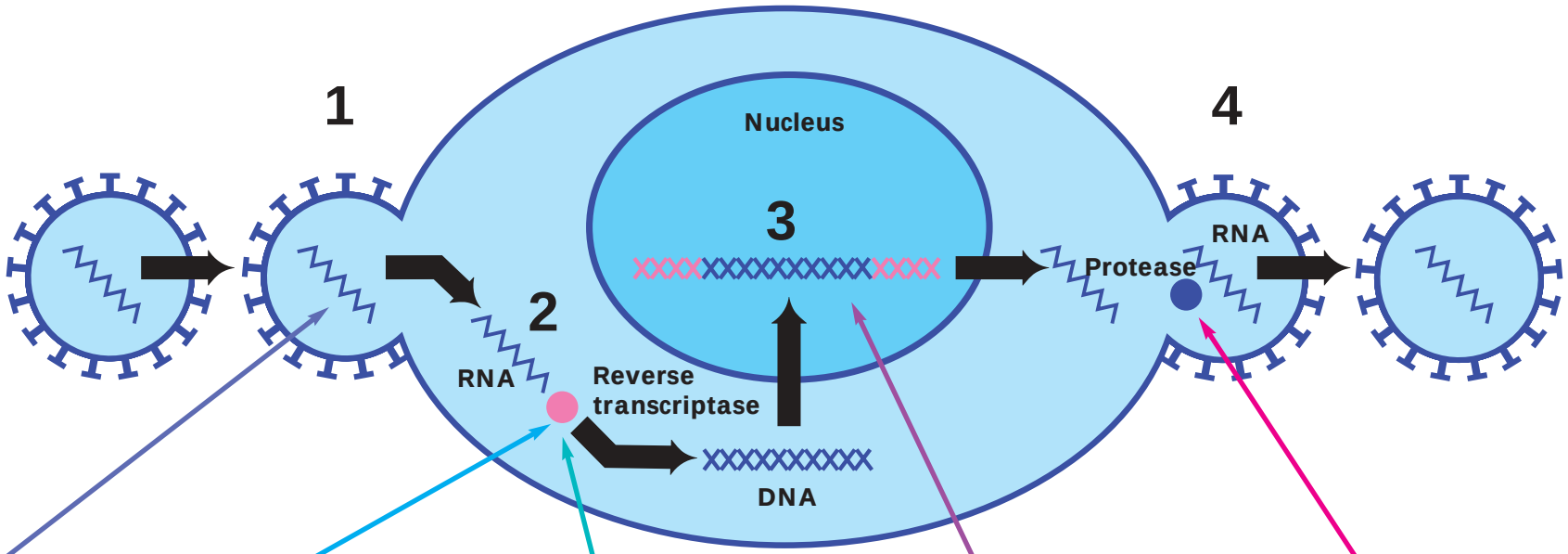
Targeting HIV Replication

Stages of HIV replication

1. HIV enters a CD4 cell.
2. HIV is a retrovirus, meaning that its genetic information is stored on single-stranded RNA instead of the double-stranded DNA found in most organisms.
3. HIV DNA enters the nucleus of the CD4 cell and inserts itself into the cell's DNA. HIV DNA then instructs the cell to make many copies of the original virus.
4. New virus particles are assembled and leave the cell, ready to infect other CD4 cells.



Fusion inhibitors

Fusion inhibitors work outside the cell to prevent the first stage of HIV replication. They prevent HIV from entering the CD4 cell by blocking fusion of the outer membrane of the virus with the cell membrane.

Non-nucleoside reverse transciptase inhibitors

Non-nucleoside reverse transcriptase inhibitors bind to reverse transcriptase and inhibit the enzyme. This stops HIV replication by preventing the conversion of RNA to DNA. These drugs are called "non-nucleoside" inhibitors because even though they work at the same stage as nucleoside analogues, they act in a completely different way.

Nucleoside/Nucleotide analogues

The first effective class of antiretroviral drugs was the nucleoside analogues. They act as false substrates for reverse transcriptase, causing chain termination. The resulting DNA is incomplete and this prevents HIV replication. Nucleotides work in a similar way to nucleosides but they have a different chemical structure.

Integrase inhibitors

Blocking integration of HIV DNA into the cell nucleus is a promising target for anti-HIV drugs because this step is essential for viral replication. Integrase inhibitors are not yet clinically available.

Protease inhibitors

Protease inhibitors work at the last stage of the viral replication cycle. They prevent HIV from being successfully assembled and released from the infected CD4 cell.