SHORT- VERSUS LONG-TERM INFECTION

While many viruses simply infect, replicate, lyse cells, and spread, others take up long-term residence in their host, sometimes living within the organism’s cells for a lifetime. This type of infection, known as persistent infection, requires a delicate balance of viral processes to avoid alerting the host immune system to the viruses’ presence.

ACUTE INFECTION

Flu viruses are inhaled into nasal passage 1. Once inside host cells 2, they replicate to produce new viral particles 3. For some viruses, the infected cells eventually die, releasing new viruses that spread through the body and are shed from the host. At the same time, the host immune system kicks into full gear, recruiting immune cells to the site of infection and releasing cytokines that maintain an inflammatory response 4.

PERSISTENT INFECTION

Some viruses lurk in host cells for much longer periods of time. Herpes viruses infect the cell 1, and then release DNA into the nucleus as a viral episome 2, all the while evading detection from immune cells. Messenger RNA (mRNA) transcribed from either the viral episome or a host chromosome exits the nucleus. Similarly, microRNA (miRNA) is transcribed from either the viral or host genome. Both mRNAs and miRNAs leave the nucleus and enter the cytoplasm 3. There, the miRNAs direct the repression of targeted transcripts 4. Silenced viral mRNAs include those involved in antigenicity and viral replication, while suppressed host genes include those involved in apoptosis, thereby keeping the infected cell alive.