Introduction

Reactome is open-source, open access, manually curated and peer-reviewed pathway database. Pathway annotations are authored by expert biologists, in collaboration with Reactome editorial staff and cross-referenced to many bioinformatics databases. A system of evidence tracking ensures that all assertions are backed up by the primary literature. Reactome is used by clinicians, geneticists, genomics researchers, and molecular biologists to interpret the results of high-throughput experimental studies, by bioinformaticians seeking to develop novel algorithms for mining knowledge from genomic studies, and by systems biologists building predictive models of normal and disease variant pathways.

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Literature references


Reactome database release: 82

This document contains 3 pathways and 1 reaction (see Table of Contents)
Virion assembly packages all the components required for infectivity. These steps include two copies of the positive sense genomic viral RNA, cellular tRNALys, the viral envelope (Env) protein, the Gag polyprotein, and the three viral enzymes: protease (PR), reverse transcriptase (RT), and integrase (IN). The viral enzymes are packaged as domains within the Gag-Pro-Pol polyprotein.

**Literature references**


**Editions**

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Evidence suggests that the RNA molecules used for the synthesis of Gag and Gag-Pro-Pol are not the same molecules that are packaged into virions. Gag proteins do not appear to aggregate around and capture the RNA contained in the polyribosome from which they emerged, but rather bind to and ultimately encapsidate free transcripts elsewhere. During the replication of retroviruses, large numbers of Gag molecules must be generated to serve as precursors to the structural proteins of the virions. Retroviruses have developed a mechanism that permits expression of the Gag protein at high levels relative to the protein sequences encoded in the pro and pol genes, while retaining coregulated expression. This linkage results from the use of the same initiation codon in the same mRNA to express the gag, pro, and pol genes. Translation of this RNA leads occasionally to synthesis of a fusion protein that is usually called the Gag-Pol precursor but is now more appropriately called the Gag-Pro-Pol precursor.

**Literature references**

The two viral membrane proteins, Env and the accessory protein Vpu, which are encoded by the same mRNA, are translated on the rough ER. All virion components need to traffic from their point of synthesis to sites of assembly on the plasma membrane. Env is an integral membrane protein. It is inserted cotranslationally into ER membranes and then travels through the cellular secretory pathway where it is glycosylated, assembled into trimeric complexes, processed into the gp41 and gp120 subunits by the cellular protease furin.

**Literature references**


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Gag assembly leads to formation of the immature lattice. The Gag molecules in the immature virion are extended and oriented radially, with their amino-terminal MA domains bound to the inner membrane leaflet and their carboxy-terminal p6 domains facing the interior of the particle. The GAGPol Pro molecules have arrived at the site of viral assembly in fewer numbers than the Gag protein (20:1). The trimeric gp41:gp120 complex is brought to the plasma membrane by the host vesicular transport system. Only 7-14 trimers per virion. VPU has followed the same ER:Golgi path. Vif, Nef, and Vpr are packaged along with the the HIV genome.

Literature references

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