RTC synthesizes SARS-CoV-2 plus strand genomic RNA

Acencio, ML., Orlic-Milacic, M.
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: 77

This document contains 1 reaction (see Table of Contents)
RTC synthesizes SARS-CoV-2 plus strand genomic RNA

**Stable identifier:** R-HSA-9694581

**Type:** omitted

**Compartments:** cytosol, double membrane vesicle viral factory outer membrane

**Diseases:** COVID-19

After synthesizing the complementary minus RNA of the plus strand viral genomic RNA, virally encoded RNA-dependent RNA polymerase (nsp12, also known as RdRP) uses the minus strand as a template to generate viral genomic RNA that can be packaged into virions. SARS-CoV-2-derived nsp12, in complex with nsp7 and nsp8, was shown to have RNA polymerization activity on a poly-U template (Yin et al. 2020). Details of SARS-CoV-2 replication have not yet been elucidated and are inferred from SARS-CoV-1. Purified SARS-CoV-1 nsp12 shows both primer dependent and primer-independent RNA synthesis activity in vitro. nsp12 is able to initiate RNA synthesis with as little as 37 nucleotides of RNA from the 3’ end of the minus strand viral RNA (complementary to the 5’-UTR of the plus strand genomic RNA - c5’-UTR). Similar to the 3’-UTR of the plus strand, the 3’ end of the minus strand (c5’-UTR) is predicted to form a stable stem-loop structure and seems to be the minimal cis-acting RNA element required for nsp12 to initiate RNA synthesis using the minus strand as a template (Ahn et al. 2012). It is unclear if replication of the minus strand is primer-dependent. The complex of nsp7 and nsp8 confers processivity to nsp12 (Subissi et al. 2014).

**Literature references**


**Editions**

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