Hydrolysis of the 5'-end of the nascent transcript by the capping enzyme

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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

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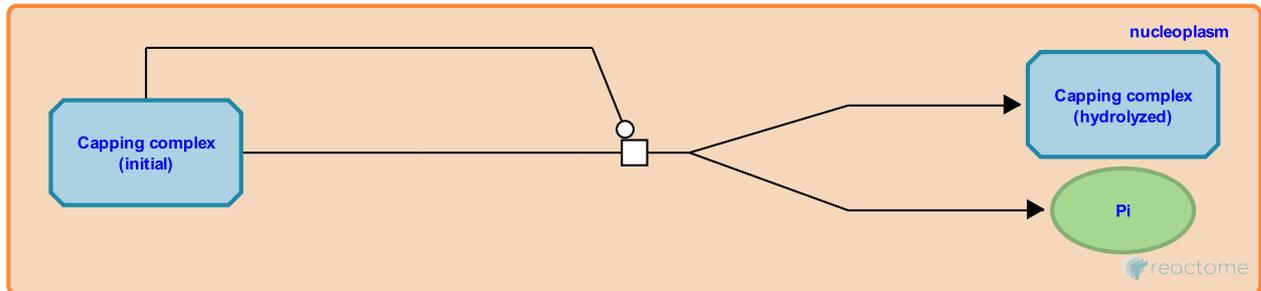
Reactome database release: 73

This document contains 1 reaction (see Table of Contents)

Hydrolysis of the 5'-end of the nascent transcript by the capping enzyme ↗

Stable identifier: R-HSA-77078

Type: transition

Compartments: nucleoplasm

After the capping complex is formed, the RNA triphosphatase activity of the capping enzyme hydrolyzes the 5'-end phosphate group of the nascent mRNA transcript to a diphosphate.

The RNA triphosphatase (RTP) domain of mammalian capping enzyme is a member of a superfamily of phosphatases that include the protein tyrosine phosphatases, some lipid phosphatases, and several nucleic acid phosphatases. This family uses a conserved nucleophilic cysteine residue to attack the target phosphate. A transient phospho-cysteinyl enzyme intermediate is then hydrolyzed to regenerate the enzyme active site. It should be noted that while higher eukaryotic capping enzymes use PTP-like triphosphatase domains, the yeast triphosphatases are a completely different class of enzymes. The yeast RTPs are metal-dependent phosphatases. RNA 5'-triphosphatase (RTP) catalyzed first reaction can be represented as:pppN(pN)n + GTP -> ppN(pN)n + Pi; (n=20-25)

Literature references

Yamada-Okabe, T., Doi, R., Shimmi, O., Arisawa, M., Yamada-Okabe, H. (1998). Isolation and characterization of a human cDNA for mRNA 5'-capping enzyme. *Nucleic Acids Res, 26*, 1700-6. ↗

Editions

2003-10-15	Authored	Buratowski, S.