CDC6 association with the ORC:origin complex

Davey, MJ., O'Donnell, M., Tye, BK.

European Bioinformatics Institute, New York University Langone Medical Center, Ontario Institute for Cancer Research, Oregon Health and Science University.

The contents of this document may be freely copied and distributed in any media, provided the authors, plus the institutions, are credited, as stated under the terms of Creative Commons Attribution 4.0 International (CC BY 4.0) License. For more information see our license.

26/10/2021
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.

The development of Reactome is supported by grants from the US National Institutes of Health (P41 HG003751), University of Toronto (CFREF Medicine by Design), European Union (EU STRP, EMI-CD), and the European Molecular Biology Laboratory (EBI Industry program).

Literature references


Reactome database release: 78

This document contains 1 pathway and 2 reactions (see Table of Contents)
CDC6 association with the ORC:origin complex

Stable identifier: R-HSA-68689

Compartments: nucleoplasm

Cdc6 is a regulator of DNA replication initiation in both yeasts and human cells, but its mechanism of action differs between the two systems. Genetic studies in budding yeast (S. cerevisiae) and fission yeast (S. pombe) indicate that the normal function of Cdc6 protein is required to restrict DNA replication to once per cell cycle. Specifically, Cdc6 may function as an ATPase switch linked to Mcm2-7 association with the Cdt1:Cdc6:ORC:origin complex. In S. cerevisiae, Cdc6 protein is expressed late in the M phase of the cell cycle and, in cells with a prolonged G1 phase, late in G1. This protein has a short half-life, and is destroyed by ubiquitin-mediated proteolysis, mediated by the SCF complex. Human Cdc6 protein levels are reduced early in G1 but otherwise are constant throughout the cell cycle. Some reports have suggested that after cells enter S phase, Cdc6 is phosphorylated, excluded from the nucleus and subject to ubiquitination and degradation. Replenishing Cdc6 protein levels during G1 appears to be regulated by E2F transcription factors.

Literature references


Piatti, S., Lengauer, C., Nasmyth, K. (1995). Cdc6 is an unstable protein whose de novo synthesis in G1 is important for the onset of S phase and for preventing a 'reductive' anaphase in the budding yeast Saccharomyces cerevisiae. EMBO J, 14, 3788-99.


Editions

2006-03-17  Authored  Davey, MJ., O'Donnell, M., Tye, BK.
**CDC6 protein is synthesized under the control of E2F transcription factors**

**Location:** CDC6 association with the ORC:origin complex

**Stable identifier:** R-HSA-68637

**Type:** omitted

**Compartments:** nucleoplasm

At the end of this reaction, 1 molecule of 'Cdc6' is present.

**Followed by:** CDC6 association with ORC:origin complexes mediated by MCM8

**Literature references**


CDC6 association with ORC:origin complexes mediated by MCM8

Location: CDC6 association with the ORC:origin complex

Stable identifier: R-HSA-68688

Type: binding

Compartments: nucleoplasm

At the beginning of this reaction, 1 molecule of 'ORC:origin', and 1 molecule of 'CDC6' are present. At the end of this reaction, 1 molecule of 'CDC6:ORC:origin complex' is present.

This reaction takes place in the 'nucleus'.

Preceded by: CDC6 protein is synthesized under the control of E2F transcription factors

Literature references


Editions
2006-03-17  Authored  Davey, MJ., O'Donnell, M., Tye, BK.
Table of Contents

Introduction

CDC6 association with the ORC:origin complex

CDC6 protein is synthesized under the control of E2F transcription factors

CDC6 association with ORC:origin complexes mediated by MCM8

Table of Contents