CDC42 GTPase cycle

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This is just an excerpt of a full-length report for this pathway. To access the complete report, please download it at the Reactome Textbook.

16/11/2022
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 1 pathway and 6 reactions (see Table of Contents)
This pathway catalogues CDC42 guanine nucleotide exchange factors (GEFs), GTPase activator proteins (GAPs), GDP dissociation inhibitors (GDIs) and CDC42 effectors. CDC42 is one of the three best characterized RHO GTPases, the other two being RHOA and RAC1. By regulating the cytoskeleton, CDC42 regulates cell polarity across different species, from yeast to humans (Pichaud et al. 2019, Woods and Lew 2019). CDC42 is an essential regulator of polarized morphogenesis in epithelial cells, where it coordinates formation of the apical membrane and lumen formation, as well as junction maturation (Pichaud et al. 2019). CDC42 plays a role in cell-to-cell adhesion and cell cycle regulation (Xiao et al. 2018). CDC42 takes part in the regulation of membrane trafficking. Dysfunction of several CDC42-specific GEFs has been shown to impair intracellular trafficking (Egorov and Polishchuk 2017). CDC42 participates in insulin synthesis and secretion and contributes to the pathogenesis of insulin resistance and diabetic nephropathy (Huang et al. 2019). CDC42 is often dysregulated in cancer because a number of GEFs and GEF activators that act upstream of RAC1 and CDC42 are known oncogenes (Aguilar et al. 2017; Maldonado et al. 2018; Zhang et al. 2019; Maldonado et al. 2020). CDC4 promotes cancer cell proliferation, survival, invasion, migration and metastasis (Xiao et al. 2018), especially under hyperglycemia (Huang et al. 2019).

**Literature references**


**Editions**

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The following guanine nucleotide exchange factors (GEFs) were shown to bind CDC42 and catalyze GDP to GTP exchange on CDC42, resulting in formation of the active CDC42-GTP complex (the high throughput study by Bagci et al. 2020 examined binding of GEFs to inactive CDC42 mutants without testing for CDC42-directed GEF activity and is cited as supporting evidence):

- **ARHGEF4** (also known as Asef) (Itoh et al. 2008; Anderson and Hamann 2012; Gotthardt and Ahmadian 2007; Jaiswal et al. 2013; Müller et al. 2020)
- **ARHGEF9** (also known as hPEM2) (Reid et al. 1999; Jaiswal et al. 2013; Müller et al. 2020)
- **ARHGEF15** (Fukushima et al. 2016; Müller et al. 2020)
- **DEF6** (Mavrakis et al. 2004)
- **DNMBP** (also known as Tuba) (Salazar et al. 2003; Jaiswal et al. 2013; Müller et al. 2020; supported by Bagci et al. 2020)
- **FGD1** (Olson et al. 1996; Müller et al. 2020)
- **FGD2** (Huber et al. 2008; Müller et al. 2020)
- **FGD3** (Hayakawa et al. 2008; Müller et al. 2020)
- **FGD4** (Umikawa et al. 1999; Müller et al. 2020)
- **MCF2** (Ueda et al. 2004; Jaiswal et al. 2013; Müller et al. 2020)
- **MCF2L** (Ueda et al. 2004; Whitehead et al. 1999; Jaiswal et al. 2013; Müller et al. 2020; supported by Bagci et al. 2020)
- **PLEKHG1** (Abiko et al. 2015; Müller et al. 2020; supported by Bagci et al. 2020)
The following GEFs; annotated as CDC42 candidate GEFs; were shown to activate CDC42 by some but not all studies (the high throughput study by Bagci et al. 2020 examined binding of GEFs to inactive CDC42 mutants without testing for CDC42-directed GEF activity and is cited as supporting evidence):

ABR (Chuang et al. 1995: CDC42-directed GEF activity; Müller et al. 2020: no CDC42-directed GEF activity)

ARHGEF5 (Xie et al. 2005: CDC42 directed GEF activity; Müller et al. 2020: no CDC42 directed GEF activity; Bagci et al. 2020: no binding to inactive CDC42)

ARHGEF6 (also known as alphaPIX or KIAA006) (Manser et al. 1998, Ramakers et al. 2012, Meseke et al. 2013: CDC42-directed GEF activity; Müller et al. 2020: no CDC42 directed GEF activity)

ARHGEF10 (Müller et al. 2020: CDC42 directed GEF activity; Mohl et al. 2006: no CDC42-directed GEF activity)

ARHGEF11 (Bagci et al. 2020: binding to inactive CDC42; Rümenapp et al. 1999, Jaiswal et al. 2011, Jaiswal et al. 2013, Müller et al. 2020: no CDC42 directed GEF activity)

ARHGEF12 (Bagci et al. 2020: binding to inactive CDC42; Reuther et al. 2001, Jaiswal et al. 2011, Jaiswal et al. 2013, Müller et al. 2020: no CDC42 directed GEF activity)

ARHGEF16 (Bagci et al. 2020: binding to inactive CDC42; Hiramoto Yamaki et al. 2010, Müller et al. 2020: no CDC42 directed GEF activity)

ARHGEF19 (Wang et al. 2004: CDC42-directed GEF activity; Müller et al. 2020: no CDC42-directed GEF activity)

ARHGEF25 (Guo et al. 2003: CDC42-directed GEF activity; Müller et al. 2020: no CDC42-directed GEF activity)

ARHGEF26 (Müller et al. 2020: CDC42 directed GEF activity; Bagci et al. 2020: binding to inactive CDC42; Ellerbroek et al. 2004: no CDC42 directed GEF activity)

BCR (Chuang et al. 1995; Korus et al. 2002: CDC42 directed GEF activity; Müller et al. 2020: no CDC42 directed GEF activity; Bagci et al. 2020: no binding to inactive CDC42)

DOCK6 (Miyamoto et al. 2007: CDC42 directed GEF activity; Müller et al. 2020: no CDC42 directed GEF activity; Bagci et al. 2020: no binding to inactive CDC42)

DOCK7 (Kukimoto Niino et al. 2019, Wilkes et al. 2014, Zhou et al. 2013, Yamauchi et al. 2008: CDC42-directed GEF activity; Müller et al. 2020: no CDC42-directed GEF activity; Bagci et al. 2020: no binding to inactive CDC42)


DOCK9 (also known as Zizimin1) (Meller et al. 2002, Cote and Vuori 2002, Kulkarni et al. 2011: CDC42-directed GEF activity; Bagci et al. 2020: binding to inactive CDC42; Müller et al. 2020: no CDC42-directed GEF activity)
activity)

DOCK10 (Gadea et al. 2008, Ruiz Lafuente et al. 2015: CDC42-directed GEF activity; Bagci et al. 2020: binding to inactive CDC42; Müller et al. 2020: no CDC42-directed GEF activity)

DOCK11 (Lin et al. 2006: CDC42-directed GEF activity; Bagci et al. 2020: binding to inactive CDC42; Müller et al. 2020: no CDC42-directed GEF activity)

ECT2 (Tatsumoto et al. 1999, Fortin et al. 2012: CDC42 directed GEF activity; Müller et al. 2020: no CDC42 directed GEF activity; Bagci et al. 2020: no binding to inactive CDC42)

FARP1 (Amado Azevedo et al. 2017: CDC42 directed GEF activity; Müller et al. 2020: no CDC42 directed GEF activity; Bagci et al. 2020: no binding to inactive CDC42)

GNA13 (Yan et al. 2015: GNA13 increases the amount of GTP-bound CDC42, but the evidence for direct effect is lacking)

ITSN1 (Hussain et al. 2001, Jaiswal et al. 2013: CDC42-directed GEF activity; Müller et al. 2020: no CDC42-directed GEF activity)

NGEF (Zhang et al. 2007: CDC42 directed GEF activity; Müller et al. 2020: no CDC42 directed GEF activity; Bagci et al. 2020: no binding to inactive CDC42)

PLEKHG2 (Ueda et al. 2008: CDC42-directed GEF activity; Bagci et al. 2020: binding to inactive CDC42; Müller et al. 2020: no CDC42-directed GEF activity)

PREX1 (Jaiswal et al. 2013: CDC42 directed GEF activity; Marei et al. 2016, Müller et al. 2020: no CDC42 directed GEF activity)

PREX2 (Müller et al. 2020: CDC42-directed GEF activity; Joseph and Norris 2005: no CDC42-directed GEF activity)

RASGRF2 (Müller et al. 2020: CDC42-directed GEF activity; Calvo et al. 2011: no CDC42-directed GEF activity)

TIAM1 (Michiels et al. 1995: CDC42 directed GEF activity; Itoh et al. 2008, Jaiswal et al. 2013, Müller et al. 2020: no CDC42 directed GEF activity; Bagci et al. 2020: no binding to inactive CDC42)

TRIO (Peurois et al. 2017, Fortin et al. 2012, Jaiswal et al. 2013: CDC42 directed GEF activity, the presence of membrane may be necessary; Debant et al. 1996: no CDC42-directed GEF activity of either the N-terminal GEF1 domain or the C-terminal GEF2 domain of TRIO in vitro; Müller et al. 2020: no CDC42-directed GEF activity of the full-length TRIO; Bagci et al. 2020: no binding of full-length TRIO to inactive CDC42)


VAV3 (Sachdev et al. 2002; Aoki et al. 2005: CDC42 directed GEF activity; Movilla and Bustelo 1999, Müller et al. 2020: no CDC42 directed GEF activity)

The following GEFs do not act on CDC42 or were shown to not bind to inactive CDC42 mutant in the high throughput screen by Bagci et al. 2020):

AKAP13 (Zheng et al. 1995; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

ALS2 (Müller et al. 2020)
ARHGEF1 (Hart et al. 1996; Jaiswal et al. 2013; Jaiswal et al. 2011; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

ARHGEF2 (Krendel et al. 2002; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

ARHGEF3 (Arthur et al. 2002; Müller et al. 2020)

ARHGEF7 (Manser et al. 1998; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

ARHGEF10L (Winkler et al. 2005; Müller et al. 2020)

ARHGEF17 (Rümenapp et al. 2002; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

ARHGEF18 (Niu et al. 2003; Blomquist et al. 2000; Müller et al. 2020)


ARHGEF39 (Müller et al. 2020)

ARHGEF40 (Curtis et al. 2004; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

DOCK1 (Cote and Vuori 2002; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

DOCK2 (Kulkarni et al. 2011; Kwofie and Skowronski 2008; Müller et al. 2020)

DOCK3 (Kwofie and Skowronski 2008; Müller et al. 2020)

DOCK4 (Kwofie and Skowronski 2008; Abraham et al. 2015; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

DOCK5 (Vives et al. 2011; Müller et al. 2020; Bagci et al. 2020: no binding to inactive CDC42)

ECT2L (Müller et al. 2020)

FARP2 (Kubo et al. 2002; Müller et al. 2020)

FGD5 (Müller et al. 2020)

FGD6 (Müller et al. 2020)

ITSN2 (Müller et al. 2020)

KALRN (Penzes et al. 2001; Müller et al. 2020)

MCF2L2 (Müller et al. 2020)

NET1 (Alberts and Treisman 1998; Müller et al. 2020)

OBSCN (Ford Speelman et al. 2009)

PLEKHG5 (De Toledo et al. 2001; Müller et al. 2020)

PLEKHG6 (Müller et al. 2020)

PLEKHG7 (Müller et al. 2020)

RASGRF1 (Müller et al. 2020)

SOS1 (Nimnual et al. 1998; Müller et al. 2020)

SOS2 (Nimnual et al. 1998; Müller et al. 2020)
SWAP70 (Bagci et al. 2020: no binding to inactive CDC42)

TIAM2 (Müller et al. 2020)

VAV1 (Aghazadeh et al. 2000; Müller et al. 2020)

Followed by: CDC42 binds effectors at the plasma membrane, CDC42 translocates to the endoplasmic reticulum membrane, CDC42 GAPs stimulate CDC42 GTPase activity

Literature references


The following GTPase activating proteins (GAPs) were shown to bind CDC42 and stimulate its GTPase activity, resulting in GTP to GDP hydrolysis and conversion of the active CDC42:GTP complex into the inactive CDC42:GDP complex (the high throughput screen by Bagci et al. 2020 is cited as supporting evidence since it examined binding of GAPs to constitutively active CDC42 mutant but did not test for activation of CDC42 GTPase activity):

ARAP1 (Miura et al. 2002; Müller et al. 2020)

ARHGAP1 (Nassar et al. 1998; Amin et al. 2016; Müller et al. 2020; supported by Bagci et al. 2020)

ARHGAP20 (Müller et al. 2020)

ARHGAP22 (Mori et al. 2014; Müller et al. 2020)

ARHGAP39 (Lundström et al. 2004; Müller et al. 2020; supported by Bagci et al. 2020)

ARHGAP40 (Müller et al. 2020)

FAM13B (Müller et al. 2020)

HMHA1 (de Kreuk et al. 2013)

The following GAPs were shown to bind CDC42 and stimulate its GTPase activity in some but not all studies and are annotated as candidate CDC42 GAPs:

ABR (Chuang et al. 1995, Amin et al. 2016: CDC42 directed GAP activity; Müller et al. 2020: no CDC42 directed GAP activity; Bagci et al. 2020: no binding to active CDC42 GAP)

ARAP2 (Müller et al. 2020: CDC42-directed GAP activity; Yoon et al. 2006: no CDC42-directed GAP activity; Bagci et al. 2020: no binding to active CDC42)

ARAP3 (Krugmann et al. 2002, Müller et al. 2020: CDC42 directed GAP activity; Bagci et al. 2020: no bind-
ing to active CDC42)

ARHGAP4 (Vogt et al. 2007: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP5 (Burbele et al. 1995: CDC42-directed GAP activity; Bagci et al. 2020: binding to active CDC42; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP9 (Furukawa et al. 2001: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP10 (also known as Graf2) (Shibata et al. 2001: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP11B (Müller et al. 2020: CDC42-directed GAP activity; Florio et al. 2015: no CDC42-directed GAP activity)

ARHGAP17 (Richnau and Aspenstrom 2001, Amin et al. 2016: CDC42-directed GAP activity; Bagci et al. 2020: binding to active CDC42; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP24 (Lavelin and Geiger 2005, Ohta et al. 2006: CDC42 directed GAP activity; Su et al. 2004, Müller et al. 2020: no CDC42 directed GAP activity)

ARHGAP26 (Hildebrand 1996, Sheffield et al. 1999, Amin et al. 2016: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP27 (Sakakibara et al. 2004: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP29 (Saras et al. 1997: CDC42 directed GAP activity; Müller et al. 2020: no CDC42 directed GAP activity; Bagci et al. 2020: no binding to active CDC42)

ARHGAP30 (Müller et al. 2020: CDC42-directed GAP activity; Naji et al. 2011: no CDC42-directed GAP activity)

ARHGAP31 (Tcherkezian et al. 2006, Müller et al. 2020: CDC42 directed GAP activity; Bagci et al. 2020: no binding to active CDC42)

ARHGAP32 (Nakazawa et al. 2003: CDC42-directed GAP activity; Bagci et al. 2020: binding to active CDC42; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP33 (Chiang et al. 2003, Liu et al. 2006: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

ARHGAP35 (Zhang et al. 1997, Amin et al. 2016: CDC42 directed GAP activity; Müller et al. 2020: no CDC42 directed GAP activity; Bagci et al. 2020: no binding to active CDC42)

ARHGAP42 (Bai et al. 2013: CDC42 directed GAP activity; Bagci et al. 2020: no binding to active CDC42)

ARHGAP44 (also known as RICH2) (Raynaud et al. 2014: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

BCR (Chuang et al. 1995: CDC42 directed GAP activity; Müller et al. 2020: no CDC42 directed GAP activity; Bagci et al. 2020: no binding to active CDC42)
CHN1 (also known as ARHGAP2) (Ahmed et al. 1994: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

DEPDC1B (Bagci et al. 2020: binding to active CDC42; Wu et al. 2015, Müller et al. 2020: no CDC42 directed GAP activity)


GMIP (Müller et al. 2020: CDC42-directed GAP activity; Aresta et al. 2002: no CDC42-directed GAP activity)

MYO9B (Müller et al. 2020: CDC42-directed GAP activity; Post et al. 1998, Kong et al. 2015: no CDC42-directed GAP activity; Bagci et al. 2020: no binding to active CDC42)

OPHN1 (Elvers et al. 2012, Amin et al. 2016: CDC42-directed GAP activity; Bagci et al. 2020: binding to active CDC42; Müller et al. 2020: no CDC42-directed GAP activity)

PIK3R1 (Bagci et al. 2020: binding to active CDC42; Müller et al. 2020: no CDC42-directed GAP activity)

PIK3R2 (Bagci et al. 2020: binding to active CDC42; Müller et al. 2020: no CDC42-directed GAP activity)

RALBP1 (Jullien Flores et al. 1995: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

SRGAP1 (Wong et al. 2001: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

SRGAP2 (Mason et al. 2011, Müller et al. 2020: CDC42 directed GAP activity; Bagci et al. 2020: no binding to active CDC42)

SRGAP3 (Endris et al. 2002: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

STARD8 (Kawai et al. 2007, Müller et al. 2020: CDC42 directed GAP activity; Amin et al. 2016: no CDC42 directed GAP activity)

STARD13 (Leung et al. 2005, Ching et al. 2003: CDC42 directed GAP activity; Amin et al. 2016, Müller et al. 2020: no CDC42 directed GAP activity)

SYDE1 (Amado Azevedo et al. 2017: CDC42-directed GAP activity; Bagci et al. 2020: binding to active CDC42; Müller et al. 2020: no CDC42-directed GAP activity)

TAGAP (Bauer et al. 2005: CDC42-directed GAP activity; Müller et al. 2020: no CDC42-directed GAP activity)

The following GAPs do not act on CDC42 or were shown in the high throughput screen by Bagci et al. 2020 to not bind to constitutively active CDC42 mutant:

ARHGAP6 (Prakash et al. 2000; Müller et al. 2020)

ARHGAP8 (Lua and Low 2004; Müller et al. 2020)

ARHGAP11A (Lawson et al. 2016; Müller et al. 2020)

ARHGAP12 (Bagci et al. 2020; Müller et al. 2020)
ARHGAP15 (Seoh et al. 2003; Müller et al. 2020)
ARHGAP18 (Maeda et al. 2011; Müller et al. 2020)
ARHGAP19 (David et al. 2014; Müller et al. 2020)
ARHGAP23 (Müller et al. 2020)
ARHGAP25 (Csépányi Kömi et al. 2012; Müller et al. 2020)
ARHGAP28 (Yeung et al. 2014; Müller et al. 2020)
ARHGAP36 (Rack et al. 2014; Müller et al. 2020; ARHGAP36 was shown by Jelen et al. 2009 to lack motifs needed for the GAP activity and likely does not act like a GAP)
ARHGAP45 (Müller et al. 2020)
CHN2 (Caloca et al. 2003; Müller et al. 2020)
DEPDC1 (Müller et al. 2020)
FAM13A (Müller et al. 2020)
INPP5B (Müller et al. 2020)
MYO9A (Müller et al. 2020; Bagci et al. 2020)
OCRL (Erdmann et al. 2007; Lichter Konecki et al. 2006; Müller et al. 2020; Bagci et al. 2020)
SH3BP1 (Müller et al. 2020)
SYDE2 (Müller et al. 2020)

Preceded by: CDC42 GEFs activate CDC42

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CDC42 GDIs block activation of CDC42

**Location:** CDC42 GTPase cycle

**Stable identifier:** R-HSA-9013158

**Type:** binding

**Compartments:** plasma membrane, cytosol

The following GDP dissociation inhibitors (GDIs) bind to CDC42 and inhibit its activation:

ARHGDIA (Gupta et al. 2013; Murphy et al. 2001)

ARHGDIg (Adra et al. 1997)

ARHGDIb (Adra et al. 1993)

CAV1 (Nevins and Thurmond 2006)

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CDC42 binds effectors at the plasma membrane

**Location:** CDC42 GTPase cycle

**Stable identifier:** R-HSA-9013157

**Type:** binding

**Compartments:** cytosol, plasma membrane

In its GTP bound active form, plasma membrane associated CDC42 binds to the following effectors:

- BAIAP2 (Krugmann et al. 2001; Kast et al. 2014)
- CDC42BPA (also known as MRCK alpha or MRCKA) (Leung et al. 1998; Schwarz et al. 2012; Bagci et al. 2020)
- CDC42BPB (also known as MRCK beta or MRCKB) (Zihni et al. 2017; Bagci et al. 2020)
- CDC42EP1 (also known as Borg5) (Joberty et al. 1999; Bagci et al. 2020)
- CDC42EP2 (also known as Borg1) (Joberty et al. 1999; Bagci et al. 2020)
- CDC42EP3 (also known as Borg2) (Joberty et al. 1999)
- CDC42EP4 (also known as Borg4) (Joberty et al. 1999; Bagci et al. 2020)
- CDC42EP5 (also known as Borg3) (Joberty et al. 1999)
- FMNL1 (Kuhn et al. 2015)
- FMNL2 (Block et al. 2012; Kuhn et al. 2015)
- FMNL3 (Richards et al. 2015)
- FNBP1 (also known as FBP17) (Chan Wah Hak et al. 2018; Bagci et al. 2020)
- FNBP1L (also known as Toca-1) (Ho et al. 2004; Bagci et al. 2020)
- IQGAP1 (Hart et al. 1996; Kuroda et al. 1996; Swart Mataraza et al. 2002)
- IQGAP2 (Brill et al. 1996)
- MAP3K11 (Leung and Lassam 1998)
- PAK1 (Parrini et al. 2002; Bagci et al. 2020)
- PAK2 (Wu and Wang 2003; Bagci et al. 2020)
PAK3 (Rousseau et al. 2003)
PAK5 (Dan et al. 2002; Ching et al. 2003, Wu and Frost 2006)
PAK6 (Lee et al. 2002, Morse et al. 2016)
PAK7 (Amado Azevedo et al. 2017)
PARD6A (Qiu et al. 2000)
PLD1 (Hammond et al. 1997)

WASP complex, through interaction with WASP complex components WASL (Kim et al. 2000; Bagci et al. 2020), WAS (WASP) (Aspenstrom et al. 1996), WIPF1 (also known as WIP) (Ramesh et al. 1997), WIPF2 (Bagci et al. 2020) and WIPF3 (Bagci et al. 2020)

The following putative CDC42 effectors are annotated as candidates either because of the opposing findings reported by different studies or because they have only been reported in the high throughput screen by Bagci et al. 2020 as proteins that bind to constitutively active CDC42 mutant:

ARFGAP2 (Bagci et al. 2020)
ARFGAP3 (Bagci et al. 2020)
ARHGAP1 (Bagci et al. 2020)
ARHGEF7 (Bagci et al. 2020)
CAV1 (Bagci et al. 2020)
CDC42SE2 (Bagci et al. 2020)
CPNE8 (Bagci et al. 2020)
DAAM1 (Aspenstrom et al. 2006: binding to active CDC42; Higashi et al. 2008: no binding to active CDC42)
DEPDC1B (Bagci et al. 2020)
DIAPH3 (Bagci et al. 2020)
GIT1 (Bagci et al. 2020)
GIT2 (Bagci et al. 2020)
GOLGA8R (Bagci et al. 2020)
IQGAP3 (Wang et al. 2007: binding to active CDC42; Bagci et al. 2020: no binding to active CDC42)
JUP (Bagci et al. 2020)
KCTD3 (Bagci et al. 2020)
LAMTOR1 (Bagci et al. 2020)
PAK4 (Bagci et al. 2020)
RAB7A (Bagci et al. 2020)
SCRIB (Bagci et al. 2020)
SH3PXD2A (Bagci et al. 2020)
SHKBP1 (Bagci et al. 2020)
SNAP23 (Bagci et al. 2020)
STEAP3 (Bagci et al. 2020)
STOM (Bagci et al. 2020)
TFRC (Bagci et al. 2020)
TMPO (Bagci et al. 2020)
VAMP3 (Bagci et al. 2020)
VANGL1 (Bagci et al. 2020)
WDR81 (Bagci et al. 2020)
WDR91 (Bagci et al. 2020)

CDC42 does not bind the following RHO GTPase effectors:

- ARL13B (Bagci et al. 2020)
- DIAPH1 (Higashi et al. 2008)
- GFOD1 (Bagci et al. 2020)
- GJA1 (Bagci et al. 2020)
- GJA1 (Bagci et al. 2020)
- KIAA0355 (Bagci et al. 2020)
- MPP7 (Bagci et al. 2020)
- NIPSNAP2 (Bagci et al. 2020)
- PLEKHG3 (Bagci et al. 2020)
- ROCK1 (Leung et al. 1996)
- ROCK2 (Leung et al. 1996)
- RTKN (Reid et al. 1996)
- SLC1A5 (Bagci et al. 2020)
- SLC4A7 (Bagci et al. 2020)
- SLK (Yamada et al. 2000)
- WASF1 (Miki et al. 1998) – component of the WAVE1 complex
- WWP2 (Bagci et al. 2020)

**Preceded by:** CDC42 GEFs activate CDC42

**Literature references**


https://reactome.org


**Editions**

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**CDC42 translocates to the endoplasmic reticulum membrane**

**Location:** CDC42 GTPase cycle

**Stable identifier:** R-HSA-9692800

**Type:** uncertain

**Compartments:** endoplasmic reticulum membrane, plasma membrane

CDC42 mainly localizes to the plasma membrane but it can also be found on endomembranes, such as endoplasmic reticulum membrane (Michaelson et al. 2001). The trafficking mechanism is not known.

**Preceded by:** CDC42 GEFs activate CDC42

**Followed by:** CDC42 binds effectors at the ER membrane

**Literature references**


**Editions**

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**CDC42 binds effectors at the ER membrane**

**Location:** CDC42 GTPase cycle

**Stable identifier:** R-HSA-9692809

**Type:** binding

**Compartments:** endoplasmic reticulum membrane

Activated GTP-bound CDC42 binds to kinectin (KTN1) at the endoplasmic reticulum membrane (Hotta et al. 1996).

Active CDC42 also binds the following candidate effectors at the endoplasmic reticulum membrane identified in the screen by Bagci et al. 2020:

LBR (Bagci et al. 2020)

YKT6 (Bagci et al. 2020)

**Preceded by:** CDC42 translocates to the endoplasmic reticulum membrane

**Literature references**


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