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 19 reactions (see Table of Contents)
This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp
**pro-RAS proteins are farnesylated**

**Location:** RAS processing

**Stable identifier:** R-RNO-9647978

**Type:** transition

**Compartments:** endoplasmic reticulum membrane, cytosol

**Inferred from:** pro-RAS proteins are farnesylated (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

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**Followed by:** RCE1 cleaves S-Farn proRAS proteins

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FNTB inhibitors bind FNTA:FNTB

Location: RAS processing

Stable identifier: R-RNO-9647987

Type: binding

Compartments: cytosol

Inferred from: FNTB inhibitors bind FNTA:FNTB (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp
RCE1 cleaves S-Farn proRAS proteins

Location: RAS processing

Stable identifier: R-RNO-9647999

Type: transition

Compartments: endoplasmic reticulum membrane

Inferred from: RCE1 cleaves S-Farn proRAS proteins (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/parologue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

Preceded by: pro-RAS proteins are farnesylated

Followed by: ICMT methylates S-Farn RAS proteins
**USP17L2 deubiquitinates RCE1**

**Location:** RAS processing

**Stable identifier:** R-RNO-9653514

**Type:** transition

**Compartments:** endoplasmic reticulum membrane, cytosol

**Inferred from:** USP17L2 deubiquitinates RCE1 (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[a href='/electronic_inference_compara.html' target = 'NEW']More details and caveats of the event inference in Reactome. For details on PANTHER see also: [a href='http://www.pantherdb.org/about.jsp' target='NEW']http://www.pantherdb.org/about.jsp

https://reactome.org
ICMT methylates S-Farn RAS proteins

**Location:** RAS processing

**Stable identifier:** R-RNO-9647977

**Type:** transition

**Compartments:** endoplasmic reticulum membrane

**Inferred from:** ICMT methylates S-Farn RAS proteins (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

[More details and caveats of the event inference in Reactome.](https://reactome.org)

For details on PANTHER see also: [http://www.pantherdb.org/about.jsp](http://www.pantherdb.org/about.jsp)

**Preceded by:** RCE1 cleaves S-Farn proRAS proteins

**Followed by:** Mature S-Farn- Me KRAS4B translocates to plasma membrane, S-farn Me-HRAS, -NRAS and -KRAS4A are palmitoylated
S-farn Me-HRAS, -NRAS and -KRAS4A are palmitoylated

**Location:** RAS processing

**Stable identifier:** R-RNO-9647982

**Type:** transition

**Compartments:** endoplasmic reticulum membrane, Golgi membrane

**Inferred from:** S-farn Me-HRAS, -NRAS and -KRAS4A are palmitoylated (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: [http://www.pantherdb.org/about.jsp](http://www.pantherdb.org/about.jsp)

**Preceded by:** ICMT methylates S-Farn RAS proteins

**Followed by:** mature RAS proteins translocate to plasma membrane

https://reactome.org
mature RAS proteins translocate to plasma membrane

Location: RAS processing

Stable identifier: R-RNO-9647980

Type: omitted

Compartments: plasma membrane, Golgi membrane

Inferred from: mature RAS proteins translocate to plasma membrane (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/parologue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

Preceded by: S-farn Me-HRAS, -NRAS and -KRAS4A are palmitoylated

Followed by: RAS proteins are depalmitoylated, mature p21 RAS binds GDP
RAS proteins are depalmitoylated

**Location:** RAS processing

**Stable identifier:** R-RNO-9647994

**Type:** transition

**Compartments:** plasma membrane

**Inferred from:** RAS proteins are depalmitoylated (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: [http://www.pantherdb.org/about.jsp](http://www.pantherdb.org/about.jsp)

**Preceded by:** mature RAS proteins translocate to plasma membrane
**Palmostatin B binds RAS depalmitoylases**

**Location:** RAS processing

**Stable identifier:** R-RNO-9647991

**Type:** binding

**Compartments:** plasma membrane

**Inferred from:** Palmostatin B binds RAS depalmitoylases (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

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Mature S-Farn-Me KRAS4B translocates to plasma membrane

Location: RAS processing

Stable identifier: R-RNO-9649732

Type: omitted

Compartments: endoplasmic reticulum membrane, plasma membrane

Inferred from: Mature S-Farn-Me KRAS4B translocates to plasma membrane (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

Preceded by: ICMT methylates S-Farn RAS proteins

Followed by: KRAS4B is phosphorylated on serine 181, S-Farn-Me KRAS4B binds calmodulin, mature p21 RAS binds GDP
mature p21 RAS binds GDP

**Location:** RAS processing

**Stable identifier:** R-RNO-9649733

**Type:** binding

**Compartments:** plasma membrane

**Inferred from:** mature p21 RAS binds GDP (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

**Preceded by:** Mature S-Farn-Me KRAS4B translocates to plasma membrane, mature RAS proteins translocate to plasma membrane
KRAS4B is phosphorylated on serine 181

**Location:** RAS processing

**Stable identifier:** R-RNO-9653503

**Type:** transition

**Compartments:** plasma membrane, cytosol

**Inferred from:** KRAS4B is phosphorylated on serine 181 (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

**Preceded by:** Mature S-Farn-Me KRAS4B translocates to plasma membrane

**Followed by:** pS181-S-Farn-Me KRAS4B translocates to the outer mitochondrial membrane
pS181-S-Farn-Me KRAS4B translocates to the outer mitochondrial membrane

**Location:** RAS processing

**Stable identifier:** R-RNO-9653592

**Type:** omitted

**Compartments:** plasma membrane, mitochondrial outer membrane

**Inferred from:** pS181-S-Farn-Me KRAS4B translocates to the outer mitochondrial membrane (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

**Preceded by:** KRAS4B is phosphorylated on serine 181

**Followed by:** pS181-S-Farn-Me KRAS4B binds BCL2L1
pS181-S-Farn-Me KRAS4B binds BCL2L1

**Location:** RAS processing

**Stable identifier:** R-RNO-9653595

**Type:** binding

**Compartments:** mitochondrial outer membrane

**Inferred from:** pS181-S-Farn-Me KRAS4B binds BCL2L1 (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: [http://www.pantherdb.org/about.jsp](http://www.pantherdb.org/about.jsp)

**Preceded by:** pS181-S-Farn-Me KRAS4B translocates to the outer mitochondrial membrane
S-Farn-Me KRAS4B binds calmodulin

Location: RAS processing

Stable identifier: R-RNO-9653585

Type: binding

Compartments: plasma membrane, cytosol

Inferred from: S-Farn-Me KRAS4B binds calmodulin (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

Preceded by: Mature S-Farn-Me KRAS4B translocates to plasma membrane

Followed by: Calmodulin dissociates KRAS4B from the plasma membrane
Calmodulin dissociates KRAS4B from the plasma membrane

**Location:** RAS processing

**Stable identifier:** R-RNO-9654521

**Type:** omitted

**Compartments:** plasma membrane, cytosol

**Inferred from:** Calmodulin dissociates KRAS4B from the plasma membrane (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species. The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also:http://www.pantherdb.org/about.jsp

**Preceded by:** S-Farn-Me KRAS4B binds calmodulin

**Followed by:** PDE6D binds S-Farn-Me KRAS4B:CALM:4 Ca2+
PDE6D binds S-Farn-|Me KRAS4B:CALM:4 Ca2+

Location: RAS processing

Stable identifier: R-RNO-9654525

Type: binding

Compartments: cytosol

Inferred from: PDE6D binds S-Farn-|Me KRAS4B:CALM:4 Ca2+ (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

Preceded by: Calmodulin dissociates KRAS4B from the plasma membrane

Followed by: ARL2:GTP bind PDE6D on KRAS4B

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ARL2:GTP bind PDE6D on KRAS4B

Location: RAS processing

Stable identifier: R-RNO-9654523

Type: binding

Compartments: cytosol

Inferred from: ARL2:GTP bind PDE6D on KRAS4B (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

More details and caveats of the event inference in Reactome. For details on PANTHER see also: http://www.pantherdb.org/about.jsp

Preceded by: PDE6D binds S-Farn-Me KRAS4B:CALM:4 Ca2+

Followed by: KRAS4B recycles to the plasma membrane
**KRAS4B recycles to the plasma membrane**

**Location:** RAS processing

**Stable identifier:** R-RNO-9654533

**Type:** omitted

**Compartments:** plasma membrane, cytosol

**Inferred from:** KRAS4B recycles to the plasma membrane (Homo sapiens)

This event has been computationally inferred from an event that has been demonstrated in another species.

The inference is based on the homology mapping from PANTHER. Briefly, reactions for which all involved PhysicalEntities (in input, output and catalyst) have a mapped orthologue/paralogue (for complexes at least 75% of components must have a mapping) are inferred to the other species. High level events are also inferred for these events to allow for easier navigation.

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**Preceded by:** ARL2:GTP bind PDE6D on KRAS4B

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