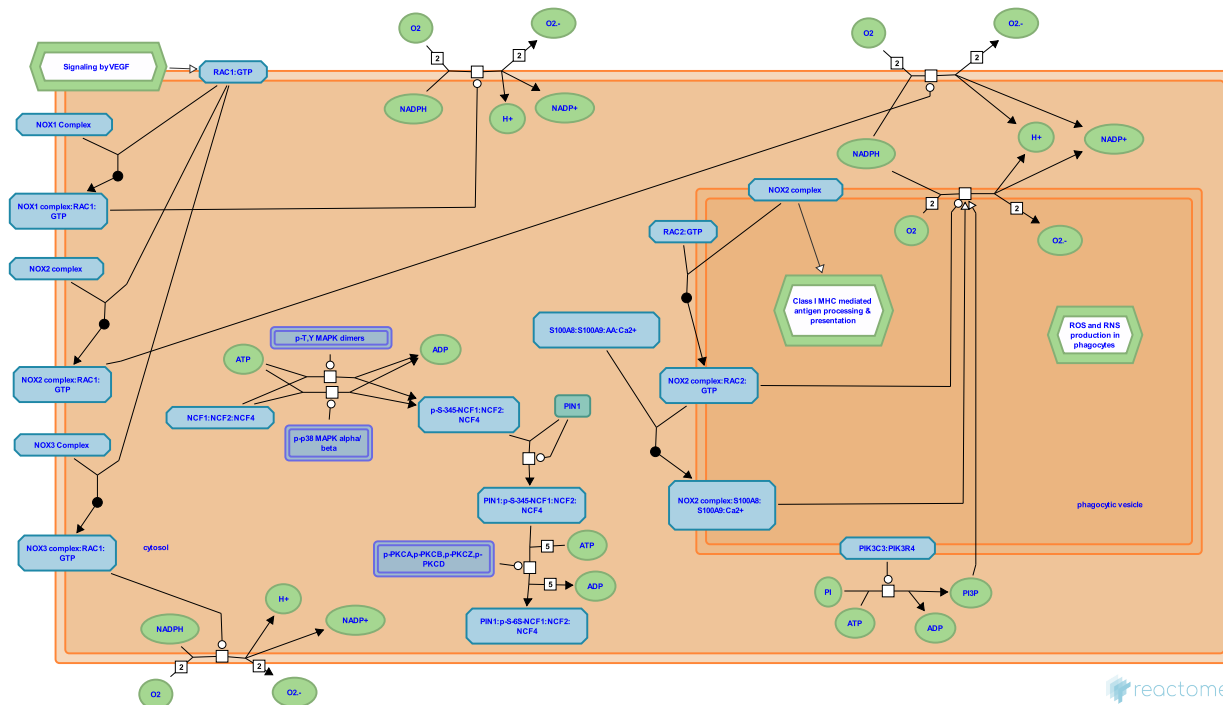


RHO GTPases Activate NADPH Oxidases



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

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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](https://reactome.org/textbook/).

04/05/2024

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

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Reactome database release: 88

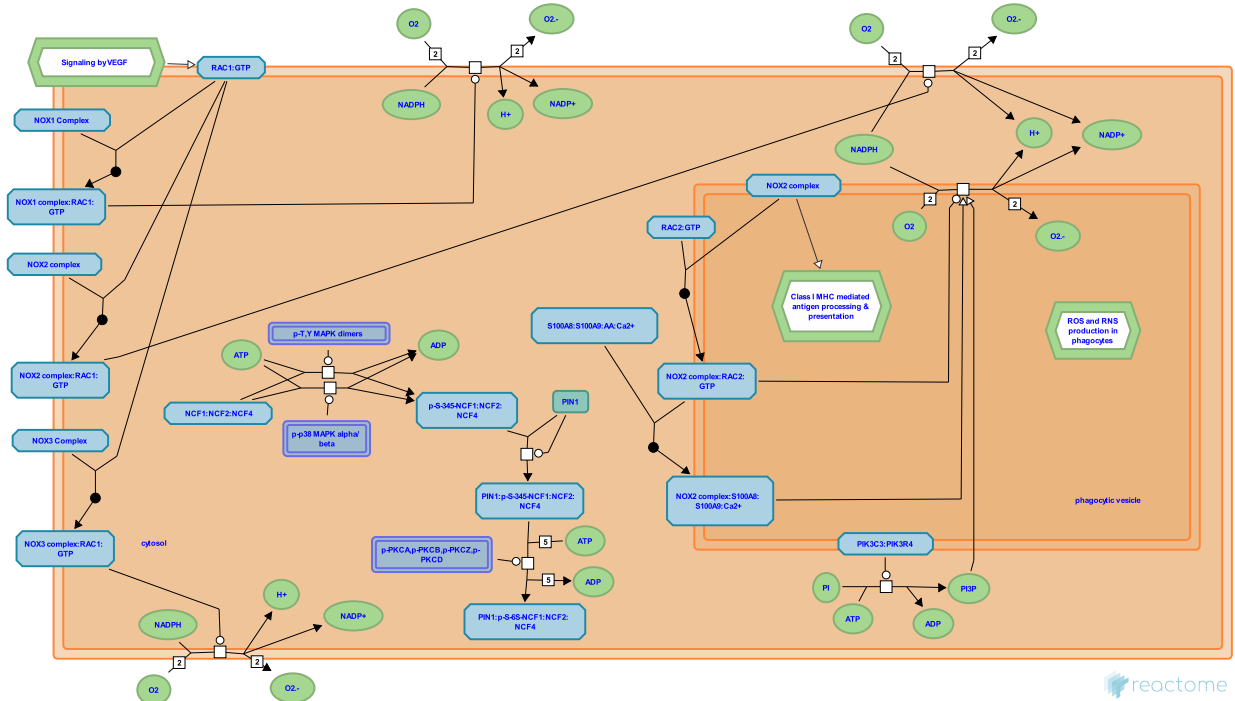
This document contains 1 pathway and 14 reactions ([see Table of Contents](#))

RHO GTPases Activate NADPH Oxidases ↗

Stable identifier: R-SSC-5668599

Compartments: cytosol, plasma membrane, phagocytic vesicle membrane, phagolysosome

Inferred from: RHO GTPases Activate NADPH Oxidases (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.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

NADPH oxidase 2 (NOX2) complex binds RAC1 [↗](#)

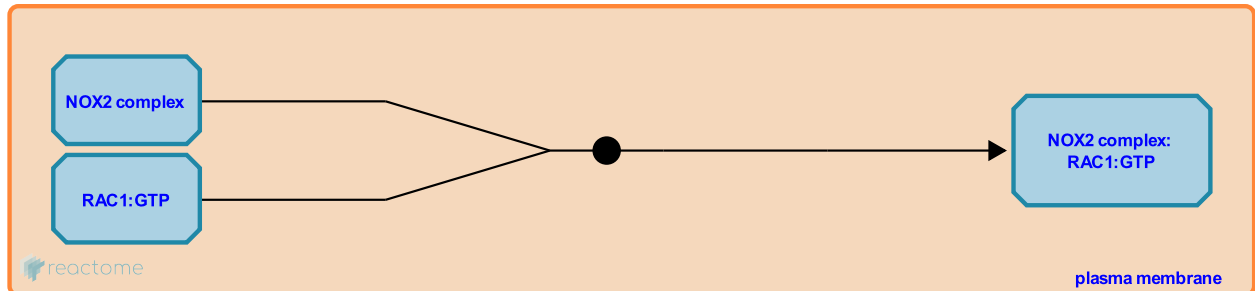
Location: [RHO GTPases Activate NADPH Oxidases](#)

Stable identifier: R-SSC-5218827

Type: binding

Compartments: plasma membrane

Inferred from: [NADPH oxidase 2 \(NOX2\) complex binds RAC1 \(Homo sapiens\)](#)



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>

Followed by: [NADPH oxidase 2 generates superoxide from oxygen](#)

NADPH oxidase 2 generates superoxide from oxygen ↗

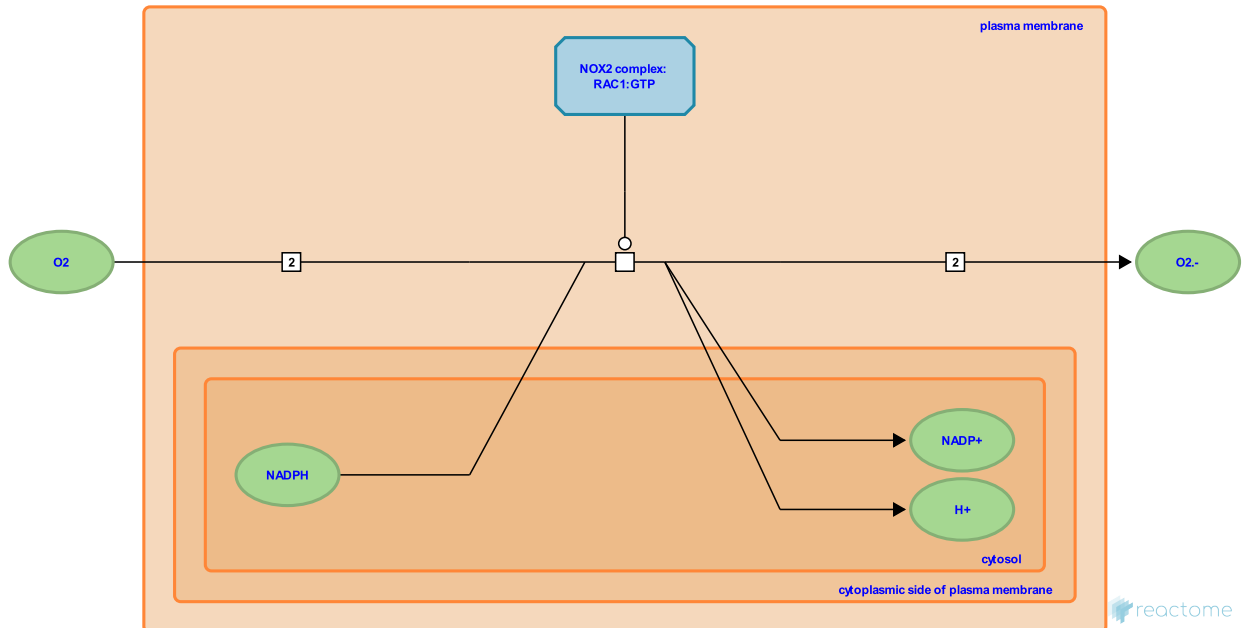
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-5218841

Type: transition

Compartments: plasma membrane, extracellular region, cytosol

Inferred from: NADPH oxidase 2 generates superoxide from oxygen (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://www.reactome.org) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Preceded by: NADPH oxidase 2 (NOX2) complex binds RAC1

RAC2:GTP binds NOX2 complex ↗

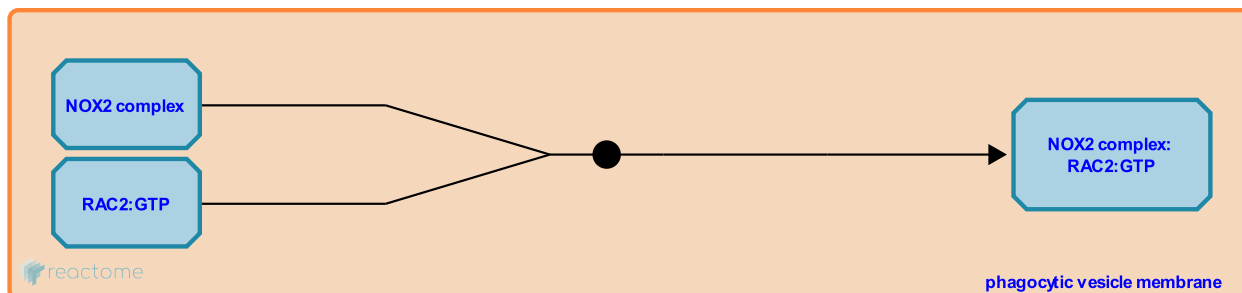
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-5668605

Type: binding

Compartments: phagocytic vesicle membrane

Inferred from: RAC2:GTP binds NOX2 complex (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>

Followed by: S100A8:S100A9:AA:Ca(2+) binds NOX2 complex, Production of phagocyte oxygen radicals by NOX2 complex bound to RAC2:GTP

Production of phagocyte oxygen radicals by NOX2 complex bound to RAC2:GTP ↗

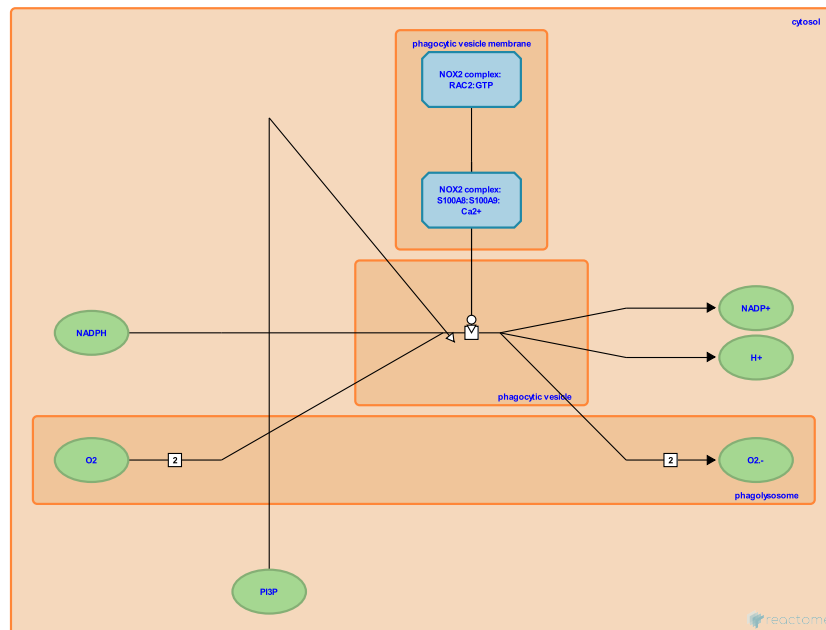
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-5668629

Type: transition

Compartments: phagocytic vesicle, phagocytic vesicle membrane, phagolysosome, cytosol

Inferred from: Production of phagocyte oxygen radicals by NOX2 complex bound to RAC2:GTP (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.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Preceded by: RAC2:GTP binds NOX2 complex

RAC1:GTP binds NOX1 complex ↗

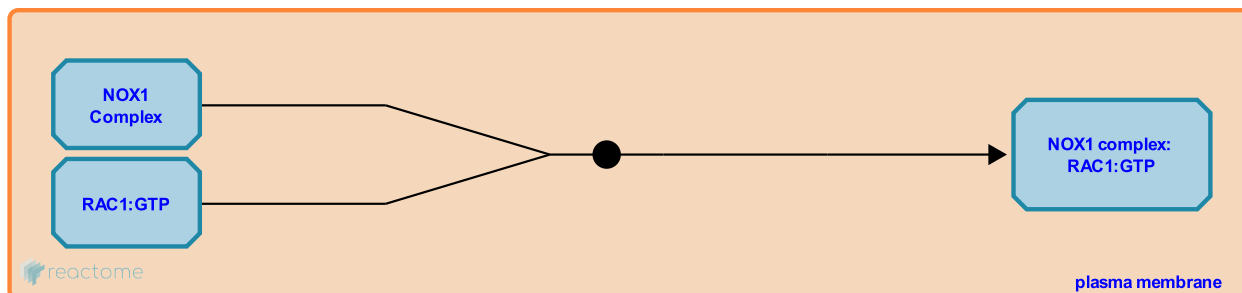
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-5668714

Type: binding

Compartments: plasma membrane

Inferred from: RAC1:GTP binds NOX1 complex (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://www.reactome.org/docs/inferring_events.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

NOX1 complex:RAC1:GTP generates superoxide from oxygen ↗

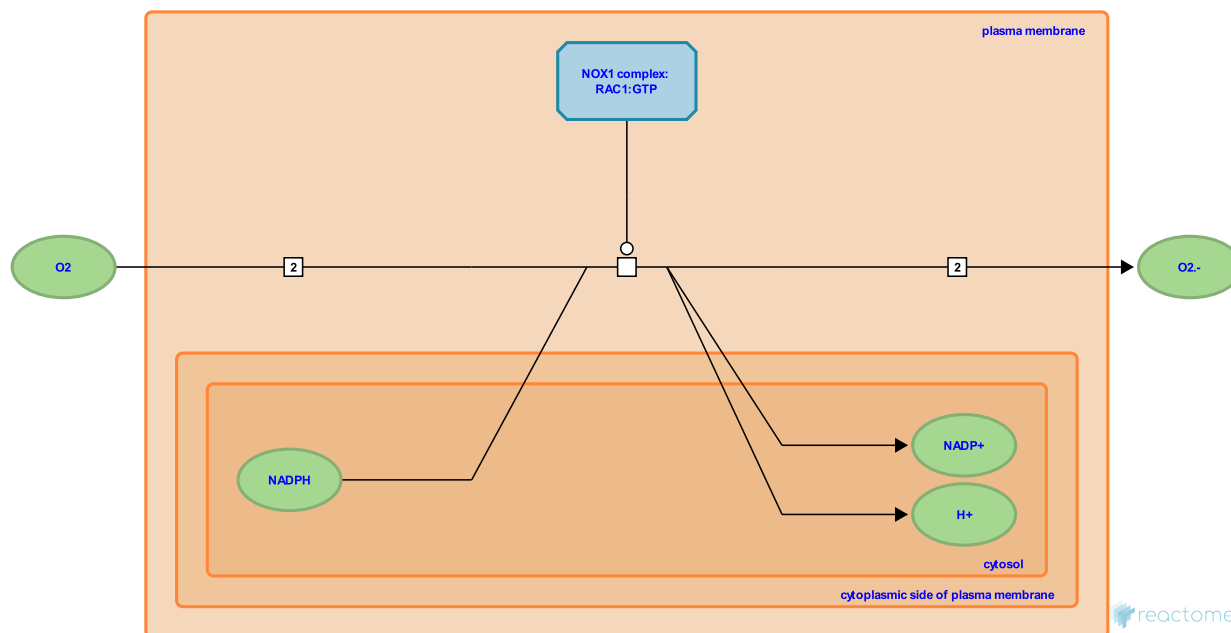
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-5668718

Type: transition

Compartments: plasma membrane, extracellular region, cytosol

Inferred from: NOX1 complex:RAC1:GTP generates superoxide from oxygen (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://www.reactome.org) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

RAC1:GTP binds NOX3 complex ↗

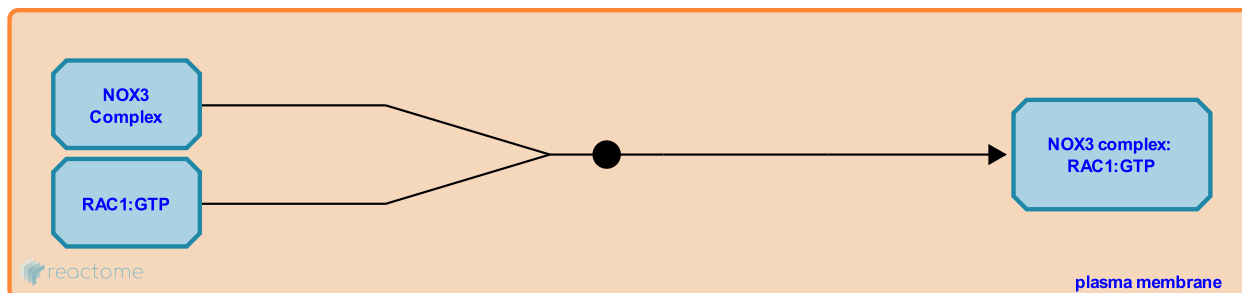
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-5668735

Type: binding

Compartments: plasma membrane

Inferred from: RAC1:GTP binds NOX3 complex (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>

Followed by: NOX3 complex:RAC1:GTP generates superoxide from oxygen

NOX3 complex:RAC1:GTP generates superoxide from oxygen ↗

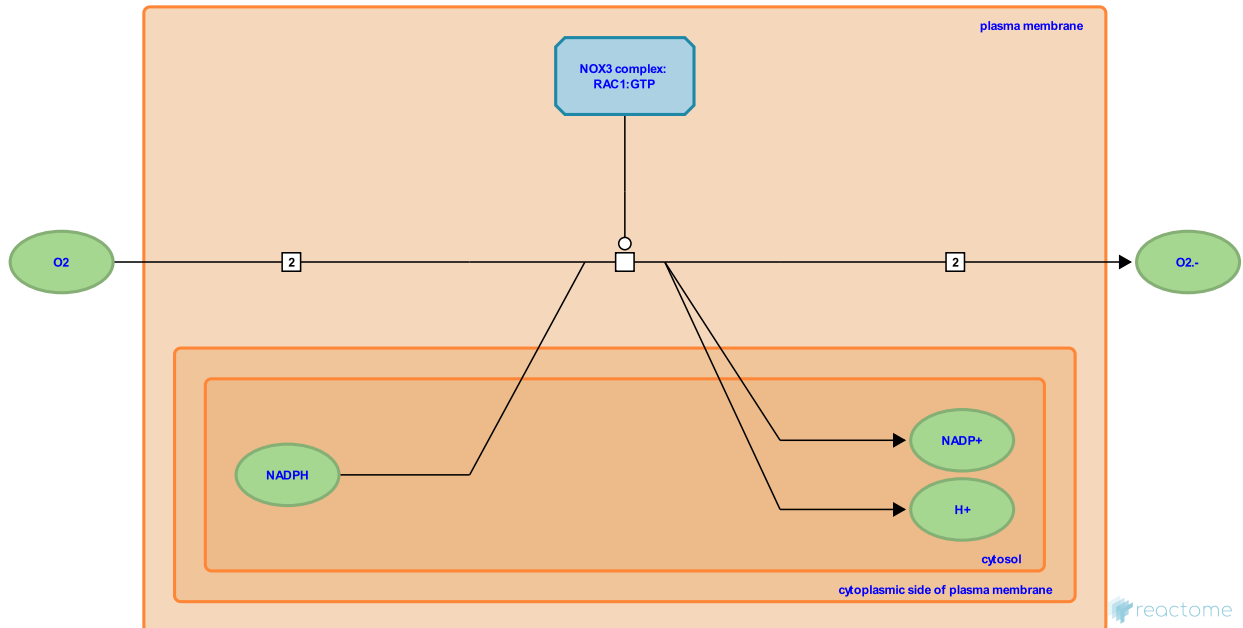
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-5668731

Type: transition

Compartments: plasma membrane, extracellular region, cytosol

Inferred from: NOX3 complex:RAC1:GTP generates superoxide from oxygen (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.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Preceded by: RAC1:GTP binds NOX3 complex

PIK3C3:PIK3R4 phosphorylates PI to PI3P ↗

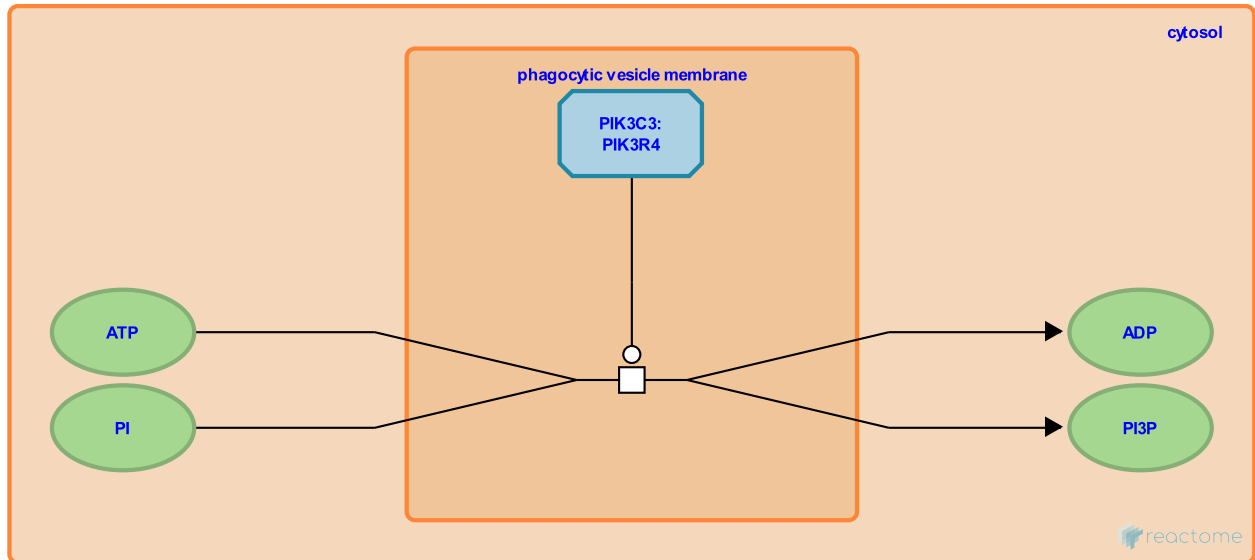
Location: [RHO GTPases Activate NADPH Oxidases](#)

Stable identifier: R-SSC-6798174

Type: transition

Compartments: phagocytic vesicle membrane, cytosol

Inferred from: [PIK3C3:PIK3R4 phosphorylates PI to PI3P \(Homo sapiens\)](#)



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>

MAPK1 or MAPK3 phosphorylates NCF1 at Ser345 ↗

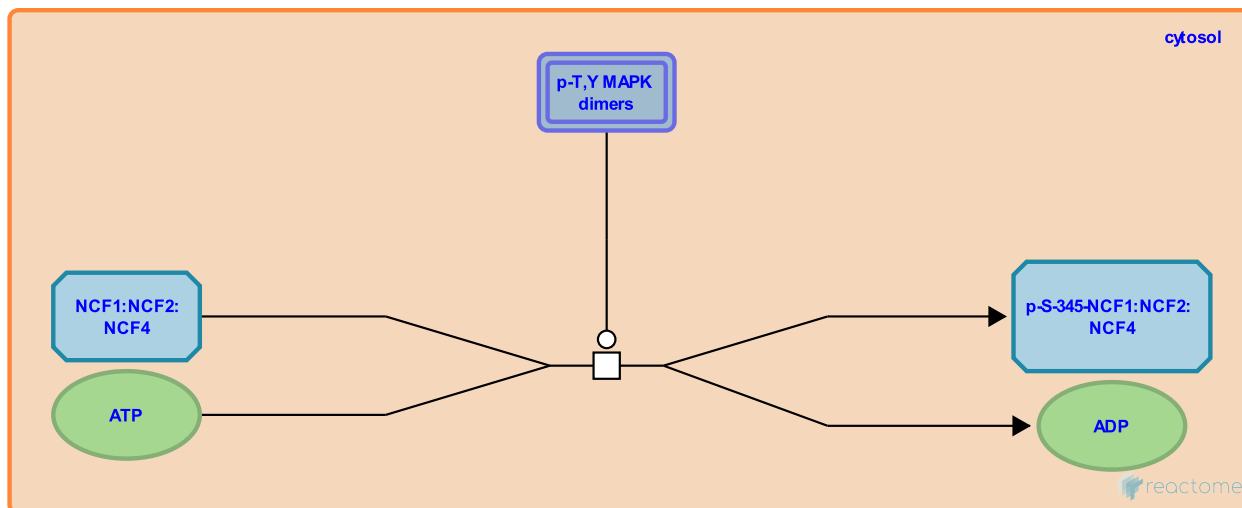
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-9626832

Type: transition

Compartments: cytosol

Inferred from: MAPK1 or MAPK3 phosphorylates NCF1 at Ser345 (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://www.reactome.org/docs/inferring_events.html) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Followed by: PIN1 binds p-S345-NCF1

MAPK11 or MAPK14 phosphorylates NCF1 at Ser345 ↗

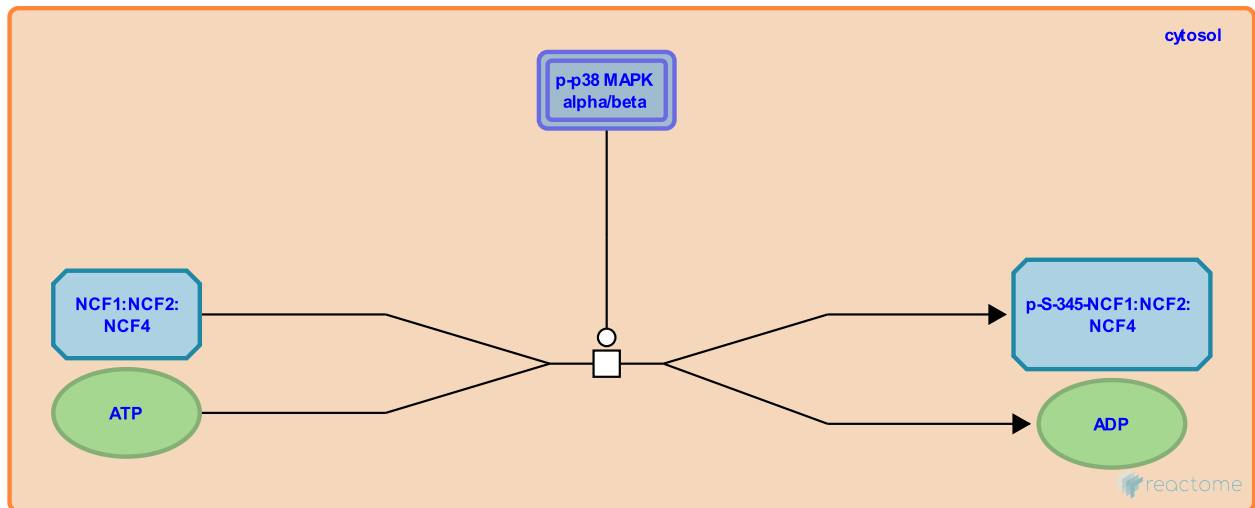
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-9626880

Type: transition

Compartments: cytosol

Inferred from: MAPK11 or MAPK14 phosphorylates NCF1 at Ser345 (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.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Followed by: PIN1 binds p-S345-NCF1

PIN1 binds p-S345-NCF1 ↗

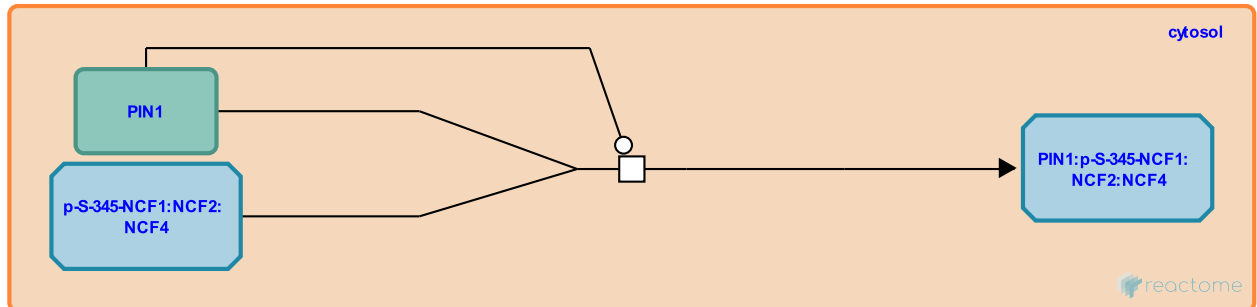
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-9626816

Type: transition

Compartments: cytosol

Inferred from: PIN1 binds p-S345-NCF1 (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.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Preceded by: MAPK1 or MAPK3 phosphorylates NCF1 at Ser345, MAPK11 or MAPK14 phosphorylates NCF1 at Ser345

Followed by: PKC phosphorylates NCF1

PKC phosphorylates NCF1 ↗

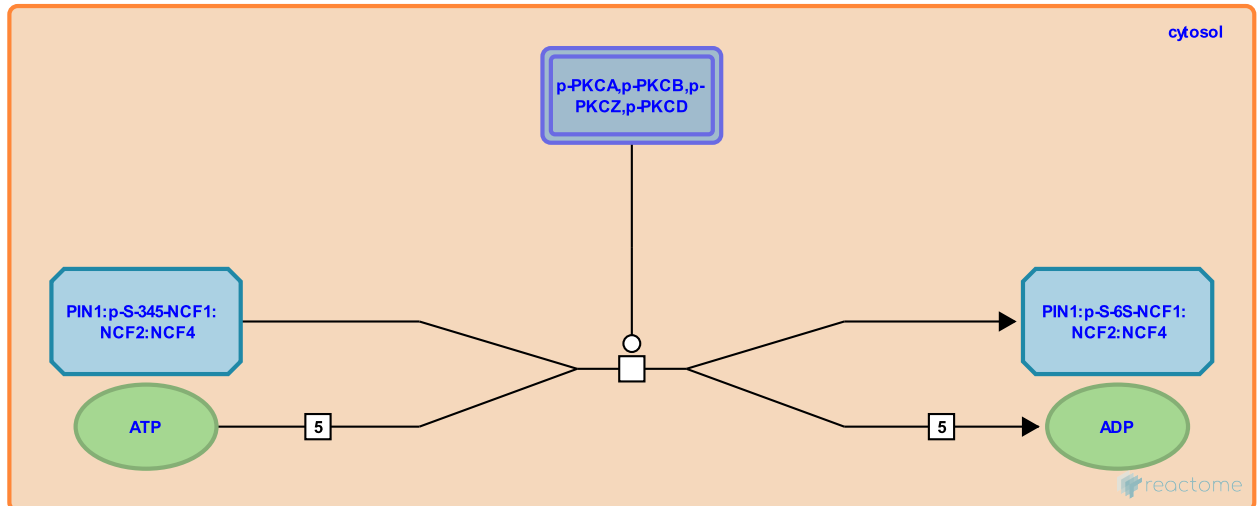
Location: RHO GTPases Activate NADPH Oxidases

Stable identifier: R-SSC-9626817

Type: transition

Compartments: cytosol

Inferred from: PKC phosphorylates NCF1 (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.](http://www.pantherdb.org/about.jsp) For details on PANTHER see also: <http://www.pantherdb.org/about.jsp>

Preceded by: PIN1 binds p-S345-NCF1

S100A8:S100A9:AA:Ca(2+) binds NOX2 complex ↗

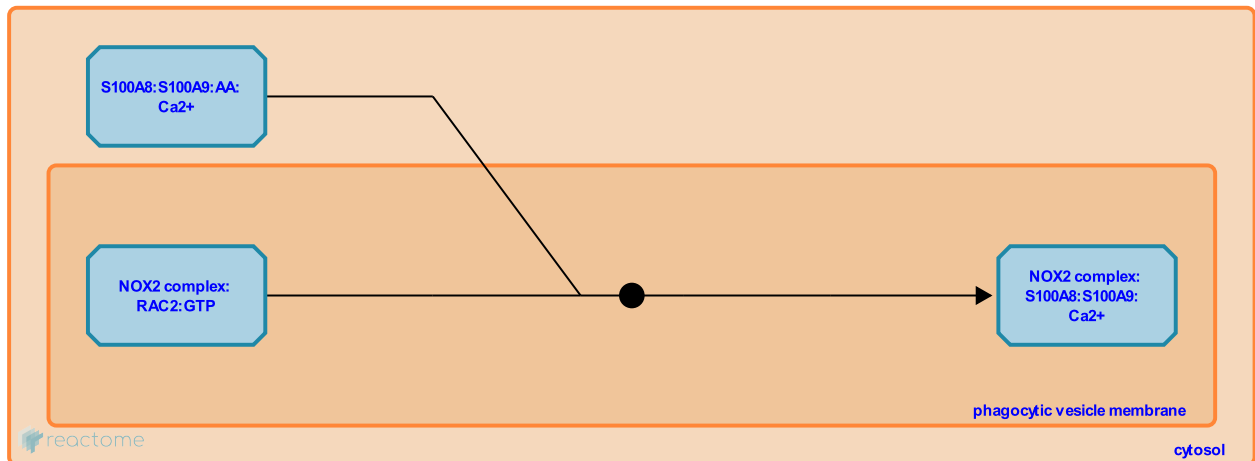
Location: [RHO GTPases Activate NADPH Oxidases](#)

Stable identifier: R-SSC-9626848

Type: binding

Compartments: phagocytic vesicle membrane, cytosol

Inferred from: [S100A8:S100A9:AA:Ca\(2+\) binds NOX2 complex \(Homo sapiens\)](#)



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: [RAC2:GTP binds NOX2 complex](#)

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