



## 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

Fabregat, A., Sidiropoulos, K., Viteri, G., Forner, O., Marin-Garcia, P., Arnau, V. et al. (2017). Reactome pathway analysis: a high-performance in-memory approach. *BMC bioinformatics*, 18, 142. [↗](#)

Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics*, 33, 3461-3467. [↗](#)

Fabregat, A., Jupe, S., Matthews, L., Sidiropoulos, K., Gillespie, M., Garapati, P. et al. (2018). The Reactome Pathway Knowledgebase. *Nucleic Acids Res*, 46, D649-D655. [↗](#)

Fabregat, A., Korninger, F., Viteri, G., Sidiropoulos, K., Marin-Garcia, P., Ping, P. et al. (2018). Reactome graph database: Efficient access to complex pathway data. *PLoS computational biology*, 14, e1005968. [↗](#)

Reactome database release: 88

This document contains 1 pathway and 4 reactions ([see Table of Contents](#))



## Phosphorylation of AXN and APC by DCO ↗

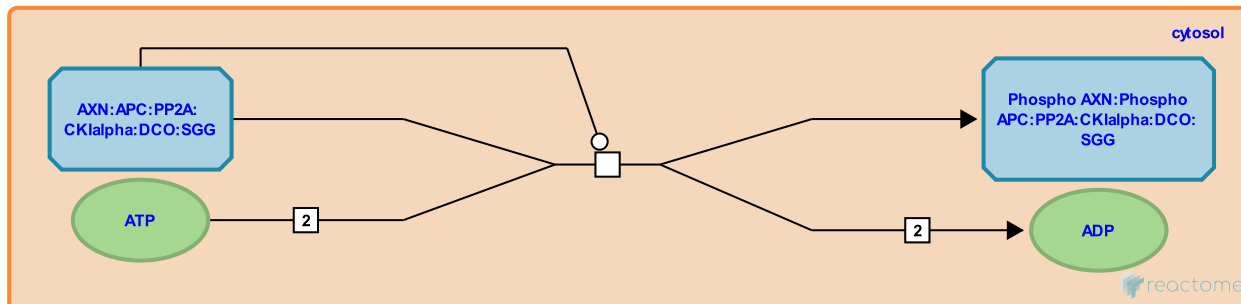
**Location:** [Phosphorylation of AXN and APC](#)

**Stable identifier:** R-DME-209143

**Type:** transition

**Compartments:** cytosol

**Inferred from:** [Human APC is initially phosphorylated by Murine CKIepsilon \(Homo sapiens\)](#)



Axin (AXN) and APC (APC/APC2) in the 'destruction complex' are primed for phosphorylation by the CKIepsilon orthologue DCO. Ser1505 in Human APC and Ser531 in Human Axin (equivalent to Ser621 in Mouse and Ser529 in Fly) are phosphorylated.

**Followed by:** [Phosphorylation of AXN and APC by SGG](#)

### Editions

2006-07-26	Authored	Williams, MG.
2008-01-19	Reviewed	Nusse, R.
2014-05-20	Edited	Williams, MG.

## Phosphorylation of AXN and APC by SGG ↗

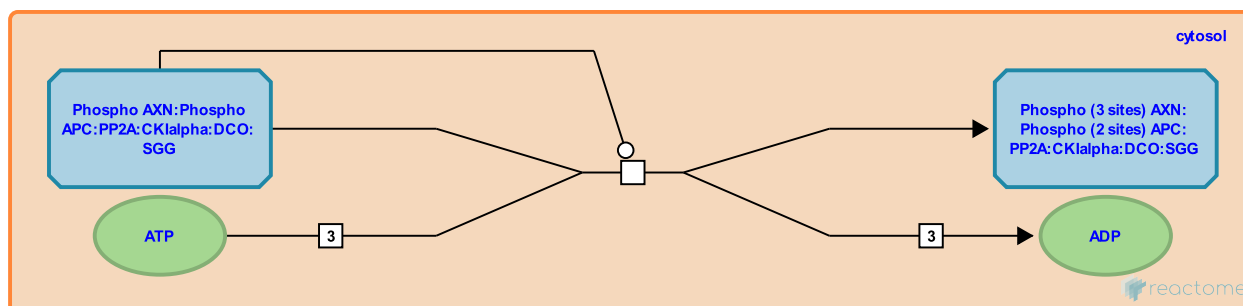
**Location:** [Phosphorylation of AXN and APC](#)

**Stable identifier:** R-DME-209049

**Type:** transition

**Compartments:** cytosol

**Inferred from:** [Murine Axin1 is further phosphorylated by Human GSK3beta \(Mus musculus\)](#), [Human APC is further phosphorylated by Murine GSK3beta \(Homo sapiens\)](#)



Additional phosphorylation of the scaffolding molecules, Axin (AXN) and APC (APC/APC2), is carried out by the GSK3beta kinase orthologue Shaggy (SGG) with Ser1501 (also a priming phosphorylation) in Human APC and Ser614 and Thr609 in Mouse Axin (equivalent to Ser522 and Thr517 respectively in Fly and Ser524 and Thr519 in Human).

**Preceded by:** [Phosphorylation of AXN and APC by DCO](#)

**Followed by:** [Further phosphorylation of APC by DCO](#)

### Editions

2006-07-26	Authored	Williams, MG.
2008-01-19	Reviewed	Nusse, R.
2014-05-20	Edited	Williams, MG.

## Further phosphorylation of APC by DCO ↗

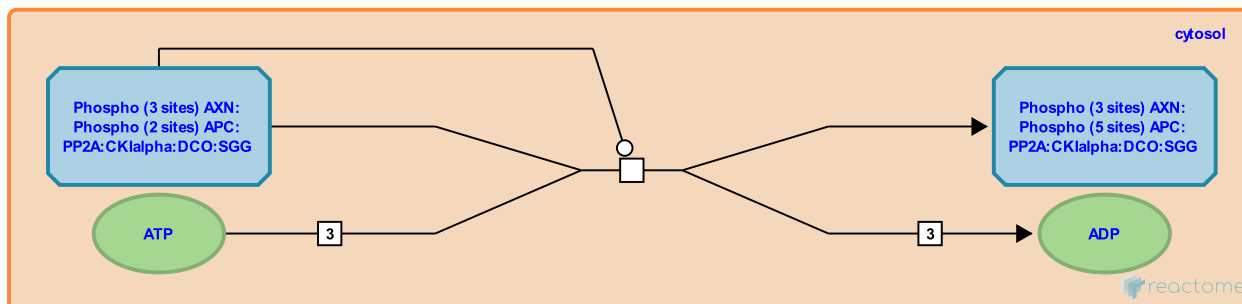
**Location:** [Phosphorylation of AXN and APC](#)

**Stable identifier:** R-DME-209107

**Type:** transition

**Compartments:** cytosol

**Inferred from:** [Human APC is further phosphorylated by Murine CKIepsilon \(Homo sapiens\)](#)



Three Serine residues in APC (APC/APC2) are further phosphorylated by DCO. Ser1504, Ser1507 (priming), and Ser1510 in Human APC are further phosphorylated by CKIepsilon.

**Preceded by:** [Phosphorylation of AXN and APC by SGG](#)

**Followed by:** [Further phosphorylation of APC by SGG](#)

### Editions

2006-07-26	Authored	Williams, MG.
2008-01-19	Reviewed	Nusse, R.
2014-05-20	Edited	Williams, MG.

## Further phosphorylation of APC by SGG ↗

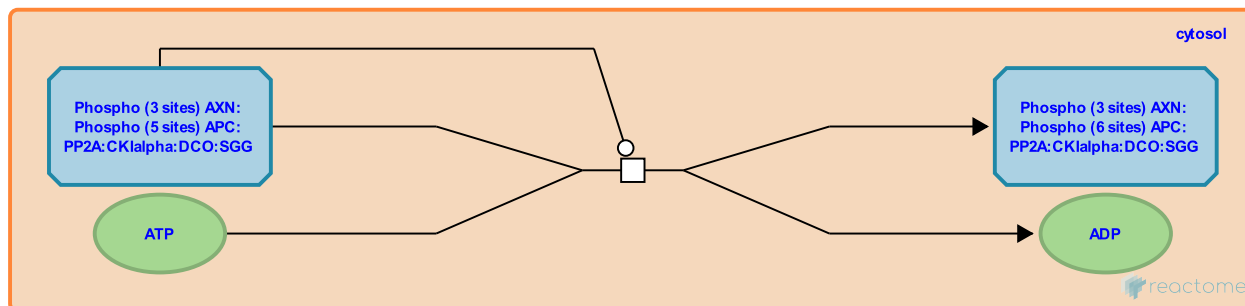
**Location:** [Phosphorylation of AXN and APC](#)

**Stable identifier:** R-DME-209082

**Type:** transition

**Compartments:** cytosol

**Inferred from:** [Human APC is finally phosphorylated by Murine GSK3beta \(Homo sapiens\)](#)



A Serine in APC (APC/APC2) is further phosphorylated by Shaggy (SGG). Ser1503 in Human APC is phosphorylated by GSK3beta.

**Preceded by:** [Further phosphorylation of APC by DCO](#)

## Editions

2006-07-26	Authored	Williams, MG.
2008-01-19	Reviewed	Nusse, R.
2014-05-20	Edited	Williams, MG.

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