SHC1 events in EGFR signaling

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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.

13/11/2022
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.

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: 82

This document contains 1 pathway and 4 reactions (see Table of Contents)
SHC1 events in EGFR signaling

**Stable identifier:** R-HSA-180336

GRB2 can bind EGFR directly or through another SH2-containing protein, SHC1. This association leads to RAS activation.

**Literature references**


**Editions**

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SHC1 binds to the phosphorylated EGF receptor:ligand complex

Location: SHC1 events in EGFR signaling

Stable identifier: R-HSA-177925

Type: binding

Compartments: plasma membrane, extracellular region, cytosol

SHC1 (Src homology 2 domain-containing) transforming protein can bind to either phosphorylated tyrosine 1148 (p-Y1148) and/or tyrosine 1173 (p-Y1173) sites on the EGF receptor. The N-terminal phosphotyrosine binding domain (PBD) of SHC1, also known as the phosphotyrosine interaction (PI) domain, binds to phosphorylated p-Y1148 of EGFR, which is part of the NPXpY motif. The SH2 domain of SHC1 binds to p-Y1173 of EGFR (Batzer et al. 1995, Songyang et al. 1995, Sakaguchi et al. 1998).

Followed by: SHC1 phosphorylation by phosphorylated EGFR

Literature references


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SHC1 phosphorylation by phosphorylated EGFR

**Location:** SHC1 events in EGFR signaling

**Stable identifier:** R-HSA-177933

**Type:** transition

**Compartments:** plasma membrane, cytosol

Once bound to EGFR, SHC1 is phosphorylated on two tyrosines (Y349, Y350).

**Preceded by:** SHC1 binds to the phosphorylated EGF receptor:ligand complex

**Followed by:** GRB2:SOS1 binds to phosphorylated SHC1 in complex with EGFR

**Literature references**


**Editions**

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GRB2:SOS1 binds to phosphorylated SHC1 in complex with EGFR

**Location:** SHC1 events in EGFR signaling

**Stable identifier:** R-HSA-177936

**Type:** binding

**Compartments:** plasma membrane, cytosol

The tyrosine sites on SHC1 become possible binding sites for the GRB2:SOS1 complex.

**Preceded by:** SHC1 phosphorylation by phosphorylated EGFR

**Followed by:** SOS1-mediated nucleotide exchange of RAS (EGF:EGFR:SHC1:GRB2:SOS1)

**Literature references**


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Son of sevenless homolog 1 (SOS1) is the guanine nucleotide exchange factor (GEF) for rat sarcoma (RAS) protein. SOS1 activates RAS nucleotide exchange from the inactive form (bound to GDP) to an active form (bound to GTP).

**Preceded by:** GRB2:SOS1 binds to phosphorylated SHC1 in complex with EGFR

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