Gamma-carboxylation of protein precursors

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Introduction

Reactome is an 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: 72

This document contains 1 pathway and 9 reactions (see Table of Contents)
Gamma-carboxylation of a cluster of glutamate residues near the amino termini of thrombin, factor VII, factor IX, factor X, protein C, protein S, protein Z, and Gas 6 is required for these proteins to bind Ca++ and function efficiently in blood clotting. A single enzyme, vitamin K-dependent gamma-carboxylase, catalyzes the gamma-carboxylation of all eight proteins involved in clotting (Morris et al. 1995; Brenner et al. 1998; Spronk et al. 2000). In the carboxylation reaction, the enzyme binds its substrate protein via a sequence motif on the amino terminal side of the glutamate residues to be carboxylated (Furie et al. 1999), then processively carboxylates all glutamates in the cluster before releasing the substrate (Morris et al. 1995; Berkner 2000; Stenina et al. 2001). The reaction occurs in the endoplasmic reticulum (Bristol et al. 1996).

Literature references


## Editions

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GGCX gamma-carboxylates 3D-F9(29-461) (pro-factor IX)

**Location:** Gamma-carboxylation of protein precursors

**Stable identifier:** R-HSA-159803