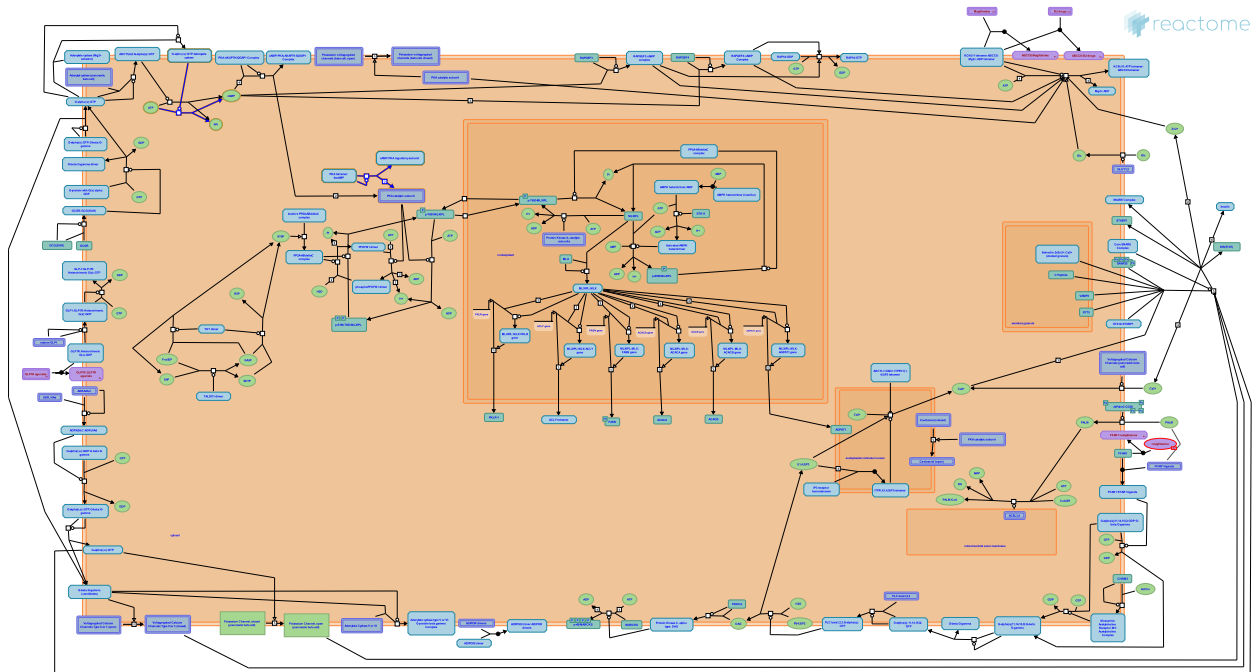


# PKA activation in glucagon signalling



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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/).

06/05/2024

## 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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- Sidiropoulos, K., Viteri, G., Sevilla, C., Jupe, S., Webber, M., Orlic-Milacic, M. et al. (2017). Reactome enhanced pathway visualization. *Bioinformatics*, 33, 3461-3467. [↗](#)
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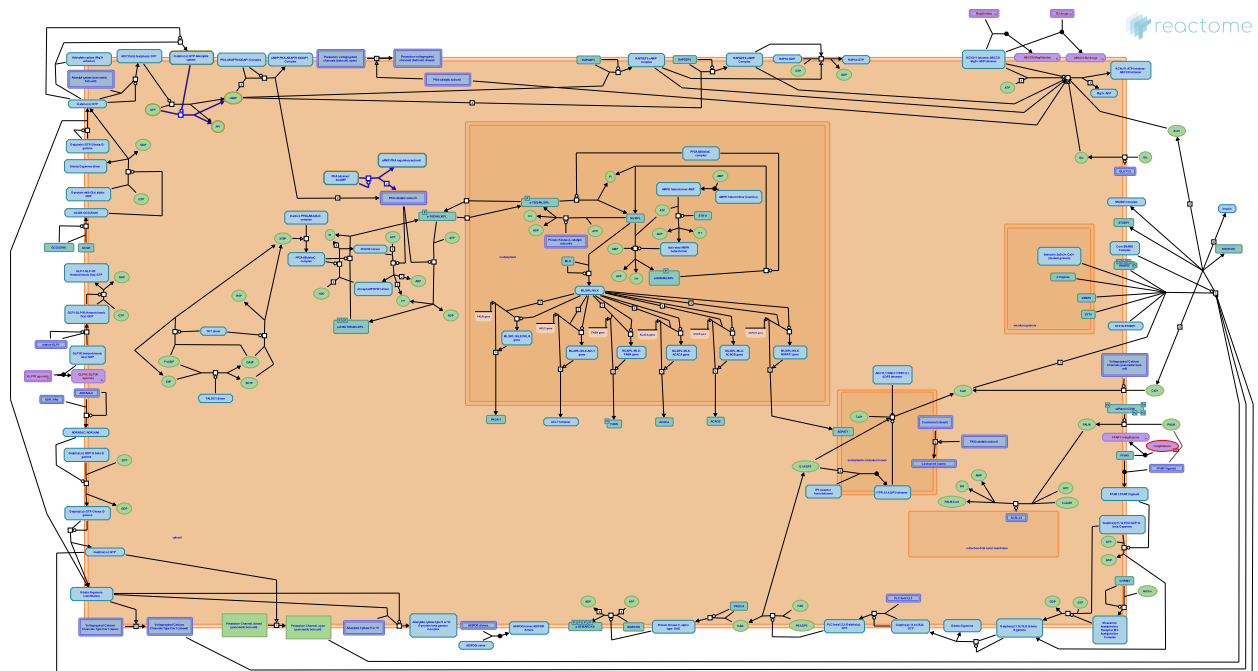
Reactome database release: 88

This document contains 1 pathway and 2 reactions ([see Table of Contents](#))

## PKA activation in glucagon signalling ↗

**Stable identifier:** R-HSA-164378

**Compartments:** plasma membrane



Adenylyl cyclase catalyses the synthesis of cyclic AMP (cAMP) from ATP. In the absence of cAMP, protein kinase A (PKA) exists as inactive tetramers of two catalytic subunits and two regulatory subunits. cAMP binding to PKA tetramers causes them to dissociate and release their catalytic subunits as active monomers. Four isoforms of the regulatory subunit are known, that differ in their tissue specificity and functional characteristics, but the specific isoform activated in response to glucagon signaling has not yet been identified.

### Editions

2005-05-19

Authored

Gopinathrao, G., D'Eustachio, P.

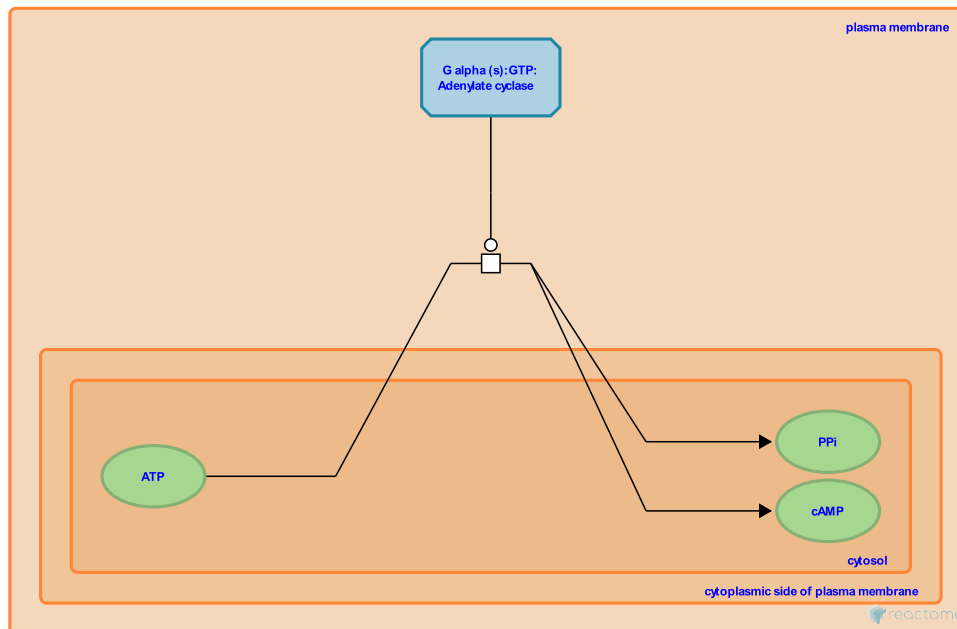
## Activated Adenylate cyclase catalyses cAMP synthesis ↗

**Location:** PKA activation in glucagon signalling

**Stable identifier:** R-HSA-164377

**Type:** transition

**Compartments:** plasma membrane, cytosol



Activated adenylate cyclase associated with the plasma membrane catalyzes the reaction of cytosolic ATP to form 3',5'-cyclicAMP and pyrophosphate (P<sub>PPi</sub>).

### Literature references

Martin, BR., Wong, SK., Farndale, RW. (1987). The role of G<sub>s</sub> in activation of adenylate cyclase. *Biochem. Soc. Trans.*, 15, 19-21. ↗

### Editions

2005-05-19	Authored	Gopinathrao, G.
2009-09-09	Edited	Jupe, S.

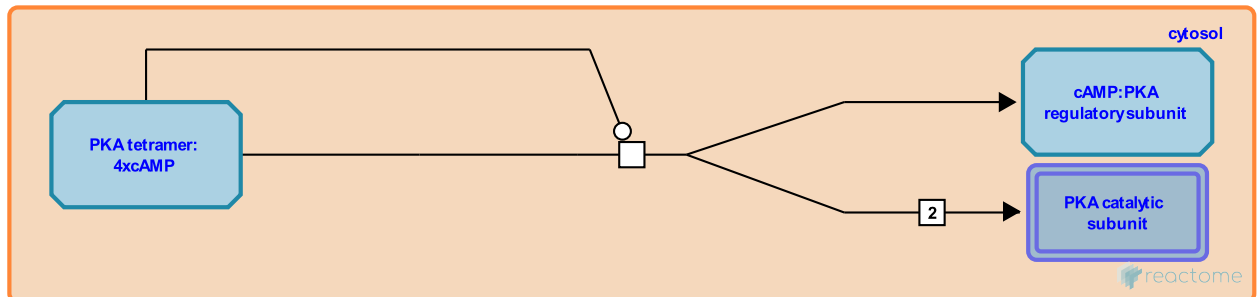
## cAMP induces dissociation of inactive PKA tetramers ↗

**Location:** [PKA activation in glucagon signalling](#)

**Stable identifier:** R-HSA-111925

**Type:** transition

**Compartments:** cytosol



The protein kinase A (PKA) regulatory subunit isoforms differ in their tissue specificity and functional characteristics. The specific isoform activated in response to glucagon signaling is not known. The PKA kinase is a tetramer of two regulatory and two catalytic subunits. The regulatory subunits block the catalytic subunits. Binding of cAMP to the regulatory subunit triggers dissociation of the tetramer into two active dimers made up of a regulatory and a catalytic subunit.

### Literature references

Kim, C., Taylor, SS., McCammon, JA., Gullingsrud, J. (2006). Dynamic binding of PKA regulatory subunit RI alpha. *Structure*, 14, 141-9. ↗

### Editions

2004-03-31	Authored	Jassal, B., Le Novere, N.
2008-11-06	Reviewed	Castagnoli, L.
2008-11-06	Edited	Jassal, B.
2018-11-02	Reviewed	Hansen, KB., Yi, F.
2018-11-07	Edited	Orlic-Milacic, M.
2024-01-29	Reviewed	D'Eustachio, P.

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