

Adenylyl cyclases (ACs) in GtoPdb v.2025.3

Carmen W. Dessauer¹, Rennolds Ostrom², Roland Seifert³ and Val J. Watts⁴

1. University of Texas Health Science Center, USA
2. Chapman University, USA
3. Medical School of Hannover, Germany
4. Purdue University, USA

Abstract

Adenylyl cyclase, **E.C. 4.6.1.1**, converts **ATP** to **cyclic AMP** and pyrophosphate. Mammalian membrane-delimited adenylyl cyclases (**nomenclature as approved by the NC-IUPHAR Subcommittee on Adenylyl cyclases** [11]) are typically made up of two clusters of six TM domains separating two intracellular, overlapping catalytic domains that are the target for the nonselective activators $G\alpha_s$ (the stimulatory G protein α subunit) and **forskolin** (except AC9, [29]). **adenosine** and its derivatives (*e.g.* **2',5'-dideoxyadenosine**), acting through the P-site, are inhibitors of adenylyl cyclase activity [36]. Four families of membranous adenylyl cyclase are distinguishable: **calmodulin-stimulated** (AC1, AC3 and AC8), Ca^{2+} - and $G\beta\gamma$ -inhibitable (AC5, AC6 and AC9), $G\beta\gamma$ -stimulated and Ca^{2+} -insensitive (AC2, AC4 and AC7), and forskolin-insensitive (AC9) forms. A soluble adenylyl cyclase (AC10) lacks membrane spanning regions and is insensitive to G proteins. It functions as a cytoplasmic bicarbonate (pH-insensitive) sensor [7].

Contents

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Please note that the database version for the citations given in GtoPdb are to the most recent preceding version in which the family or its subfamilies and targets were substantially changed. The links below are to the current version. If you need to consult the cited version, rather than the most recent version, please contact the GtoPdb curators.

Database links

Adenylyl cyclases (ACs)

<https://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=257>

Enzymes

AC1(adenylyl cyclase 1)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1278>

AC2(adenylyl cyclase 2)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1279>

AC3(adenylyl cyclase 3)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1280>

AC4(adenylyl cyclase 4)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1281>

AC5(adenylyl cyclase 5)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1282>

AC6(adenylyl cyclase 6)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1283>

AC7(adenylyl cyclase 7)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1284>

AC8(adenylyl cyclase 8)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1285>

AC9(adenylyl cyclase 9)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1286>

AC10(adenylyl cyclase 10)

<https://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=3068>

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