

## Adenylyl cyclases (ACs) in GtoPdb v.2023.1

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### 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  $\alpha$  subunit) and **forskolin** (except AC9, [28]). **adenosine** and its derivatives (*e.g.* **2',5'-dideoxyadenosine**), acting through the P-site, are inhibitors of adenylyl cyclase activity [35]. 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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### 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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