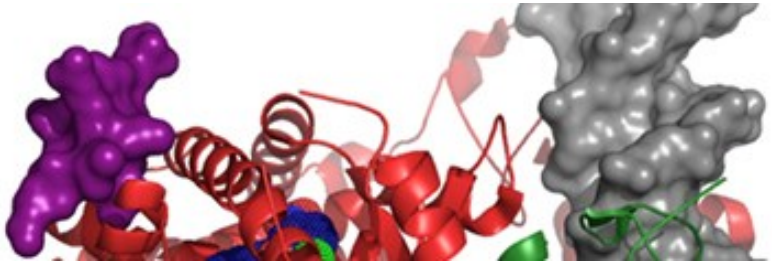


IUPHAR/BPS
Guide to PHARMACOLOGY

Tutorial

Contents

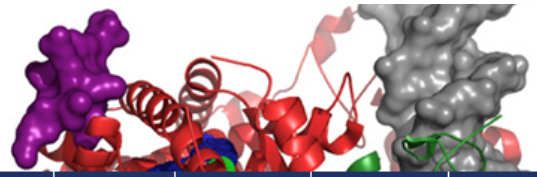
See the **About** pages for more information on the IUPHAR/BPS Guide to PHARMACOLOGY database, the Concise Guide to PHARMACOLOGY and the IUPHAR database

A PDF outlining pharmacological terms and symbols used on the Guide to PHARMACOLOGY can be found at **http://www.guidetopharmacology.org/pdfs/termsAndSymbols.pdf**

For definitions of terms used in this document and on the Guide to PHARMACOLOGY go to the **Glossary** at the end of this document.

Email **enquiries@guidetopharmacology.org** *with comments/queries/suggestions about the* **Guide to PHARMACOLOGY**

Home page



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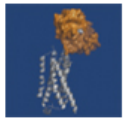
Guide to PHARMACOLOGY

Search database

Home | About | Targets | Ligands | Resources | Advanced search

An expert-driven guide to pharmacological targets and the substances that act on them.

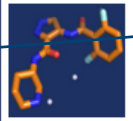
Targets



- G protein-coupled receptors
- Ion channels
- Nuclear hormone receptors
- Kinases
- Catalytic receptors
- Transporters
- Enzymes
- Other protein targets

Search for targets GO

Ligands



- Approved drugs
- Synthetic organics
- Metabolites
- Natural products
- Endogenous peptides
- Other peptides
- Inorganics
- Antibodies
- Labelled ligands

Search for ligands GO

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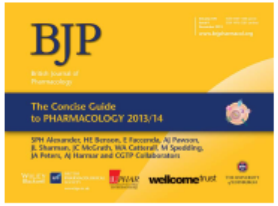

A publication snapshot created from the database summary pages.

Access the table of contents GO

IUPHAR Database

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The IUPHAR/BPS Guide to PHARMACOLOGY builds upon and replaces the original IUPHAR Committee on Receptor Nomenclature and Drug Classification Database (IUPHAR-DB)

What's new to Guide to PHARMACOLOGY

New version (2014.3) released 5th Nov 2014!

Target updates:

- GPCR updates include:
  - Class Frizzled GPCRs
  - Lysophospholipid (LPA) receptors
  - Lysophospholipid (S1P) receptors
  - Melanin-concentrating hormone receptors
  - Melatonin receptors
  - Neuropeptide FF/neuropeptide AF receptors
- VGIC updates include:
  - Inwardly rectifying potassium channels
  - Voltage-gated calcium channels
  - Two-P potassium channels
  - Voltage-gated potassium channels
  - Voltage-gated sodium channels
- Enzyme updates include curation of phase III kinase inhibitors and ~20 protease clinical candidates or lead compounds, e.g. BACE1

Ligand updates:

- NCATS and AstraZeneca repurposing compounds

Latest News

From our blog

A Pharmacologist's Guide to Entity Resolution
by guidetopharmacology - 21 hours ago
This is an introduction to resolving ligands and their protein targets from the literature to standardised identifiers, in ...

New content and features: November 2014 update
by guidetopharmacology - Nov 07, 2014
The latest database version (2014.3) was released on 5th November and includes many content updates and new website ...

Latest news from NC-IUPHAR

Publications: Two new IUPHAR reviews, one on Dopamine
Nov 05, 2014
An IUPHAR review article with recommendations for nomenclature of receptor allosterism and allosteric ligands has been ...

Publication: IUPHAR review on endothelin receptors.
Aug 19, 2014
A new IUPHAR review article on endothelin receptors is published online in the British Journal of Pharmacology.

Perform a '**quick search**' using the search box at the top of the page

Navigate to explore our **target** and **ligand** pages

Sign up for **email updates**

The Guide to PHARMACOLOGY provides a portal to information included in the Concise Guide to PHARMACOLOGY (formerly Guide to Receptors and Channels (GRAC) 5th Edition) and our original website, the IUPHAR Database.

Summaries of what's new on the Guide to PHARMACOLOGY, and the latest news from NC-IUPHAR and the Guide to PHARMACOLOGY team.

Home page continued

► New file formats added to the download page

Hot topics in pharmacology GO
Recent receptor-ligand pairings GO
NC-IUPHAR newsletter GO
Get email updates GO

WCP2014

Join us in South Africa for WCP2014

A number of plenary lectures and symposia will given by NC-IUPHAR members and affiliates

More information available here GO

Resources

Learn how to use the Guide to PHARMACOLOGY

- About the Guide to PHARMACOLOGY
- Help documentation
- Download tutorial

Nomenclature guidelines

- NC-IUPHAR nomenclature guidelines
- Terms and symbols in pharmacology

Download data

- Download data in various formats
- Lists of drugs and targets

Recent Publications

IUPHAR review article on lysophospholipid receptor nomenclature.

Kihara Y, Maceyka M, Spiegel S, *et al.* (2014) *Br J Pharmacol.* doi: 10.1111/bph.12678 [Epub ahead of print] GO

IUPHAR review article on leukotriene, lipoxin and oxoeicosanoid receptors.

Bäck M, Powell WS, Dahlén SE, *et al.* (2014) *Br J Pharmacol.* doi: 10.1111/bph.12665 [Epub ahead of print] GO

IUPHAR review article on somatostatin receptor signaling.

Schulz S, Lehmann A, Kliewer A, *et al.* (2014) *Br J Pharmacol.* **171**: 1591-9. GO

IUPHAR review article updating chemokine receptors and introducing a new nomenclature for atypical chemokine receptors.

Bachelerie F, Ben-Baruch A, Burkhardt AM, *et al.* (2014). *Pharmacol Rev.* **66**: 1-79. GO

FULL LIST...

Recent Twitter activity

Tweets Follow

BrPharmacologicalSoc 28 Apr
@BritPharmSoc
Join our mixer tonight to celebrate our publications, including @BrJPharmacol @BritJClinPharm @GuidetoPHARM #EB2014
pic.twitter.com/N9JqRv4OQL

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Guide to PHARMACOLOGY
#Ligandoftheweek: AZD1283 (http://ow.ly/weaQv). Antagonist of, & recently shown in complex with

News of recent **events**

Links to **Hot topics** in pharmacology and our list of **recent receptor-ligand parings**

Links to **recent publications** from NC-IUPHAR

Links to **resources** to help users get the most out of the site

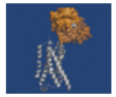
Follow our **social media** accounts for updates

Target menu page

Home | About | Targets | Ligands | Resources | Advanced search

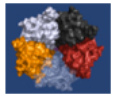
Home ▸ Targets

G protein-coupled receptors (GPCRs)



- Browse GPCR families and access overviews, key references and selective ligands
- Follow the links for longer introductions and for detailed annotation on pharmacology, function, structure, physiology and clinical relevance of each receptor
- View the list of GPCR families GO

Ion channels



Including:

- Ligand-gated ion channels (LGICs)
- Voltage-gated ion channels (VGICs)
- Other ion channels

- Browse ion channel families and access overviews, key references and selective ligands
- Follow the links for longer introductions and for detailed annotation on pharmacology, function, structure, physiology and clinical relevance of each channel or subunit
- View the list of ion channel families GO

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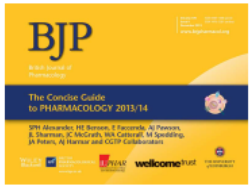
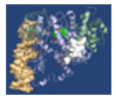


A publication snapshot created from the database summary pages.

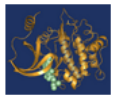
Access the table of contents GO

Nuclear hormone receptors (NHRs)



- Browse NHR families and access overviews, key references and selective ligands
- Follow the links for detailed annotation on pharmacology, function, structure, physiology and clinical relevance of each receptor
- View the list of NHR families GO

Kinases



- Browse kinase subfamilies and access large-scale inhibitor screening data.
- Access detailed clinical information for approved drug kinase inhibitors.
- View the list of kinase families GO

IUPHAR Database

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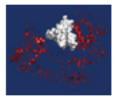
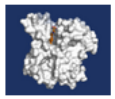
Catalytic receptors



- Browse catalytic receptor families and access overviews, key references and selective ligands
- Additional data are provided for selected receptor kinases
- View the list of catalytic receptor families GO

Transporters

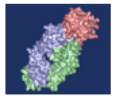


- Browse transporter families and access overviews, key references and selective ligands
- View the list of transporter families GO

Enzymes

- Browse a subset of enzymes with pharmacological relevance and access overviews, key references and selective ligands
- Additional data are provided for protein kinases
- View the list of enzyme families GO

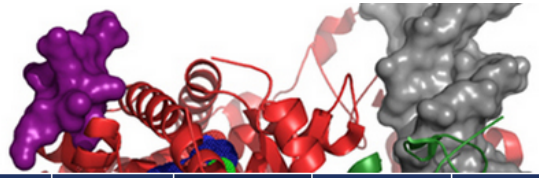
Other protein targets



- Browse other types of protein targets with pharmacological relevance and access overviews, key references and selective ligands
- View the list of other protein target families GO

- The **target menu page** can be reached from the top menu bar on the site.
- A breadcrumbs trail bar tracks the user's navigation from the homepage

There are separate navigation panels for each class of target. Follow the links to navigate to the full list of target families within each class.



IUPHAR/BPS
Guide to PHARMACOLOGY

Search database

Home | About | Targets | Ligands | Resources | Advanced search

Home ▸ Targets ▸ G protein-coupled receptors

G protein-coupled receptors

View a list of class A GPCRs, class B GPCRs, class C GPCRs, class frizzled GPCRs, adhesion class GPCRs or other 7TM proteins

Expand all nodes | Collapse all nodes

- G protein-coupled receptors OVERVIEW
  - Orphan and other 7TM receptors OVERVIEW
    - Class A Orphans
    - Class B Orphans
    - Class C Orphans
    - Taste 1 receptors
    - Taste 2 receptors
    - Other 7TM proteins
  - 5-Hydroxytryptamine receptors
  - Acetylcholine receptors (muscarinic)
  - Adenosine receptors
  - Adhesion Class GPCRs
  - Adrenoceptors
  - Angiotensin receptors
  - Apelin receptor
  - Bile acid receptor
  - Bombesin receptors
  - Bradykinin receptors
  - Calcitonin receptors
  - Calcium-sensing receptors
  - Cannabinoid receptors
  - Chemerin receptor
  - Chemokine receptors
  - Cholecystokinin receptors
  - Class Frizzled GPCRs
  - Complement peptide receptors
  - Corticotropin-releasing factor receptors
  - Dopamine receptors
  - Endothelin receptors
  - Estrogen (G protein-coupled) receptor
  - Formylpeptide receptors
  - Free fatty acid receptors
  - $GABA_B$ receptors
  - Galanin receptors
  - Ghrelin receptor
  - Glucagon receptor family

List of target families:

G protein-coupled receptors

GPCRs can be viewed in lists by **class**

Overview s are available for target classes

Each of the receptor families listed links to a **concise overview page** for the receptor family

Target family page: concise view

Overview: Brief introduction to the receptor family. For more detailed information click on the 'more detailed introduction' link.

NC-IUPHAR review article on receptor nomenclature- NC-IUPHAR reviews shown in bold in receptor family overviews

Links to **HGNC and UniProt**

Links to **ligand pages**

Links to **reference list**

Receptor list: Click to 'Show/Hide' data for each receptor

Comments: Click to 'Show/Hide' further information on the receptors listed in the table

Further reading: Click to 'Show/Hide' additional key papers on the receptor family

Reference list: Click to 'Show/Hide' a complete list of all references cited on the receptor family pages

NC-IUPHAR subcommittee and list of other **contributors** for the family

Receptor page: GHRH receptor, concise view

For a definition of nomenclature, see the **glossary** on our help pages

Unique **target Id** displayed at the top of each entry

Links to human, mouse and rat **genome databases**

Link to **detailed** receptor page view

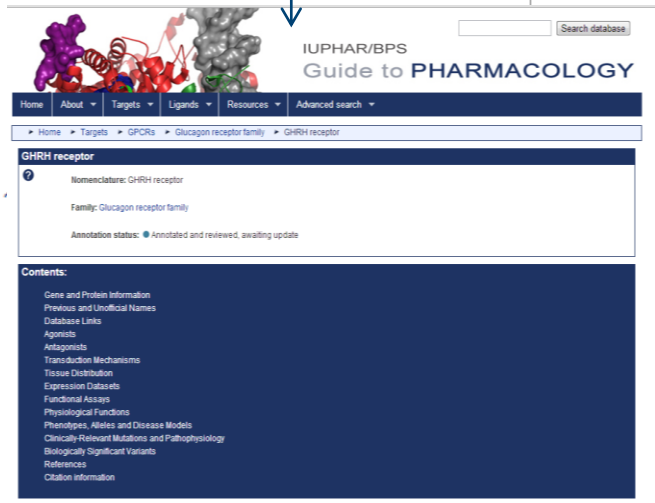
Links to **ensembl.org** and **UniProt**

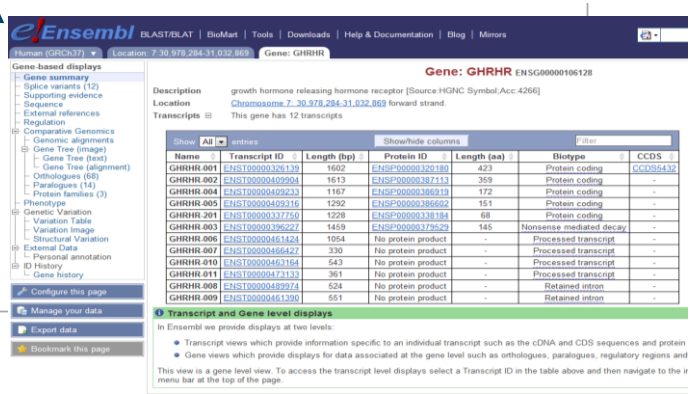
Receptors

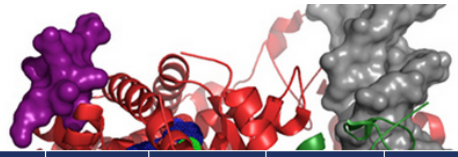
GHRH receptor « Hide summary

More detailed page GO

Target Id	247
Nomenclature	**GHRH receptor**
Previous and unofficial names	GRF receptor, GRFR, growth hormone-releasing factor receptor, Ghrfr,
Genes	*GHRHR* (Hs), *Ghrhr* (Mm), *Ghrhr* (Rn)
Ensembl ID	ENSG00000106128 (Hs), ENSMUSG00000004654 (Mm), ENSRNOG0000001
UniProtKB AC	Q02643 (Hs), P32082 (Mm), Q02644 (Rn)
Principal transduction	G_s
Selective agonists	tesamorelin JI-38 [11] - Rat BIM28011 [5] sermorelin
Selective antagonists	JV-1-36 pK_i 10.1 – 10.4 [20,26-27] - Rat JV-1-38 pK_i 10.1 [20,26-27] - Rat
Labelled ligands	[^{125}I]GHRH (human) (Agonist, Full agonist) K_d 2.8x10^{-8} M [1] - Rat







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Home ▸ Targets ▸ GPCRs ▸ Glucagon receptor family ▸ GHRH receptor

GHRH receptor

Target id: 247

Nomenclature: GHRH receptor

Family: Glucagon receptor family

Annotation status: Annotated and reviewed, aw

GHRH Receptor: **Detailed** view content

Includes more **extensive lists of agonists & antagonists**, **gene and protein information**, **functional assays** and **tissue distribution** information

Contents:

Gene and Protein Information

class B G protein-coupled receptor

Species	TM	AA	Chromosomal Location	Gene Symbol	Gene Name
Human	7	423	7p14	*GHRHR*	growth hormone releasing hormone receptor

Primary Transduction Mechanisms

Transducer	Effector/Response
G_s family	Adenylate cyclase stimulation Calcium channel

References: 14

Tissue Distribution

Pituitary.

Species: Rat
Technique: Northern blotting.
References: 9

Functional Assays

Measurement of cAMP in COS cells transfected with the human GHRH receptor.

Species: Human
Tissue: Transient transfected COS cells.
Response measured: Stimulation of intracellular cAMP accumulation.
References: 9

Measuring the changes in membrane potential of GH-secreting adenoma cells upon receptor activation.

Species: Human
Tissue: GH-secreting adenoma cells.
Response measured: Increase in Na^{2+} conductance.
References: 23

Natural/Endogenous Ligand(s)

GHRH {Sp: Human} , GHRH {Sp: Mouse} , GHRH {Sp: Rat}

Agonists

Key to terms and symbols — Click column headers to sort

Ligand	Sp.	Action	Affinity	Units	Reference
[^{125}I]GHRH (human)	Rn	Full agonist	7.6	pK_d	5
GHRH-(1-29)-NH_2 (rat)	Rn	Full agonist	9.1	pIC_{50}	8
GHRH-(1-29)-NH_2 (human)	Rn	Full agonist	8.2	pIC_{50}	8
GHRH-(1-29)-OH (human)	Rn	Full agonist	8.0	pIC_{50}	8

Antagonists

Key to terms and symbols — Click column headers to sort

Ligand	Sp.	Action	Affinity	Units	Reference
JV-1-37	Rn	Antagonist	10.4	pK_i	25
JV-1-40	Rn	Antagonist	10.4	pK_i	25
JV-1-41	Rn	Antagonist	10.4	pK_i	25
JV-1-42	Rn	Antagonist	10.4	pK_i	25
JV-1-43	Rn	Antagonist	10.4	pK_i	25
MZ-4-169	Rn	Antagonist	10.4	pK_i	28
MZ-4-243	Rn	Antagonist	10.4	pK_i	28
JV-1-10	Rn	Antagonist	10.3	pK_i	25
MZ-4-181	Rn	Antagonist	10.3	pK_i	28
JV-1-36	Rn	Antagonist	10.1 – 10.4	pK_i	22,25-26
JV-1-62	Rn	Antagonist	10.2	pK_i	26
JV-1-63	Rn	Antagonist	10.2	pK_i	26
MZ-5-156	Rn	Antagonist	10.2	pK_i	27
MZ-6-55	Rn	Antagonist	10.2	pK_i	25
JV-1-38	Rn	Antagonist	10.1	pK_i	22,25-26
JV-1-39	Rn	Antagonist	10.1	pK_i	25
MZ-4-71	Rn	Antagonist	9.9	pK_i	27-28
[Ac-Tyr^1, D-Arg^2]GHRH-(1-29)-NH_2 (human)	Rn	Antagonist	8.3 – 8.5	pK_i	25-28
MZ-5-192	Rn	Antagonist	10.2	pIC_{50}	27
MZ-5-78	Rn	Antagonist	10.2	pIC_{50}	27

Receptor page: 5-HT$_{1D}$ receptor

5-HT$_{1D}$ receptor « Hide summary

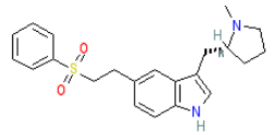
All data listed in the receptor tables refers to the **human** protein unless otherwise stated (see example below)

Target Id	3
Nomenclature	**5-HT$_{1D}$ receptor**
Previous and unofficial names	5-HT$_{1Dα}$ [137], HTRL, 5-HT1D, HT1DA, serotonin recepto
Genes	*HTR1D* (Hs), *Htr1d* (Mm), *Htr1d* (Rn)
Ensembl ID	ENSG00000179546 (Hs), ENSMUSG00000070687 (Mm),
UniProtKB AC	P28221 (Hs), Q61224 (Mm), P28565 (Rn)
Principal transduction	$G_{i/o}$
Selective agonists	dihydroergotamine pK_i 9.2 – 9.9 [48,75-76]
	ergotamine pK_i 9.1 [44]
	PNU109291 pK_i 9.1 [36] - Gorilla
	L-694,247 pK_i 9.0 [139]
	zolmitriptan pK_i 8.9 [92]
	eletriptan pK_i 8.9 [92]
	naratriptan pK_i 8.4 – 9.0 [33,92,111]
	frovatriptan pK_i 8.36 [141]
	sumatriptan pK_i 8.0 – 8.7 [48,76,91-92,137]
	rizatriptan pK_i 7.9 [92]
Selective antagonists	SB 714786 pK_i 9.1 [136]
	BRL-15572 pK_i 7.9 [107]
	risperidone pK_i 7.8 – 8.0 [76,117]
Labelled ligands	[^{3}H]eletriptan (Agonist, Full agonist) K_d 9x10^{-10} M [92]

Ligand tested at gorilla receptor

Ligand Id: 40	
Ligand name	**eletriptan**

2D Structure



Calculated Physico-chemical Properties

Hydrogen bond acceptors	4
Hydrogen bond donors	1
Rotatable bonds	6
Topological polar surface area	61.55
Molecular weight	382.17
XLogP	4.61
No. Lipinski's rules broken	0

Molecular properties generated using the CDK

Summary | Biological activity | Clinical data | References | Structure | Similar ligands | (Un)labelled forms

Classification

Compound class	Synthetic organic
Approved drug?	Yes (source: FDA (2002))

IUPAC Name

3-[[(2R)-1-methylpyrrolidin-2-yl]methyl]-5-(2-phenylsulfonylethyl)-1H-indole

International Nonproprietary Names

INN number	INN
7426	eletriptan

Synonyms

Relpax®

UK 116044

Database Links

CAS Registry No.	143322-58-1 (source: Scifinder)
ChEBI	CHEBI:50922

Click on ligand name to display the **ligand page**

Activity data, with link to reference

IUPHAR/BPS Guide to PHARMACOLOGY

Search database

Home | About | Targets | Ligands | Resources | Advanced search

Home ▸ Targets ▸ Ion channels

Ion channels

View a list of voltage-gated ion channels, ligand-gated ion channels or other ion channels

Expand all nodes | Collapse all nodes

- **Ion channels** OVERVIEW
  - Voltage-gated ion channels OVERVIEW
    - CatSper and Two-Pore channels
    - Cyclic nucleotide-regulated channels
    - Potassium channels OVERVIEW
    - Transient Receptor Potential channels
    - Voltage-gated calcium channels
    - Voltage-gated proton channel
    - Voltage-gated sodium channels
  - Ligand-gated ion channels OVERVIEW
    - 5-HT_3 receptors
    - Acid-sensing (proton-gated) ion channels (ASICs)
    - Epithelial sodium channels (ENaC)
    - $GABA_A$ receptors
    - Glycine receptors
    - Ionotropic glutamate receptors
    - IP_3 receptor
    - Nicotinic acetylcholine receptors
    - P2X receptors
    - Ryanodine receptor
    - ZAC
  - Other ion channels
    - Aquaporins
    - Chloride channels OVERVIEW
    - Connexins and Pannexins
    - Sodium leak channel, non-selective

Ion channel families are grouped according to **gating regulator**
Click on the ion channel family name to view the channel page

Ion Channel family list

IP_3 receptor

Unless otherwise stated all data on this page refer to the human proteins. Gene information is provided for human (Hs), mouse (Mm) and rat (Rn).

Overview

« Hide

The inositol 1,4,5-trisphosphate receptors (IP_3R) are ligand-gated Ca^{2+}-release channels on intracellular Ca2+ store sites (such as the endoplasmic reticulum). They are responsible for the mobilization of intracellular Ca^{2+} stores and play an important role in intracellular Ca^{2+} signalling in a wide variety of cell types. Three different gene products (types I–III) have been isolated, which assemble as large tetrameric structures. IP_3Rs are closely associated with certain proteins: calmodulin (*CALM2*, *CALM3*, *CALM1*, P62158) and FKBP (and calcineurin via FKBP). They are phosphorylated by PKA, PKC, PKG and CaMKII.

Subunits

IP_3R1 « Hide summary

Target Id	743
Nomenclature	**IP_3R1**
Previous and unofficial names	INSP3R1, IP3R1, SCA15, SCA16, spinocerebellar ataxia 15, spinocerebellar ataxia 16, I145TR, inositol 1,4,5-triphosphate receptor 1, InsP3R, IP3 receptor, InsP3R type I, Ip3r, Itpr-1, opt, Pcp1
Genes	*ITPR1* (Hs), *Itpr1* (Mm), *Itpr1* (Rn)
Ensembl ID	ENSG00000150995 (Hs), ENSMUSG00000030102 (Mm), ENSRNOG00000007104 (Rn)
UniProtKB AC	Q14643 (Hs), P11881 (Mm), P29994 (Rn)
Endogenous activators	cytosolic Ca^{2+} Concentration range: < $7.5x10^{-4}$ M cytosolic ATP (< mM range) IP_3 (endogenous; nM - µM range)
Activators	inositol 2,4,5-trisphosphate (pharmacological; also activated by other $InsP_3$ analogues) adenophostin A (pharmacological; nM range)
Endogenous antagonists	heparin (µg/ml)
Antagonists	caffeine (mM range) decavanadate (µM range) PIP_2 (µM range) xestospongin C (µM range)
Functional characteristics	Ca^{2+}: (P_{Ba}/P_K ~6) single-channel conductance ~70 pS (50 mM Ca^{2+})
Comment	IP_3 R1 is also antagonised by calmodulin at high cytosolic Ca^{2+} concentrations

Ion channel page:

IP_3R1 receptor, IP_3 receptor family

Complete **synonym** lists provided for targets

See the **glossary** on the help page for definitions of ligand types *e.g.* activator, antagonist.

Functional characteristics: Provides details of the conductance, voltage-dependence, rectification and selectivity properties of ion channels

Comment: additional information on ligand activity at IP_3R1

IUPHAR/BPS
Guide to PHARMACOLOGY

Search database

Home | About | Targets | Ligands | Resources | Advanced search

Home ▸ Targets ▸ Nuclear hormone receptors ▸ 1B. Retinoic acid receptors

1B. Retinoic acid receptors

Unless otherwise stated all data on this page refer to the human proteins. Gene information is provided for human (Hs), mouse (Mm) and rat (Rn).

Overview

« Hide

More detailed introduction GO

Retinoic acid receptors **(nomenclature as agreed by NC-IUPHAR Committee on Nuclear Receptors, [3])** are nuclear hormone receptors of the NR1B family activated by the vitamin A-derived agonists all-trans-retinoic acid (ATRA) and 9-cis-retinoic acid, and the RAR-selective synthetic agonists TTNPB and adapalene.

Receptors

Retinoic acid receptor-α / NR1B1 Show summary »	More detailed page GO
Retinoic acid receptor-β / NR1B2 Show summary »	More detailed page GO
Retinoic acid receptor-γ / NR1B3 Show summary »	More detailed page GO

Comments

Show »

Further reading

Show »

References

Show »

Nuclear receptors: Retinoic acid receptors

The nomenclature listed for many of our receptors includes the nomenclature approved by NC-IUPHAR, in addition to the systematic or abbreviated name for the receptor. In the case of nuclear hormone receptors, systematic nomenclature is listed. For definitions of these terms, see the glossary.

Catalytic receptor family page: interferon receptor family

Interferon receptor family

Unless otherwise stated all data on this page refer to the human proteins. Gene information is provided for human (Hs), mouse (Mm) and rat (Rn).

Overview

« Hide

The interferon receptor family includes receptors for type I (α, β κ and ω) and type II (γ) interferons. There are at least 13 different genesencoding IFN-&ALPHA; subunits in a cluster on human chromosome 9p22: α1 (*IFNA1*, P01562), α2 (*IFNA2*, P01563), α4 (*IFNA4*, P05014), α5 (*IFNA5*, P01569), α6 (*IFNA6*, P05013), α7 (*IFNA7*, P01567), α8 (*IFNA8*, P32881), α10 (*IFNA10*, P01566), α13 (*IFNA13*, P01562), α14 (*IFNA14*, P01570), α16 (*IFNA16*, P05015), α17 (*IFNA17*, P01571) and α21 (*IFNA21*, P01568).

Receptors

Interferon-α/β receptor Show summary »

Interferon-γ receptor « Hide summary

Target Id	1899
Nomenclature	**Interferon-γ receptor**
Previous and unofficial names	
Subunits	Interferon γ receptor 1 (Ligand-binding subunit) Interferon γ receptor 2 (Other subunit)
Endogenous agonists	IFN-γ (*IFNG*, P01579)

Subunits

interferon α/β receptor 1 Show summary »

Interferon α/β receptor 2 Show summary »

Interferon γ receptor 1 « Hide summary

Target Id	1725
Nomenclature	**Interferon γ receptor 1**
Previous and unofficial names	CD119, interferon gamma receptor, Ifgr, IFN-gammaR, Nktar,
Genes	*IFNGR1* (Hs), *Ifngr1* (Mm), *Ifngr1* (Rn)
Ensembl ID	ENSG00000027697 (Hs), ENSMUSG00000020009 (Mm), ENSRNOG00000012074 (Rn)
UniProtKB AC	P15260 (Hs), P15261 (Mm)

Interferon γ receptor 2 Show summary »

Many catalytic receptors are **homo- or heteromeric** structures consisting of subunits. In these cases, receptors and their subunit components are displayed in separate lists

Heteromeric receptors are linked to their subunits. The role of the subunit in the heteromeric receptor is specified where this is known

Endogenous agonists are listed and link to ligand pages. **HGNC** and **UniProt** links are also included here

Subunit entries include links to genome databases, Ensembl, and UniProt.

Transporters

Expand all nodes | Collapse all nodes

- **Transporters** OVERVIEW
  - ATP-binding cassette transporter family OVERVIEW
    - ABCA subfamily
    - ABCB subfamily
    - ABCC subfamily
    - ABCD subfamily of peroxisomal ABC transporters
    - ABCG subfamily
  - F-type and V-type ATPases OVERVIEW
    - F-type ATPase
    - V-type ATPase
  - P-type ATPases OVERVIEW
    - Na^+/K^+-ATPases
    - Ca^{2+}-ATPases
    - H^+/K^+-ATPases
    - Cu^+-ATPases
    - Phospholipid-transporting ATPases
  - Major facilitator superfamily (MFS) of transporters
  - SLC superfamily of solute carriers OVERVIEW
    - SLC1 family of amino acid transporters OVERVIEW
      - Glutamate transporter subfamily
      - Alanine/serine/cysteine transporter subfamily
    - SLC2 family of hexose and sugar alcohol transporters OVERVIEW
      - Class I transporters
      - Class II transporters
      - Proton-coupled inositol transporter
    - SLC3 and SLC7 families of heteromeric amino acid transporters (HATs) OVERVIEW
      - SLC3 family
      - SLC7 family
    - SLC4 family of bicarbonate transporters OVERVIEW
      - Anion exchangers
      - Sodium-dependent HCO_3^- transporters
    - SLC5 family of sodium-dependent glucose transporters OVERVIEW
      - Hexose transporter family
      - Choline transporter
      - Sodium iodide symporter, sodium-dependent multivitamin transporter and sodium-coupled monocarboxylate transporters
      - Sodium *myo*-inositol cotransporter transporters
    - SLC6 neurotransmitter transporter family OVERVIEW
      - Monoamine transporter subfamily

List of transporter families

An **overview** to the transporters target class is available, in addition to separate overviews for each superfamily

The **SLC superfamily** of solute carriers is subdivided into families listed in numerical order

Transporter page

EAAT1 (Excitatory amino acid transporter 1 / SLC1A3) « Hide summary

Target Id	868
Nomenclature	**Excitatory amino acid transporter 1**
Systematic nomenclature	SLC1A3
Common abbreviation	EAAT1
Previous and unofficial names	GLAST, EAAT1, excitatory amino acid transporter 1, GLAST-1, glial glutamate transporter, GluT-1, glutamate/aspartate transporter, sodium-dependent glutamate/aspartate transporter 1, solute carrier family 1, member 3, Gmt1, EA6
Genes	*SLC1A3* (Hs), *Slc1a3* (Mm), *Slc1a3* (Rn)
Ensembl ID	ENSG00000079215 (Hs), ENSMUSG00000005360 (Mm), ENSRNOG00000016163 (Rn)
UniProtKB AC	P43003 (Hs), P56564 (Mm), P24942 (Rn)
Endogenous substrates	L-glutamic acid L-aspartic acid
Substrates	L-trans-2,4-pyrolidine dicarboxylate D-aspartic acid DL-threo-β-hydroxyaspartate (Ki 5.8x10^{-8} M) [46]
Inhibitors	DL-TBOA pK_B 5.0 [46] UCPH-101 pIC_{50} 6.9 (membrane potential assay) [26]
Labelled ligands	[^{3}H]ETB-TBOA K_d 1.55x10^{-8} M [47] - Rat [^{3}H]D-aspartic acid [^{3}H](2S,4R)-4-methylglutamate [^{3}H]L-aspartic acid
Stoichiometry	Probably 3 Na^+: 1 H^+ : 1 glutamate (in): 1 K^+ (out)

The **common abbreviation**, **nomenclature**, and **systematic name** are all included in the title for each transporter entry.

Systematic nomenclature- see the 'Transporter Tables' section on the help pages for a definition

Common abbreviation- commonly used abbreviations for the transporter name existing in the literature

Endogenous substrates- the natural substrates of the transporter

Substrates- synthetic and other non-endogenous ligands found to act as substrates when tested experimentally

Inhibitors-compounds found to inhibit the transporters ability to translocate substrates across the membrane. Assay details describing how the inhibitor was tested included where available

Stoichiometry- describes the relative quantities of substrates and ions translocated across the membrane by the transporter

Example of an enzyme page

Adenosine turnover

Unless otherwise stated all data on this page refer to the human proteins. Gene information is provided for human (Hs), mouse (Mm) and rat (Rn).

Many of our enzymes targets are categorised according to the metabolic pathway in which they are involved

Overview

« Hide

A multifunctional, ubiquitous molecule, adenosine acts at cell-surface G protein-coupled receptors, as well as numerous enzymes, including protein kinases and adenylyl cyclase. Extracellular adenosine is thought to be produced either by export or by metabolism, predominantly through ecto-5'-nucleotidase activity (also producing inorganic phosphate). It is inactivated either by extracellular metabolism *via* adenosine deaminase (also producing ammonia) or, following uptake by nucleoside transporters, *via* adenosine deaminase or adenosine kinase (requiring ATP as co-substrate). Intracellular adenosine may be produced by cytosolic 5'-nucleotidases or through S-adenosylhomocysteine hydrolase (also producing L-homocysteine).

Enzymes

ADA (Adenosine deaminase) « Hide summary More det

Target Id	1230
Nomenclature	**Adenosine deaminase**
Common abbreviation	ADA
Previous and unofficial names	ADA1, Adenosine aminohydrolase
Genes	*ADA* (Hs), *Ada* (Mm), *Ada* (Rn)
Ensembl ID	ENSG00000196839 (Hs), ENSMUSG00000017697 (Mm), ENSRNOG00000010265 (Rn)
UniProtKB AC	P00813 (Hs), P03958 (Mm), Q920P6 (Rn)
EC number	3.5.4.4
Rank order of affinity	2'-deoxyadenosine > adenosine
Products	2'-deoxyinosine inosine
Selective inhibitors	EHNA pK_i 8.8 [1] pentostatin pIC_{50} 10.8 [1]

ADK (Adenosine kinase) Show summary »

NT5E (Ecto-5'-Nucleotidase) Show summary »

Search BRITE hierarchies

```
Enzymes [BR:ko01000]
  3. Hydrolases
    3.5  Acting on carbon-nitrogen bonds, other than peptide bonds
      3.5.4  In cyclic amidines
        3.5.4.4  adenosine deaminase
```

[BRITE | KEGG2 | KEGG]

EC (Enzyme Commission) numbers link to the Kegg BRITE hierachy pages outlining how they define each enzyme

Rank order of affinity- of the enzyme to its endogenous substrates

Products- the substances arising from conversion of endogenous substrate by the enzyme

Selective inhibitors-compounds found to selectively decrease the enzyme activity

Ligand lists

Click on the tabs to sort the ligand list by compound classification. See the **help page** for a description of each class.

Home ▸ Ligands

The IUPHAR/BPS Guide to PHARMACOLOGY complete ligand list

Approved | Synthetic organic | **Metabolite** | Natural product | Endogenous peptide | Other peptide | Inorganic | Antibody | Labelled

Low molecular weight, non-peptidic, biogenic compounds produced by life processes (normally endogenous and of animal origin, including hormones and neurotransmitters) and their close analogues.

A B C D E F G H I K L M N O P R S T U V X

Ligand name		Synor
A		
acetaldehyde		acetic aldehyde, ethanal, ethyl aldehyde, NSC 759
acetic acid		acetate, ethanoic acid
acetoacetyl CoA		3-acetoacetyl-CoA, acetoacetyl coenzyme A, acetc
acetylcholine		ACh, E1001, O-acetylcholine
acetyl CoA		acetyl coenzyme A, acetyl-CoA, acetylCoA, S-acet
[^{14}C]acetylCoA		[^{14}C]-acetylCoA
acetyl-L-carnitine		
adenine		
adenosine		Adenocard®, Adenoscan®
adenosine-3'-5'-bisphosphate		adenosine 3',5'-bisphosphate, adenosine 3',5'-diphc
adenosine diphosphate		
adenosine 5'-monophosphate		AMP, 5'-AMP, adenosine monophosphate
ADP ribose		
ADPβS		adenosine 5'-O-(2-thiodiphosphate), ADPbetaS
(-)-adrenaline		adrenalin, Auvi-Q®, Epipen®, l-adrenaline, L-epine
(+)-adrenaline		(S)-(+)-adrenaline, (S)-adrenaline
(±)-adrenaline		adrenaline, epinephrine
agmatine		
β-alanine		
[^{14}C]alanine		[^{14}C]-alanine
[^{3}H]alanine		[^{3}H]-alanine

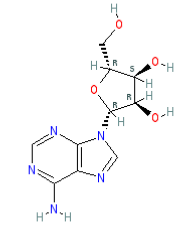
Ligand list links to ligand pages

adenosine

Ligand Id: 2844

Ligand name	adenosine

2D Structure



Calculated Physico-chemical Properties	
Hydrogen bond acceptors	9
Hydrogen bond donors	4
Rotatable bonds	2
Topological polar surface area	139.54
Molecular weight	267.1
XLogP	-1.81
No. Lipinski's rules broken	0

Molecular properties generated using the CDK

Summary | Biological activity | Clinical data | References | Structure | Similar ligands

Classification	
Compound class	Metabolite or derivative
Approved drug?	Yes (source: FDA (1989))

IUPAC Name

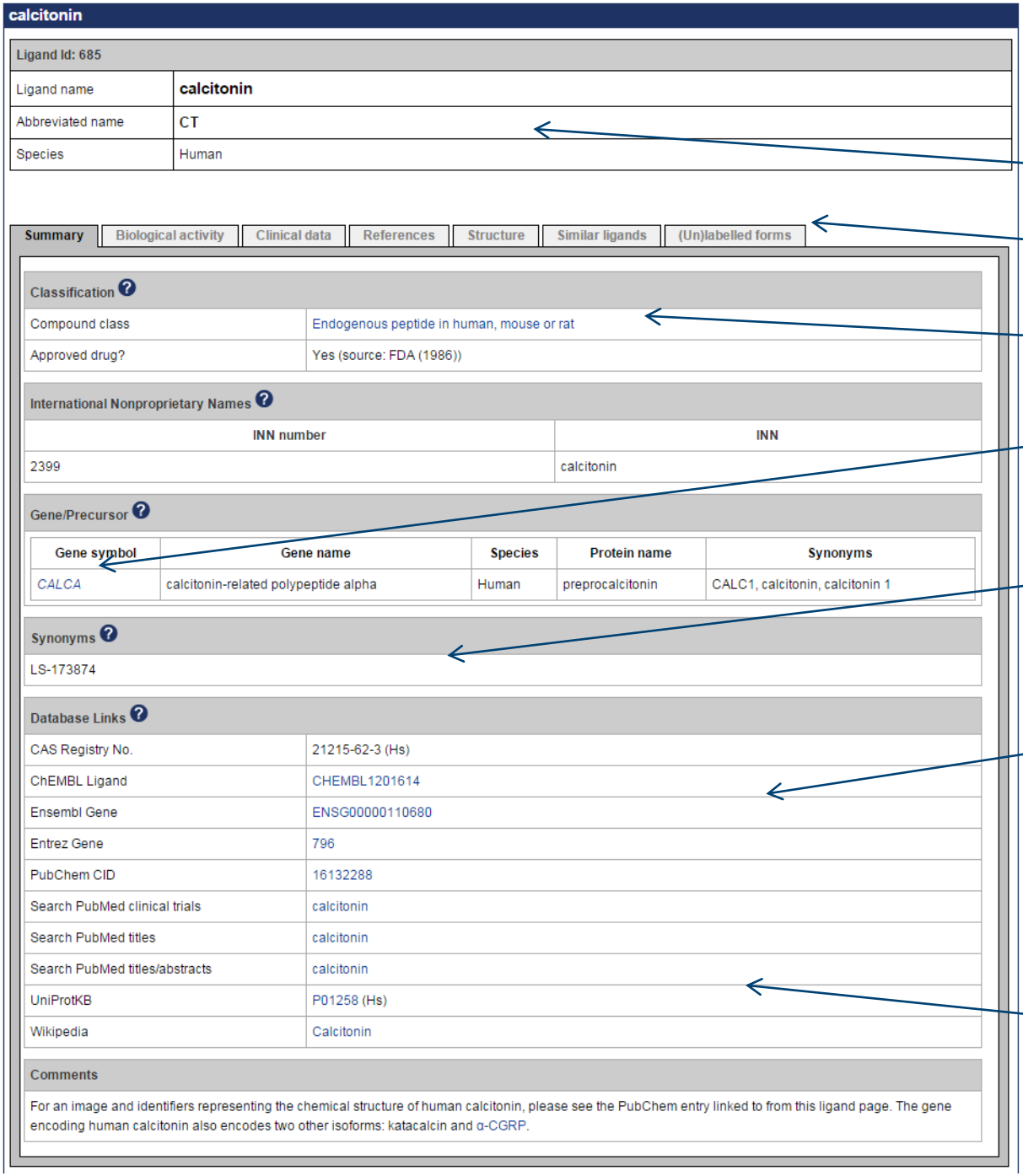
(2R,3R,4S,5R)-2-(6-aminopurin-9-yl)-5-(hydroxymethyl)oxolane-3,4-diol

Synonyms

Adenocard®

Adenoscan®

Database Links	
CAS Registry No.	58-61-7 (source: Scifinder)
ChEBI	CHEBI:16335
ChEMBL Ligand	CHEMBL477
DrugBank Ligand	DB00640
Human Metabolome Database	HMDB00050
PubChem CID	60961
RCSB PDB Ligand	ADN&sid=2YDO
Search Google for chemical match using the InChIKey	OIRDTQYFTABQOQ-KQYNXXCUSA-N
Search Google for chemicals with the same backbone	OIRDTQYFTABQOQ



calcitonin

Ligand Id: 685	
Ligand name	**calcitonin**
Abbreviated name	CT
Species	Human

Summary | Biological activity | Clinical data | References | Structure | Similar ligands | (Un)labelled forms

Classification

Compound class	Endogenous peptide in human, mouse or rat
Approved drug?	Yes (source: FDA (1986))

International Nonproprietary Names

INN number	INN
2399	calcitonin

Gene/Precursor

Gene symbol	Gene name	Species	Protein name	Synonyms
CALCA	calcitonin-related polypeptide alpha	Human	preprocalcitonin	CALC1, calcitonin, calcitonin 1

Synonyms

LS-173874

Database Links

CAS Registry No.	21215-62-3 (Hs)
ChEMBL Ligand	CHEMBL1201614
Ensembl Gene	ENSG00000110680
Entrez Gene	796
PubChem CID	16132288
Search PubMed clinical trials	calcitonin
Search PubMed titles	calcitonin
Search PubMed titles/abstracts	calcitonin
UniProtKB	P01258 (Hs)
Wikipedia	Calcitonin

Comments

For an image and identifiers representing the chemical structure of human calcitonin, please see the PubChem entry linked to from this ligand page. The gene encoding human calcitonin also encodes two other isoforms: katacalcin and α-CGRP.

Example of an endogenous peptide ligand Summary page

Species specified for endogenous peptide ligands

Click on each tab to display ligand data/information

Ligand classification- see **glossary** for further explanation

Link to the **HGNC database** for more information on the **gene**

Synonyms: Alternative names for the ligand. Some may be systematic names. These may be used as search terms.

Databases: Click to link to other relevant resources including genomic and chemical databases for further data on the ligand.

Link to **UniProt** for more information on the protein and its precursor

Ligand page: calcitonin (Biological activity)

Summary | **Biological activity** | Clinical data | References | Structure | Similar ligands | (Un)labelled forms

Natural/Endogenous Targets

Target
AMY_1 receptor
AMY_2 receptor
AMY_3 receptor
CT receptor

Selectivity at human GPCRs

Key to terms and symbols — Click column headers to sort

Target	Type	Action	Affinity	Units	Concentration range (M)	Reference
AMY_2 receptor	Agonist	Full agonist	11.4	pEC_{50}	-	2
AMY_1 receptor	Agonist	Full agonist	8.9 – 11.3	pEC_{50}	-	2-3,5
CT receptor	Agonist	Full agonist	9.0 – 11.2	pEC_{50}	-	1-6
AMY_3 receptor	Agonist	Full agonist	8.0 – 10.6	pEC_{50}	-	2

Additional information and targets (data relate to human unless otherwise stated)

Description	Data	Reference
Rank order of potency at CT receptor	CT (salmon) ≥ CT (*CALCA*, P01258) ≥ AMY (*IAPP*, P10997), α-CGRP (*CALCA*, P06881) > AM (*ADM*, P35318), AM2/IMD (*ADM2*, Q7Z4H4)	
Rank order of potency at AMY_1 receptor	CT (salmon) ≥ AMY (*IAPP*, P10997) ≥ α-CGRP (*CALCA*, P06881) > AM2/IMD (*ADM2*, Q7Z4H4) ≥ CT (*CALCA*, P01258) > AM (*ADM*, P35318)	
Rank order of potency at AMY_3 receptor	CT (salmon) ≥ AMY (*IAPP*, P10997) > α-CGRP (*CALCA*, P06881) ≥ AM2/IMD (*ADM2*, Q7Z4H4) ≥ CT (*CALCA*, P01258) > AM (*ADM*, P35318)	

Ligand mentioned in the following text fields

Calcitonin receptors overview

Calcitonin receptors comments

Natural/endogenous ligands table lists the receptors at which the ligand is the principal natural or other endogenous ligand

Activity data: Table displays all activity data for the ligand from the **detailed view** pages . As the table indicates, calcitonin is an endogenous agonist at several members of the calcitonin receptor family.

Click on the receptor name in the table to link to the **detailed view** receptor page.

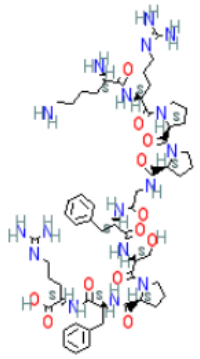
Calcitonin is available as an approved drug and the **primary target** at which it acts is indicated by this symbol

Ligand page: kallidin (Structural information)

kallidin

Ligand Id: 650	
Ligand name	**kallidin**
Species	Human

2D Structure



Summary | Biological activity | References | **Structure** | Similar ligands

Peptide Sequence

KRPPGFSPFR

Lys-Arg-Pro-Pro-Gly-Phe-Ser-Pro-Phe-Arg

Post-translational Modification

None.

Download 2D Structure

Canonical SMILES	Download
Isomeric SMILES	Download
InChI standard identifier	Download
InChI standard key	Download

Molecular structure representations generated using Open Babel

Click on the 2D structure to launch the image in the MarvinSketch chemical editor where it can be modified and used in structure-based searches

One and three -letter sequences displayed for peptide ligands. Three-letter sequences are annotated with details of modifications

Summary information on **post-translational** or **chemical modifications** is provided where applicable

Structural identifiers can be downloaded. See the **glossary** for more information on these identifiers.

Comparison of ligand pages for a peptide and a metabolite

Metabolites and synthetic organic compounds: IUPAC name generated and physico-chemical properties calculated from the ligand structure

calcitonin

Ligand Id: 685	
Ligand name	**calcitonin**
Abbreviated name	CT
Species	Human

Summary | Biological activity | Clinical data | References | Structure | Similar ligands | (Un)labelled forms

Classification

Compound class	Endogenous peptide in human, mouse or rat
Approved drug?	Yes (source: FDA (1986))

International Nonproprietary Names

INN number	INN
2399	calcitonin

Gene/Precursor

Gene symbol	Gene name	Species	Protein name	Synonyms
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Synonyms

LS-173874

Database Links

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ChEMBL Ligand	CHEMBL1201614
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Entrez Gene	796
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Search PubMed titles	calcitonin
Search PubMed titles/abstracts	calcitonin
UniProtKB	P01258 (Hs)
Wikipedia	Calcitonin

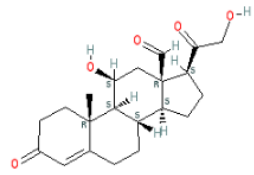
Comments

For an image and identifiers representing the chemical structure of human calcitonin, please see the PubChem entry linked to from this ligand page. T
encoding human calcitonin also encodes two other isoforms: katacalcin and α-CGRP.

aldosterone

Ligand Id: 2872	
Ligand name	**aldosterone**

2D Structure



Calculated Physico-chemical Properties

Hydrogen bond acceptors	5
Hydrogen bond donors	2
Rotatable bonds	3
Topological polar surface area	91.67
Molecular weight	360.19
XLogP	0.26
No. Lipinski's rules broken	0

Molecular properties generated using the CDK

Summary | Biological activity | References | Structure | Similar ligands | (Un)labelled forms

Classification

Compound class	Metabolite or derivative

IUPAC Name

(8S,9S,10R,11S,13R,14S,17S)-11-hydroxy-17-(2-hydroxyacetyl)-10-methyl-3-oxo-1,2,6,7,8,9,11,12,14,15,16,17-dodecahydrocyclopenta[a]phenanthrene-13-carbaldehyde

International Nonproprietary Names

INN number	INN
483	aldosterone

Database Links

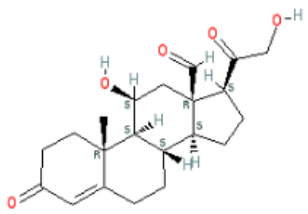
CAS Registry No.	52-39-1 (source: Scifinder)
ChEBI	CHEBI:27584
ChEMBL Ligand	CHEMBL273453
Human Metabolome Database	HMDB00037
Lipid Maps	LMST02030026
PubChem CID	5839
Search Google for chemical match using the InChIKey	PQSUYGKTWSAVDQ-ZVIOFETBSA-N
Search Google for chemicals with the same backbone	PQSUYGKTWSAVDQ
Search PubMed clinical trials	aldosterone
Search PubMed titles	aldosterone
Search PubMed titles/abstracts	aldosterone
Wikipedia	Aldosterone

Example of a metabolite ligand page: aldosterone

aldosterone

Ligand Id: 2872	
Ligand name	**aldosterone**

2D Structure



Calculated Physico-chemical Properties

Hydrogen bond acceptors	5
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XLogP	0.26
No. Lipinski's rules broken	0

Molecular properties generated using the CDK

Summary | Biological activity | References | Structure | Similar ligands | (Un)labelled forms

Classification

Compound class	Metabolite or derivative

IUPAC Name

(8S,9S,10R,11S,13R,14S,17S)-11-hydroxy-17-(2-hydroxyacetyl)-10-methyl-3-oxo-1,2,6,7,8,9,11,12,14,15,16,17-dodecahydrocyclopenta[a]phenanthrene-13-carbaldehyde

International Nonproprietary Names

INN number	INN
483	aldosterone

Database Links

CAS Registry No.	52-39-1 (source: Scifinder)
ChEBI	CHEBI:27584
ChEMBL Ligand	CHEMBL273453
Human Metabolome Database	HMDB00037
Lipid Maps	LMST02030026
PubChem CID	5839
Search Google for chemical match using the InChIKey	PQSUYGKTWSAVDQ-ZVIOFETBSA-N
Search Google for chemicals with the same backbone	PQSUYGKTWSAVDQ
Search PubMed clinical trials	aldosterone

The **2D structure** specifies the ligand stereochemistry

For more information on the **physico-chemical** properties of the molecule, see the glossary

Select **'Structure'** to download structural identifiers for the ligand

Click on **'(Un)labelled forms**' to display (un)labelled variants of the ligand

IUPAC name: A systematic chemical name generated according to IUPAC rules

INNs are displayed on the summary tab for ligands to which they have been assigned

Use the unique **InChi key** to search for the exact structure on **Google,** and the inner InChi key for compounds with the same backbone structure.

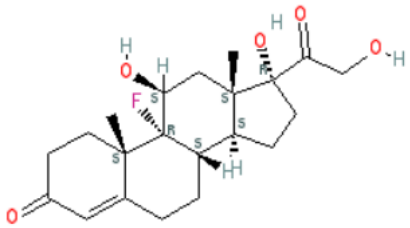
For more information on the ligand pages see the help page

Summary | Biological activity | References | Structure | **Similar ligands** | (Un)labelled forms

For advanced searching click here to open chemical structure editor

Similar Ligands

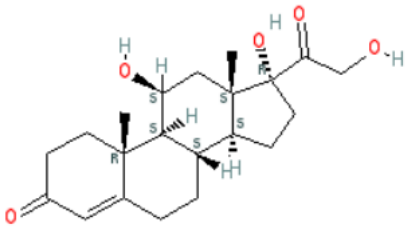
fludrocortisone



Targets

Mineralocorticoid receptor

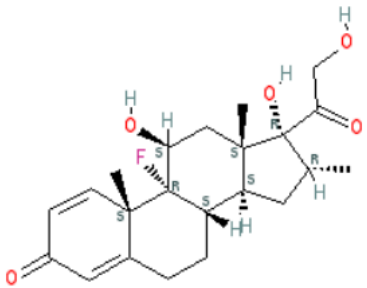
cortisol



Targets

Glucocorticoid receptor; Mineralocorticoid receptor

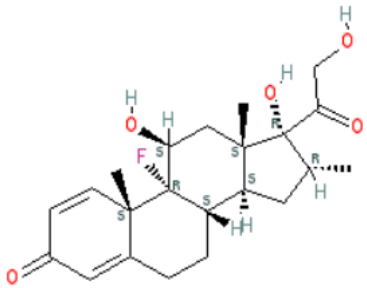
[^{3}H]dexamethasone



Targets

Glucocorticoid receptor

dexamethasone



Targets

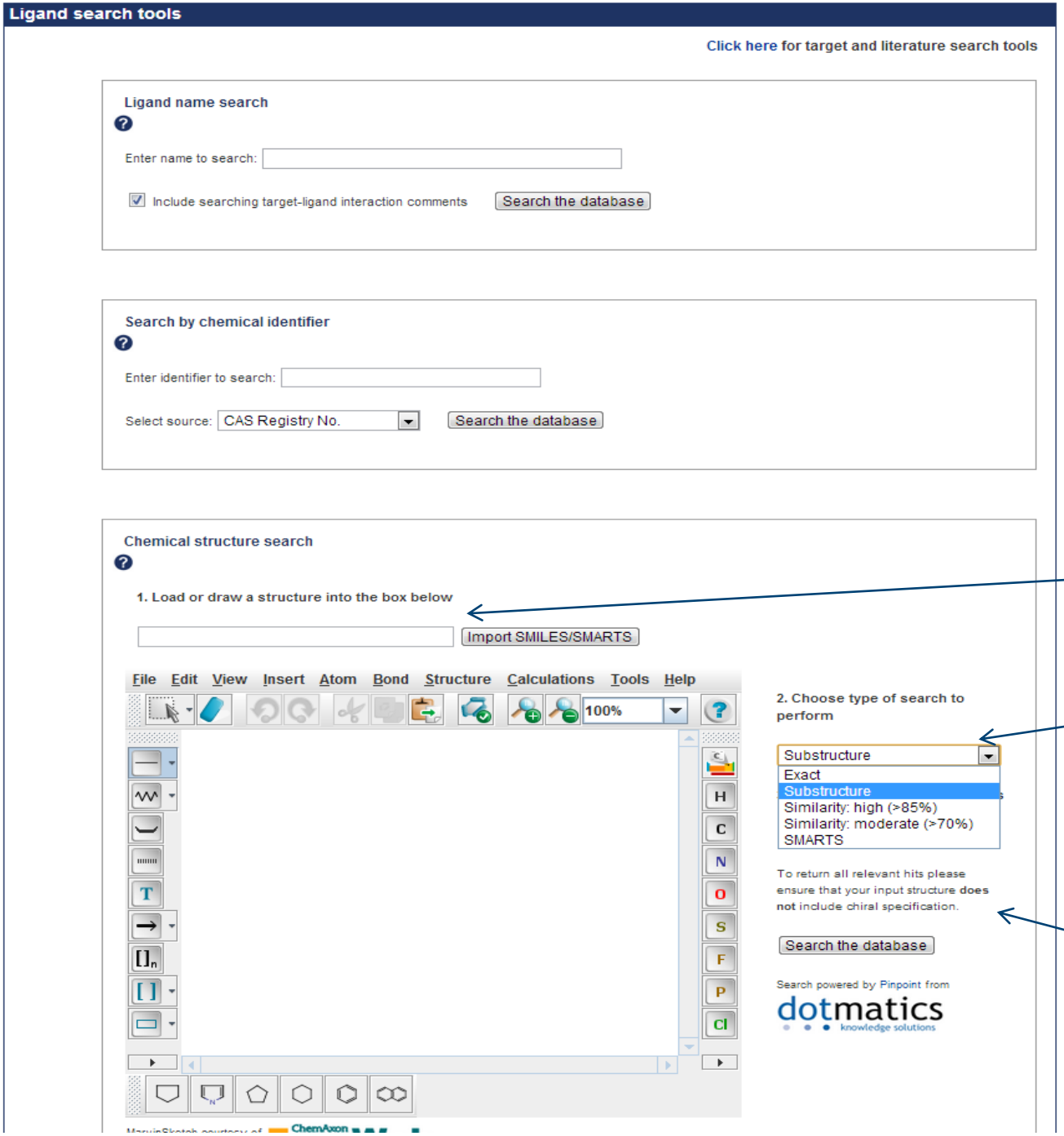
Glucocorticoid receptor; Mineralocorticoid receptor; Pregnane X receptor

Similar ligands: aldosterone

Ligand name: click to link to ligand page

Links to **detailed** views of the target pages with activity data for the ligand

2D image of ligand results, specifying stereochemistry



Advanced search tools:

Ligand Search Tools

For a '**quick search**' use the search box on the toolbar

It is possible to search for a ligand on the database by:

- Ligand name
- Chemical identifier (*e.g.* SMILES, CAS Registry No.)
- Drawing a structure into the Chemical structure search tool

*See the **help page** for more information*

A SMILES string pasted into the search box can be imported into MarvinSketch to generate a 2D image of the molecule, or a structure can be drawn into the box

Select type of structure-based search to perform

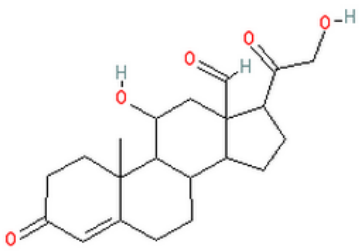
The query structure used for the Chemical Structure search **must not include** chiral or isotopic specification *i.e.* use canonical SMILES instead of isomeric SMILES

Results from a structure-based query

Home ▸ Ligand search ▸ Chemical structure search results

Chemical structure search results

Input structure:



Input SMILES:
CC12CCC(=O)C=C1CCC1C3CCC(C(=O)CO)C3(CC(O)C21)C=O

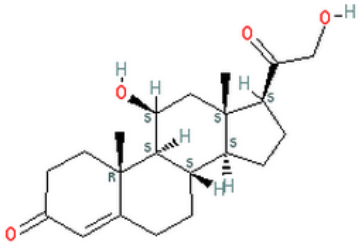
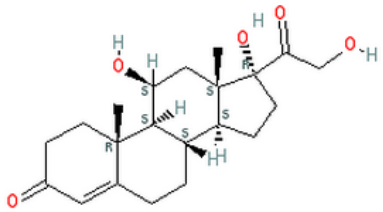
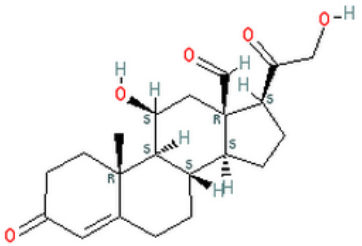
Query molecule (stereochemistry not specified)

Search result generated when **'Similarity: high (>85%)'** selected from drop-down menu

Results can be re-ordered alphabetically or by chemical properties, and limited by chemical property *e.g.* molecular weight

Your query returned 4 matches:

Order results by: Default | Limit results by: None <= 0.0 Update

corticosterone	cortisol	[^{3}H]aldosterone
		
Targets	**Targets**	**Targets**
Glucocorticoid receptor; Mineralocorticoid receptor	Glucocorticoid receptor; Mineralocorticoid receptor	Mineralocorticoid receptor
Use in search	Use in search	Use in search

Search results: **Ligand name search-** ‘Aldosterone’

Two results matched by name

Home ▸ Ligand search ▸ Ligand search results

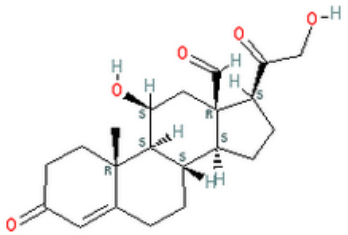
Ligand search results

Search results for: *aldosterone*

Order results by: Match Go

Ligand: [^{3}H]aldosterone

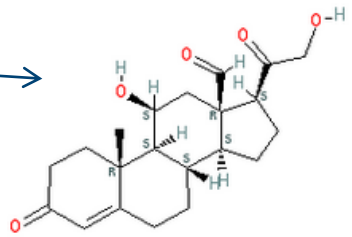
Synonyms: [3H]-**aldosterone**

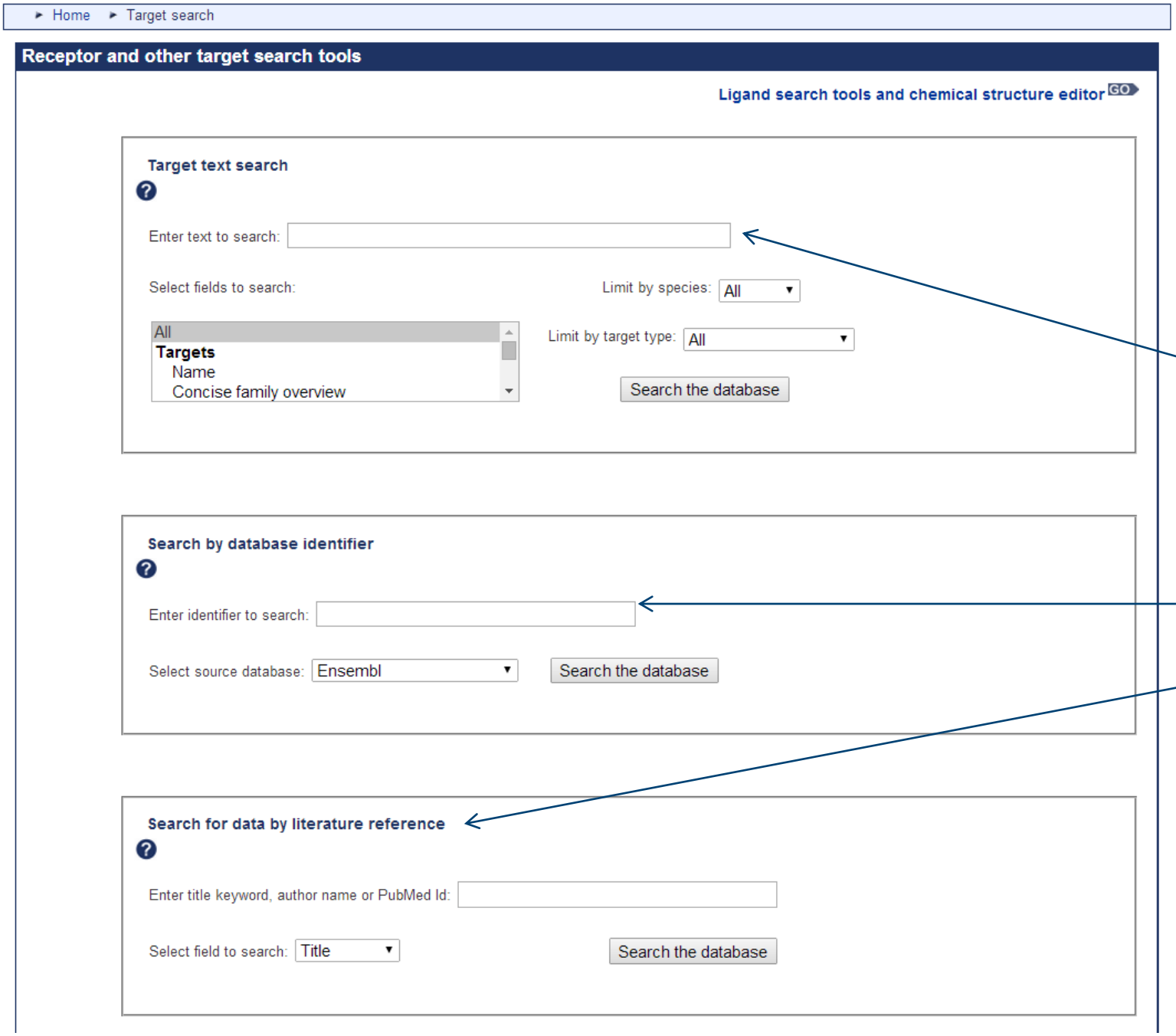


Ligand: aldosterone

Synonyms: **aldosterone** [INN]

Click on the ligand name or image to link to the ligand page.





Advanced search tools:

Target Search Tools

*For a '**quick search**' use the search box in the header*

To search by target name, enter the term into the text search box

Search for a target by **database identifier** or **reference information.**

*See the **help page** for further information on how to use the target search tools*

Target search results: calcitonin

Search results

Search results include receptors of the calcitonin family

Search results for: *calcitonin*

Order results by: Match ▾ Go

Target: CT receptor (Calcitonin receptors)

Synonym: **calcitonin** receptor
HGNC gene name: **calcitonin** receptor
MGI gene name: **calcitonin** receptor
RGD gene name: **calcitonin** receptor
Comment: **calcitonin** (salmon) binds with high affinity to **calcitonin** and amylin receptors, data using this radioligand
Consequences of altering gene expression: consistent with a regulatory role for **calcitonin** on bone primarily under conditions of calcium stress.
Physiological function - description: **Calcitonin** inhibits food intake when injected into hypothalamic areas known to be rich in **calcitonin**
Physiological function - description: **Calcitonin** is a potent inhibitor of bone resorption acting directly on osteoclasts.
Variant: **calcitonin** receptor that contains a 37 amino acid insert in the first extracellular loop. The insert
Variant: **calcitonin** receptor which lacks 47 amino acids at the N-terminus, including a potential glycosylation
Variant: **calcitonin** receptor is a T to C base mutation which encodes a leucine447 to proline
Agonists - comment: **calcitonin** receptor have also been reported, which act via the juxtamembrane region of the receptor
Transduction - comment: **calcitonin** receptor (hCT(b)) has reduced signalling capacity. Inhibition of bone resorption by CT has been
Transduction - comment: **calcitonin** receptor (hCT(b)) has reduced signalling capacity. CT appears to stimulate this pathway in pituitary

Target search results include individual target pages and target families including the search term in their name.

Family: Calcitonin receptors

Name: **Calcitonin** receptors
(Concise view) family overview: ...**Calcitonin** (CT), amylin (AMY), **calcitonin** gene-related peptide (CGRP) and adrenomedullin (AM) receptors (nomenclature as agreed...

Target: calcitonin receptor-like receptor (Calcitonin receptors)

Name: **calcitonin** receptor-like receptor
Synonym: **calcitonin** receptor-like
Synonym: **calcitonin** receptor-like receptor
Synonym: **calcitonin** gene-related peptide type 1 receptor
HGNC gene name: **calcitonin** receptor-like
MGI gene name: **calcitonin** receptor-like
RGD gene name: **calcitonin** receptor-like
Comment: **Calcitonin** receptor-like receptor and RAMP1 make up the CGRP receptor. **Calcitonin** receptor-like receptor

Target: AM_1 receptor (Calcitonin receptors)

Consequences of altering gene expression: **calcitonin** receptor-like receptor leads to severe oedema and embryonic lethality. Although the **calcitonin** receptor
Functional assay - description: cAMP in COS-7 cells transfected with the human **calcitonin** receptor-like receptor and RAMP2.
Functional assay - description: levels in COS-7 cells transfected with the rat **calcitonin** receptor-like receptor and mouse RAMP2.
Functional assay - description: levels in COS-7 cells transfected with the mouse **calcitonin** receptor-like receptor and mouse RAMP2.
Functional assay - description: levels in COS-7 cells transfected with the rat **calcitonin** receptor-like receptor and human RAMP2.
Functional assay - description: levels in Drosophila Schneider 2 cells transfected with the rat **calcitonin** receptor-like receptor and RAMP2.

Guide to PHARMACOLOGY Help Page

Found under the **'Resources' tab**, the help page includes a **walk-through demo of the site**, a guide to the content of our concise and detailed view pages, a **glossary** of the terms used on the site and a guide to the external sites we link to.

Search database

IUPHAR/BPS
Guide to PHARMACOLOGY

Home | About | Targets | Ligands | Resources | Advanced search

Home ▸ Help page

Guide to PHARMACOLOGY Help Page

About The IUPHAR/BPS Guide to PHARMACOLOGY

Background

For more information on the Guide to PHARMACOLOGY see the About page. The Guide to PHARMACOLOGY is based on information previously available separately in the International Union of Basic and Clinical Pharmacology Database (IUPHAR-DB) and the Guide to Receptors and Channels (GRAC). This help page describes the terms and symbols used in the database and the search tools available on the website.

Terms and symbols

For further information on the pharmacological terms mentioned see the NC-IUPHAR publication on terms and symbols. Please refer also to the Glossary section of this help page.

Tutorial

A tutorial for using the database and guidance on navigating the website is available to download as a PDF.

Instructions for citing the Guide to PHARMACOLOGY

Each target page in the Guide includes citation information at the bottom. This screenshot shows an example of a concise view page:

Citation information

Database page citation:

5-Hydroxytryptamine receptors. Accessed on 30/04/2014. IUPHAR/BPS Guide to PHARMACOLOGY, http://www.guidetopharmacology.org/GRAC/FamilyDisplayForward?familyId=1.

Concise Guide to PHARMACOLOGY citation:

Alexander SPH, Benson HE, Faccenda E, Pawson AJ, Sharman JL, Spedding M, Peters JA and Harmar AJ, CGTP Collaborators. (2013) **The Concise Guide to PHARMACOLOGY 2013/14: G Protein-Coupled Receptors.** *Br J Pharmacol.* **170**: 1459–1581.

The equivalent citation for one of the detailed view pages from this target family:

Citation information

Rodrigo Andrade, Nicholas M. Barnes, Gordon Baxter, Joel Bockaert, Theresa Branchek, Marlene L. Cohen, Aline Dumuis, Richard M. Eglen, Manfred Göthert, Mark Hamblin, Michel Hamon, Paul R. Hartig, René Hen, Katharine Herrick-Davis, Rebecca Hills, Daniel Hoyer, Patrick P. A. Humphrey, Klaus Peter Latté, Luc Maroteaux, Graeme R. Martin, Derek N. Middlemiss, Ewan Mylecharane, Stephen J. Peroutka, Pramod R. Saxena, Andrew Sleight, Carlos M. Villalon, Frank Yocca.

Last modified on 29/04/2014.

The citation format for the published version of this page will be:

Rodrigo Andrade, Nicholas M. Barnes, Gordon Baxter, Joel Bockaert, Theresa Branchek, Marlene L. Cohen, Aline Dumuis, Richard M. Eglen, Manfred Göthert, Mark Hamblin, Michel Hamon, Paul R. Hartig, René Hen, Katharine Herrick-Davis, Rebecca Hills, Daniel Hoyer, Patrick P. A. Humphrey, Klaus Peter Latté, Luc Maroteaux, Graeme R. Martin, Derek N. Middlemiss, Ewan Mylecharane, Stephen J. Peroutka, Pramod R. Saxena, Andrew Sleight, Carlos M. Villalon, Frank Yocca.
5-Hydroxytryptamine receptors: 5-HT_{1A} receptor. Last modified on 29/04/2014. Accessed on 30/04/2014. IUPHAR/BPS Guide to PHARMACOLOGY, http://www.guidetopharmacology.org/GRAC/ObjectDisplayForward?objectId=1.

There is also detailed information about general citation of the IUPHAR/BPS Guide to PHARMACOLOGY database using our database publications on our **'Citing'** page under the **'About'** menu.