



Human



DRD1 (D1)



Dopamine receptor D1, involved in G protein signaling, calcium homeostasis, and peptide hormone secretion, regulates JNK activity, nitric oxide production, and blood pressure; aberrant gene expression is associated with neurodegenerative diseases

## Synonyms

(D1); D1A; DRD1; DADR; DRD1A; Hs.2624; dopamine receptor D1; dopamine D1A receptor

Biomarker Associations

Drug Interactions

Gene Ontology

Expression

Mutant Phenotype

Pathways &amp; Interactions

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## Biomarker Associations



## Diseases associated with DRD1 (13 entries)

Disease <a href="#">[details- all]</a> <a href="#">[Sort alphabetically]</a>	Type of Association				Indication		
	Causal	Correlative <a href="#">[details]</a> (50 associations)	Preventative <a href="#">[details]</a> (4 associations)	Negative <a href="#">[details]</a> (7 associations)	Disease Mechanism	Prognosis <a href="#">[details]</a> (8 associations)	Therapeutic Target <a href="#">[details]</a> (4 associations)
Schizophrenia (14 associations) <a href="#">[details]</a>		✓ (11 associations)		✓ (3 associations)		✓ (1 associations)	
Huntington Disease (13 associations) <a href="#">[details]</a>		✓ (13 associations)				✓ (6 associations)	
Parkinson Disease (11 associations) <a href="#">[details]</a>		✓ (9 associations)	✓ (2 associations)			✓ (1 associations)	✓ (2 associations)
Hypertension (4 associations) <a href="#">[details]</a>		✓ (4 associations)					
Cocaine-Related Disorders (4 associations) <a href="#">[details]</a>			✓ (2 associations)	✓ (2 associations)			✓ (2 associations)

[\[details- all\]](#)  
[\[more ...\]](#)

## Inherited DRD1 mutations

The [Human Gene Mutation Database \(HGMD®\) report](#) provides information on the following inherited DRD1 mutations (subscription required):

Mutation Type	Count	Mutation Type	Count
Missense/nonsense	7	Small indels	0
Splicing	0	Gross deletions	0
Regulatory	3	Gross insertions	0
Small deletions	0	Complex rearrangements	0
Small insertions	0	Repeat variations	0

## Drug Interactions



## Drug(s) targeting DRD1 (29 entries)

\* Indicates target provided by DrugBank.

Drug(s)	Status <small>(provided by DrugBank)</small>
*Acetophenazine	Approved, Small Molecule
*Amantadine	Approved, Small Molecule
*Apomorphine	Approved, Investigational, Small Molecule
*Carphenazine	Approved, Small Molecule
*Chlorprothixene	Approved, Small Molecule

## Gene Ontology



### Molecular function

D1 dopamine receptor binding [E], D2 dopamine receptor binding [E], D3 dopamine receptor binding [E], D5 dopamine receptor binding [E]... [\[details\]](#)

### Biological process

activation of adenylate cyclase activity [E], activation of adenylate cyclase activity by dopamine receptor signaling pathway [E], behavior... [\[details\]](#)

### Cellular component

cell surface [E], dendrite [E], integral to plasma membrane [S], plasma membrane [E] [\[details\]](#)

## Expression



### Tissue expression

brain breast colon heart intestine kidney liver lung muscle ovary pancreas placenta spleen stomach testis thymus

<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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View organ or tissue, cell type, and tumor type entries in detail

### Organ or tissue

<u>Organ/Tissue</u> <a href="#">[details]</a>	<u>Form Not Determined</u>	<u>mRNA</u>	<u>Protein</u>	<u>Evidence</u>
adrenal		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ligand binding rt-PCR
brain		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	in situ hybridization ligand binding nuclease protection assay promoter fusion rt-PCR
caudate nucleus		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Northern analysis ligand binding nuclease protection assay promoter fusion rt-PCR

### Cell type

<u>Cell Type</u> <a href="#">[details]</a>	<u>Form Not Determined</u>	<u>mRNA</u>	<u>Protein</u>	<u>Evidence</u>
B-lymphocytes			<input type="checkbox"/>	flow cytometry
NK cells			<input type="checkbox"/>	flow cytometry
T-lymphocytes			<input type="checkbox"/>	flow cytometry
amnion epithelium/epithelial		<input checked="" type="checkbox"/>		rt-PCR

### Tumor type

<u>Tumor Type</u> <a href="#">[details]</a>	<u>Form Not Determined</u>	<u>mRNA</u>	<u>Protein</u>	<u>Evidence</u>
adenocarcinoma		<input checked="" type="checkbox"/>		rt-PCR
adrenal other tumors		<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	ligand binding rt-PCR
medulloblastoma		<input checked="" type="checkbox"/>		rt-PCR
neural cells teratoma		<input type="checkbox"/>		rt-PCR

## Regulation of DRD1 expression



Legend: Upregulated by ... Downregulated by ... Not affected by ... the following regulators

### Proteins, complexes, or pathways that influence DRD1 expression (4 entries)

Regulator <a href="#">[details]</a>	Effect
AP-2alpha	
Meis-2	
SPBP	
TGIF	

## Mutant Phenotype



### Mutant phenotype of closely related homolog(s)

**Mouse Hrh2** ( 35.0% identity to Human DRD1 [5e-50])

#### Viability effects

viable [\[details\]](#)

#### Anatomical effects

epithelium/epithelial cells; parietal cells; serum; stomach [\[details\]](#)

#### Physiological effects

fertile; regulated expression; transport; vesicular transport [\[details\]](#)

**C. elegans dop-1** ( 38.2% identity to Human DRD1 [4e-45])

Phenotypic effect <a href="#">[details]</a>	Mutation type
Touch sensation is defective	Recessive

## Pathways & Interactions



### Pathways

#### Canonical pathways assembled from experiments involving orthologous proteins (1 entry)

Name	View Supporting Reactions	View Graphic Representation	Load in Pathfinder
NMDA receptor signaling	<a href="#">[details]</a>		

#### Subcomponents assembled from experiments involving orthologous proteins (1 entry)

Name	View Supporting Reactions	View Graphic Representation	Load in Pathfinder
D1 ---Fyn--> (NR1:NR2B)2	<a href="#">[details]</a>		

### Protein-protein interactions

#### Proteins bound by DRD1 (7 partners)

Binding Partner(s)	Specific Form	Direct / Indirect	Supporting Reaction	Effect
--------------------	---------------	-------------------	---------------------	--------

(NR1)2:(NR2B)2		direct	(NR1)2:(NR2B)2 + D1 + Fyn <==> D1:(NR1)2:(NR2B)2:Fyn [ps] [details]	binding
D1:(NR1)2:(NR2B)2:Fyn		direct	D1:(NR1)2:(NR2B(pY1472))2:Fyn + PSD-95 <==> D1:(NR1)2:(NR2B(pY1472))2:PSD-95:Fyn [ps] [details]	binding
ERK1(h)		direct	beta-arrestin2(h) + ERK2(h){p} + ERK1(h){p} + D1(h) <==> beta-arrestin2(h):ERK2(h){p}:ERK1(h){p}:D1(h) [me] [details]	binding
NR1(m.s.)	✓	direct	NR1(m.s.) + D1(h) <==> NR1(m.s.):D1(h) [me] [details]	binding
NR1		direct	D1 --> NR1 [se] [details]	binding

[more ...]

#### Protein-protein associations

Protein [details]	Method
A1R	coimmunoprecipitation
COPG1	coimmunoprecipitation
D1	coimmunoprecipitation
D2	immunolocalization
DRD1IP	affinity column

[more ...]

#### Events acting on DRD1

##### Proteins or complexes that phosphorylate DRD1 (2 partners)

Binding Partner(s)	Specific Form	Direct / Indirect	Supporting Reaction	Effect
betaARK-1		direct	betaARK-1 --> D1 [se] [details]	phosphorylation
D1:(NR1)2:(NR2B)2:Fyn		direct	D1:(NR1)2:(NR2B)2:Fyn + ATP --> D1:(NR1)2:(NR2B(pY1472))2:Fyn + ADP [ps] [details]	phosphorylation

##### Proteins or complexes that affect DRD1 in other ways (1 partner)

Binding Partner(s)	Specific Form	Direct / Indirect	Supporting Reaction	Effect
D1:(NR1)2:(NR2B)2:Fyn		direct	D1:(NR1)2:(NR2B(pY1472))2:Fyn --> D1:(NR1)2:(NR2B(pY1472))2:Fyn [ps] [details]	translocation

#### Events triggered by DRD1

##### Proteins or complexes activated by DRD1 (1 partner)

Binding Partner(s)	Specific Form	Direct / Indirect	Supporting Reaction	Effect
Gs		direct	D1 --> Gs [se] [details]	activation

##### Proteins or complexes phosphorylated (directly or indirectly) by DRD1 (2 partners)

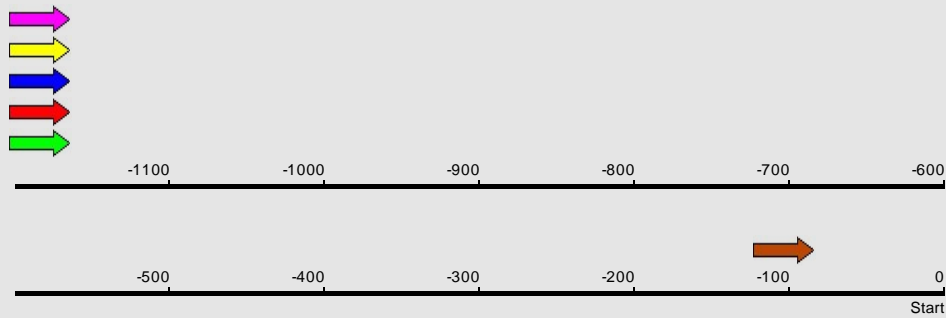
Binding Partner(s)	Specific Form	Direct / Indirect	Supporting Reaction	Effect
ERK(h)		indirect	D1(h) --> ERK(h){p} [me] [details]	increase of phosphorylation
MEK(h)		indirect	D1(h) --> MEK(h){p} [me] [details]	increase of phosphorylation



## Regulation of DRD1 gene expression

Chromosome : 5q35.1

Predicted promoter sequences : [PM000008338](#)



\* Note: Only binding sites whose location is relative to the TSS are graphically displayed.

### Transcription factor binding sites within the DRD1 gene (18 entries)

	Identifier	Location	Binding Factor(s)	DNA Binding Reaction	Effect
	<a href="#">HS\$DRD1A_10</a>	-1197 to -1152 *	<a href="#">AP-2alpha(h)</a>	AP-2alpha(h) --> DRD1A(h)	DNA binding
	<a href="#">HS\$DRD1A_10</a>	-1197 to -1152 *	<a href="#">AP-2alpha(m)</a>	AP-2alpha(m) --> DRD1A(h)	DNA binding
	<a href="#">HS\$DRD1A_01</a>	-1173 to -1154	<a href="#">TGIF-isoform2(h)</a>	TGIF-isoform2(h) --/ DRD1A(h)	transrepression
	<a href="#">HS\$DRD1A_01</a>	-1173 to -1154	<a href="#">Meis-2c(h)</a>	Meis-2c(h) --> DRD1A(h)	transactivation
	<a href="#">HS\$DRD1A_01</a>	-1173 to -1154	<a href="#">Meis-2d(h)</a>	Meis-2d(h) --> DRD1A(h)	transactivation

[\[more ...\]](#)

### View in vivo fragments within the vicinity of the DRD1 gene that are bound by transcription factors (111 entries)

Identifier	Location	Binding Factor
<a href="#">FR000654283</a>	174726692..174728001	<a href="#">ER-alpha(h)</a>
<a href="#">FR000194621</a>	174733294..174733836	<a href="#">HNF3A(h)</a>
<a href="#">FR000215245</a>	174745918..174746378	<a href="#">REST(h)</a>
<a href="#">FR000214499</a>	174746236..174746622	<a href="#">REST(h)</a>
<a href="#">FR000223122</a>	174748572..174749465	<a href="#">REST(h)</a>

[\[more ...\]](#)

### Regions of the DRD1 gene with characterized functionality (1 entry)

Identifier	Location	Name	Element
<a href="#">FE00450</a>	-1342		-1472

## Regulation of DRD1 mRNA expression

### miRNA binding sites within DRD1 mRNA (1entry)

Identifier	Region	Location	Location Reference Point	Binding Factor(s)
<a href="#">HS\$DRD1A_13</a>	3' UTR			<a href="#">hsa-miR-504(h)</a>

## RNA Features



### Overview of RNA sequence

Nucleotide Sequence : GGCTCGC...TTTCTGA (1..3373; 3373 nt) [\[details\]](#)

## Protein Features



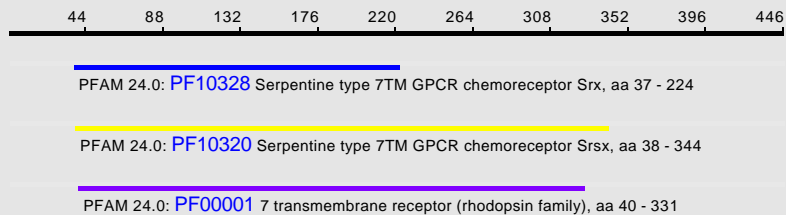
## Overview of protein sequence and structure

Chromosome : 5q35.1

Family membership : GPCR

Isoforms : D1

## View associated sequences and their domains

**Sequence Overview** : Click [here](#) to view associated sequences and their properties.**Sequence Features** :

## View related proteins

**H. sapiens** : [DRD5](#) [1e-123;58.0%]; [ADRB2](#) [3e-60;38.6%]; [HTR4](#) [3e-57;36.4%]... [\[details\]](#)**M. musculus** : [Drd1a](#) [0.0;91.6%]; [Drd5](#) [1e-126;58.3%]; [Htr4](#) [2e-59;35.0%]... [\[details\]](#)**R. norvegicus** : [Drd1a](#) [0.0;90.7%]; [Adrb2](#) [1e-62;36.8%] [\[details\]](#)**C. elegans** : [dop-1](#) [4e-45;38.2%]; [ser-7](#) [3e-37;32.3%]; [F14D12.6](#) [3e-34;31.0%]... [\[details\]](#)

## View orthologous relationships

## View related protein structure at PDB

[PDB Report](#)

JMol

[View](#)

## Post-translational modifications of DRD1 protein

**Known types of modification** : N-linked glycosylation; palmitoylation; phosphorylation [\[details\]](#)

## View complexes containing DRD1 protein

[View complexes \(6 entries\)](#)

## Identifiers



## Accessions mapped to this record

**BIOBASE gene accession** : GN000007476, G002129, MO000022956**BIOBASE protein accession** : PR000014383, MO000018518

## Gene

Affymetrix	214652_at, 34550_at, Hs.2624.0.S2_3p_at, M85247_at, X58987_at,
AgilentProbe	A_23_P388061
Ensembl	<a href="#">ENSG00000184845</a> , <a href="#">ENST00000329144</a> , <a href="#">ENST00000393752</a>
EntrezGene	<a href="#">1812</a>
HGMD	<a href="#">DRD1</a>

HGNC	3020
IPI	IPI00010289
OMIM	126449
RefSeq	NM_000794, NP_000785
UniGene	Hs&2624
<b>Protein</b>	
Ensembl	ENSP00000327652
UniProt	P21728

## Annotations



[Description](#) | [Editor's Notes](#) | [Name](#) | [Function](#) | [Regulates](#) | [Transcript Information](#) | [Alternative Forms](#) | [Ligand](#) | [Pathway](#) | [Related to](#) | [Variations](#) | [Physical interactions](#) | [Domains](#) | [Expression](#) | [Localization](#) | [Modifications](#) | [Regulation](#) | [Abundance](#) | [Antibodies](#) | [Gel mobility](#) | [Structure](#) | [Motif\(s\)](#) | [Disease related](#) | [Amino acid configuration](#) | [Drug effects](#) | [Other](#)

**Display all annotations**

### Description

- Dopamine receptor D1, involved in G protein signaling, calcium homeostasis, and peptide hormone secretion, regulates [JNK](#) activity, nitric oxide production, and blood pressure; aberrant gene expression is associated with neurodegenerative diseases [\[11\]](#) ,[\[31\]](#) ,[\[85\]](#) ,[\[89\]](#) ,[\[118\]](#) ,[\[132\]](#)

### Editor's Notes

- driven by two promoters, one promoter is in the intron [\[142\]](#)
- gene consists of two exons

### Name

- [DRD1](#) "dopamine receptor D1"

### Function

- induces quiescence of T-cells [\[12\]](#)
- partially mediates dopamine-induced oxidative stress and cell death in postsynaptic striatal neurons [\[32\]](#)
- upregulation in the brain is associated with drug abuse [\[85\]](#)

### Regulates

- activation by agonist increases intracellular cAMP accumulation, effect is blocked by antagonist [\[68\]](#)
- activation by agonist increases intracellular concentration of cAMP, effect is inhibited by decreased expression of G protein gamma 7 ([GNG7](#)) [\[79\]](#)
- activation by non-selective agonist dopamine increases intracellular accumulation of cAMP, effect is inhibited by co-expression of D2 long receptor ([DRD2](#)) [\[70\]](#)
- activation by selective agonist SKF81297 increases intracellular accumulation of cAMP, effect is unchanged by co-expression of D2 long receptor ([DRD2](#)) [\[70\]](#)
- activation does not induce clusterization of adenosine receptor 1 ([ADORA1](#)) and mouse adenosine deaminase (mouse [Ada](#)) [\[63\]](#) [\[more . . .\]](#)

### Transcript Information

- [D1A](#) mRNA (long transcript) contains exon 1 and originates from the weaker, upstream promoter while [DA1](#) (short transcript) lacks exon1 and originates from the stronger, intronic promoter [\[127\]](#)
- long and short transcripts decay with a half-life of 1.0 and 1.8 hours respectively [\[142\]](#)
- long transcripts are approximately two-fold more abundant than short transcripts [\[142\]](#)
- long transcripts contain exon 1 and originate from the weaker, upstream promoter while short transcripts lack exon 1 and originate from the stronger, intronic promoter (position -525 to -239) [\[142\]](#)
- mRNA of 4.2 kb is detected [\[169\]](#) [\[more . . .\]](#)

### Alternative Forms

- alternative forms [D1A](#) and [DA1](#) are products of tissue-specific promoter usage [\[127\]](#)

### Ligand

- (+)-butaclamol and flupentixol are inverse agonists while SCH23390 is a [partial](#) agonist for the [DRD1](#) receptor [\[164\]](#)

- activation by ligand and signal transduction involve serines in transmembrane V [183]
  - activation of mutant form S202A by dopamine is impaired but activation by other agonists is comparable to wild-type [183]
  - activation of mutant forms S198A and S199A by dopamine and other agonists is impaired [183]
  - activation-induced internalization is associated with agonists that exhibit high functional potency and intrinsic activity [22]
- [more ...]

## Pathway

- activation induced stimulation of p38MAPK (**CSBP1**) and **JNK** (MAP\_kinase) involve adenylyl\_cyclase and protein\_kinase\_A, but not protein\_kinase\_C and tyrosine kinases [119]
- couples to Gs alpha and Go alpha, but not to Gi alpha or Gq alpha to stimulate phosphoinositide turnover [159]
- stimulation of intracellular calcium mobilization by co-activation with the D2 dopamine receptor (**DRD2**) involves a phospholipase C- and Gq-dependent, protein kinase A- and protein kinase C-independent pathway [34]

## Related to

- antibodies raised against residues 176 to 185 of the dopamine D4 receptor (**DRD4**) do not cross-react with dopamine D1 receptor [see [91]]
  - has 24% identity to *C. elegans* DOP-3 [29]
  - has 24% identity to muscarinic M1 receptor (**CHRM1**) (1011718) [172]
  - has 24% identity to platelet alpha2-adrenergic receptor (**ADRA2C**) [172]
  - has 28% identity to 5-hydroxytryptamine **5HT1A** receptor (**HTR1A**) [172]
- [more ...]

## Variations

- D1.0, D1.1, and D1.7 variants carry G94A, A48G, and T1403C nucleotide changes respectively [153]
  - D1.8 variant is a rare polymorphism that encodes a silent change in the third base of codon 421 [153]
  - four biallelic polymorphisms (D1P.5 (-1251HaeIII), D1P.6 (-800HaeIII), D1.1 (-48Ddel) and D1.7 (+1403Bsp1286I) are detected in a population of attention-deficit, hyperactivity disorder patients [44]
  - genotype 1,2 variant (allele 12) in schizophrenic patients is associated with few decreases in brain metabolic activity and a 7% worsening in clinical symptoms in response to clozapine treatment [54]
  - genotype 2,2 variant (allele 22) in schizophrenic patients is associated with decreased brain metabolic activity and a 30% improvement in clinical symptoms in response to clozapine treatment [54]
- [more ...]

## Physical interactions

- ACT promoter region interacts with **TGIF** and **Meis2** isoforms to regulate expression [94]
  - associates with Gs alpha and Go alpha, but not with Gi1 alpha, Gi2 alpha, and Gi3 alpha [159]
  - binds strongly to **Nsf** [41]
  - binds to adenosine A1 receptors (**ADORA1**) [92]
  - C-terminal domain interacts with NMDA **NR1** subunit (**GRIN1**), but not with **NR2A** (**GRIN2A**) or **NR2B** subunits (**GRIN2B**) [51]
- [more ...]

## Domains

- amino acids within transmembrane regions VI and VII confer receptor ligand specificity [155]
  - C-terminal portion including transmembrane segment 6, extracellular loop 3, transmembrane segment 7, and the cytoplasmic tail is responsible for the differences in dopamine affinity, dopamine potency and agonist-independent activity when compared to **D1B** (**Drd5**) [101]
  - extracellular loop 3 is responsible for the differences in maximal activation of adenylyl\_cyclase when compared to **D1B** (**Drd5**) [101]
  - fourth intracellular loop mediates subtype-specific ligand binding and activation properties [27]
  - residues 421-435 are sufficient for interaction with **CALCYON** [95]
- [more ...]

## Expression

- alternative form **D1A** is expressed in the brain and neuronal cell lines, but not in kidney and renal cell line [127]
  - alternative form **DA1** is expressed in the brain, kidney, neuronal, and renal cell lines [127]
  - coexpressed with mu opioid receptor (**OPRM1**) and kappa opioid receptor (**OPRK1**) in the core and shell subdivisions of the nucleus accumbens (NA) and in NUDAPs (neurochemically unique domains in the accumbens and putamen) at low, intermediate and high abundance, respectively, for all three receptors [137]
  - expressed at different levels in different layers of neuropil of primary visual cerebral cortex [156]
  - expressed at very low levels in the hippocampus; expression levels within sub-regions of the hippocampus differ [120]
- [more ...]

## Localization

- endocytosed differentially from the D2 (**DRD2**) receptor [114]
  - following endocytosis, are rapidly recycled to the plasma membrane [114]
  - ligand (dopamine)-dependent internalization is mediated by both **dynammin-1** (**DNM1**) and **dynammin-2** (**DNM2**) [40]
  - localization is not shifted from the plasma membrane to cytoplasmic structures after activation by SKF-81297 if both NMDA subunits **GRIN1** and **GRIN2B** are also expressed [51]
  - localization shifts from the plasma membrane to cytoplasmic structures after activation by SKF-81297 [51]
- [more ...]

## Modifications

- glycosylated at N5 [102]

- mutant form S380A is not phosphorylated by protein kinase A [161]
  - phosphorylated at serine 380 by protein kinase A [see [161]]
  - phosphorylated by protein kinase A but not protein kinase C [161]
  - phosphorylated following agonist exposure, mutant forms R360A and E359A are not phosphorylated [74]
- [more ...]

## Regulation

- activation by (R)-SKF-82526 is 10-fold more potent than dopamine, terms of inducing the activation of the mouse adenylyl\_cyclase [184]
  - activation causes an increase in interaction with **CALCYON** [95]
  - activation does not induce cross desensitization of beta1-adrenergic receptor (**ADRB1**) [173]
  - activation increases its own expression [38]
  - activation induces 70 percent internalization of the total surface receptor pool [114]
- [more ...]

## Abundance

- expressed at higher levels than **DRD3** and **DRD5** [8]

## Antibodies

- antibodies raised against residues 176 to 185 of the dopamine D4 receptor (**DRD4**) do not cross-react with dopamine D1 receptor [see [91]]

## Gel mobility

- **DRD1** from the striatum runs at 70-80 kDa while that from the cerebral cortex runs at 65-75 kDa on SDS gels [85]
  - runs at 40 kD on SDS gels [103]
  - runs at 48 kDa and 110 kDa on SDS gels [166]
  - runs at 48-50 kDa on SDS gels [95]
  - runs at 50, 100 or 200 kDa on SDS gels, possibly representing multimeric forms [85]
- [more ...]

## Structure

- multiple active conformations may be generated by additive, synergistic and-or interfering intramolecular interactions between the third extracellular loop and the C-terminal tail [56]

## Motif(s)

- contains a potential N-linked glycosylation site at amino acid 175 [102]
  - contains a potential palmitoylation site at position 347 [169]
  - contains a potential palmitoylation site at position 348 [172]
  - contains Asp103 in transmembrane segment 3 and Ser199 and Ser202 in transmembrane segment 5 that are conserved in catecholamine receptors [169]
  - contains potential N-linked glycosylation sites in the N terminus and second extracellular loop [168]
- [more ...]

## Disease related

- altered interaction with **DRD3** may play a role in the pathogenesis of hypertension [38]
  - dysfunction in prefrontal cortex may contribute to negative symptoms and cognitive defects in schizophrenic patients [135]
  - expressed at reduced level in the striatum, possibly resulting from striatal degeneration of neurons expressing **DRD1** , in Huntington's disease patients [see [85]]
  - expressed in hyperplastic adrenal gland [30]
  - expression in lobule 9 of the cerebellar uvula is significantly reduced in patients with Parkinson's disease [43]
- [more ...]

## Amino acid configuration

- C terminus is serine and threonine rich [172]
- transmembrane domains contain highly conserved prolines [see [138]]

## Drug effects

- binds the anxiolytic antipsychotic agent, cyamemazine, with high affinity (Ki ~12 nanomolar) [55]
- genotype 1,2 variant (allele 12) in schizophrenic patients is associated with few decreases in brain metabolic activity and a 7% worsening in clinical symptoms in response to clozapine treatment [54]
- genotype 2,2 variant (allele 22) in schizophrenic patients is associated with decreased brain metabolic activity and a 30% improvement in clinical symptoms in response to clozapine treatment [54]

## Other

- activation-induced adenylyl cyclase activity determined in cadaverous brain tissue is comparable to that in normal biopsies [82]
- assumption that signaling through G proteins is constrained to act through associated **Galpha** subunits in experiments employing tethered receptor-Galpha subunit constructs is apparently invalid [53]

## References (187 entries)



- [1] PMID [21178390](#) Lee, K. Y., Joo, E. J., Ji, Y. I., Kim, D. H., Park, J. B., Chung, I. W., Lee, S. I., Joo, Y. H., Ahn, Y. M., Song, J. Y., Kim, Y. S., Associations between DRDs and schizophrenia in a Korean population: multi-stage association analyses. *Exp Mol Med* 43 (1) 44-52 (2011).
  - [2] PMID [20456319](#) Novak, G., LeBlanc, M., Zai, C., Shaikh, S., Renou, J., DeLuca, V., Bulgin, N., Kennedy, J. L., Le Foll, B., Association of polymorphisms in the BDNF, DRD1 and DRD3 genes with tobacco smoking in schizophrenia. *Ann Hum Genet* 74 (4) 291-8 (2010).
  - [3] PMID [20382433](#) Zhang, C., Fang, Y., Xie, B., Cheng, W., Du, Y., Wang, D., Yu, S., No genetic association between dopamine D1 receptor gene and [early onset] schizophrenia. *Psychiatry Res* 177 (3) 350-3 (2010).
  - [4] PMID [20361984](#) Kosaka, J., Takahashi, H., Ito, H., Takano, A., Fujimura, Y., Matsumoto, R., Nozaki, S., Yasuno, F., Okubo, Y., Kishimoto, T., Suhara, T., Decreased binding of [<sup>11</sup>C]NNC112 and [<sup>11</sup>C]SCH23390 in patients with chronic schizophrenia. *Life Sci* 86 (21) 814-8 (2010).
  - [5] PMID [19772578](#) Corominas, R., Ribases, M., Camina, M., Cuenca-Leon, E., Pardo, J., Boronat, S., Sobrido, M. J., Cormand, B., Macaya, A., Two-stage case-control association study of dopamine-related genes and migraine. *BMC Med Genet* 10 95 (2009).
- [\[more . . .\]](#)