Dopamine

Overview: Dopamine receptors (nomenclature as agreed by NC-IUPHAR Subcommittee on Dopamine Receptors, see Schwartz *et al*., 1998) are commonly divided into D_1-like (D_1 and D_5) and D_2-like (D_2, D_3 and D_4) families, where the endogenous agonist is dopamine. Quinpirole is an agonist with selectivity for D_2-like receptors.

Nomenclature	D_1	D_2	D_3	D_4	D_5
Other names	D_{1A}	–	–	–	D_{1B}
Ensembl ID	ENSG00000184845	ENSG00000149295	ENSG00000151577	ENSG00000069696	ENG00000169676
Principal transduction	G_s, G_{olf}	$G_{i/o}$	$G_{i/o}$	$G_{i/o}$	G_s
Selective agonists	*R*(+)SKF81297, *R*(+)SKF38393	–	PD128907	PD168077, A412997 (Moreland *et al.*, 2005)	–
Selective antagonists	SCH23390, SKF83566, SCH39166	Raclopride, domperidone	S33084 (9.6, Millan *et al.*, 2000), nafadotride (9.5), (+)S14297 (8.7, Millan *et al.*, 1994), SB277011 (7.5, Reavill *et al.*, 2000)	L745870 (9.3), U101958 (8.9, Schlachter *et al.*, 1997), L741742 (8.5)	–
Probes	[^{3}H]-SCH23390 (0.2 nM), [^{125}I]-SCH23982 (0.7 nM)	[^{3}H]-Raclopride, [^{3}H]-spiperone	[^{3}H]-7-OH-DPAT, [^{3}H]-PD128907, [^{3}H]-spiperone	[^{3}H]-NGD941 (5 nM, Primus *et al.*, 1997), [^{125}I]-L750667 (1 nM, Patel *et al.*, 1996), [^{3}H]-spiperone	[^{125}I]-SCH23982 (0.8 nM) [^{3}H]-SCH23390 (0.5 nM)

The selectivity of many of these agents is less than two orders of magnitude. [^{3}H]-Raclopride exhibits similar high affinity for D_2 and D_3 receptors (low affinity for D_4), but has been used to label D_2 receptors in the presence of a D_3-selective antagonist. [^{3}H]-7-OH-DPAT has similar affinity for D_2 and D_3 receptors, but labels only D_3 receptors in the absence of divalent cations. The pharmacological profile of the D_5 receptor is similar to, yet distinct from, that of the D_1 receptor. The splice variants of the D_2 receptor are commonly termed D_{2S} and D_{2L} (short and long). The *DRD4* gene encoding the D_4 receptor is highly polymorphic in humans, with allelic variations of the protein from amino acid 387 to 515.

Abbreviations: **(+)7-OH-DPAT**, (+)-7-hydroxy-2-aminopropylaminotetralin; **(+)S14297**, (+)-7-(*N*,*N*-dipropylamino)-5,6,7,8-tetrahydronaphtho(2,3*b*)dihydro-2,3-furane; **L741742**, 5-(4-chlorophenyl)-4-methyl-3-(1-[2-phenethyl]piperidin-4-yl)isoxazole; **L745870**, 3-[{4-(4-chlorophenyl)piperazin-1-yl}methyl)-1*H*-pyrrolo[2,3-*b*]pyridine; **L750667**, iodinated L745870; **NGD941**, 2-phenyl-4(*S*)-(4-[2-pyrimidinyl]-[piperazin-1-yl]-methyl)-imidazole dimaleate; **PD128907**, *R*-(+)-*trans*-3,4,4*a*,10*b*-tetrahydro-4-propyl-2*H*,5*H*-[1]benzopyrano[4,3-*b*]-1,4-oxazine-9-ol; **PD168077**, *N*-methyl-4-(2-cyanophenyl)piperazinyl-3-methylbenzamide; ***R*(+)SKF38393**, *R*(+)-7,8-dihydroxy-1-phenyl-2,3,4,5-tetrahydro-1*H*-3-benzazepine; ***R*(+)SKF81297**, *R*(+)-6-chloro7,8-dihydroxy-1-phenyl-2,3,4,5-tetrahydro-1*H*-benzazepine; **S33084**, (3*aR*,9*bS*)-*N*[4-(8-cyano-1,3*a*,4,9*b*-tetrahydro-3*H*-benzopyrano[3,4-*c*]pyrrole-2-yl)-butyl] (4-phenyl)benzamide; **SB277011**, *trans*-*N*-(4-[2-{6-cyano-1,2,3,4-tetrahydroisoquinolin-2-yl}ethyl]cyclohexyl)-4-quinolininecarboxamide; **SCH23390**, 7-chloro-8-hydroxy-3-methyl-5-phenyl-2,3,4,5-tetrahydro-1*H*-3-benzazepine; **SCH23982**, 8-iodo-2,3,4,5-tetrahydro-3-methyl-5-phenyl-1*H*-3-benzazepine; **SCH39166**, (-)-*trans*-6,7,7*a*,8,9,13*b*-hexahydro-3-chloro-2-hydroxy-*N*-ethyl-5*H*-benzo[*d*]naphtho-(2,*b*)azepine; **SKF83566**, (-)-7-bromo-8-hydroxy-3-methyl-1-phenyl-2,3,4,5-tetrahydro-3-benzazepine; **U101958**, 3-isopropoxy-*N*-methyl-*N*-(1-[phenylmethyl]-4-piperidinyl)-2-pyridinylamine

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