

Somatostatin

Overview: Somatostatin (somatotropin release inhibiting factor) is an abundant neuropeptide, which acts on five subtypes of somatostatin receptor (sst₁–sst₅; nomenclature approved by the NC-IUPHAR Subcommittee on Somatostatin Receptors, see Hoyer *et al.*, 2000). Activation of these receptors produces a wide range of physiological effects throughout the body including inhibiting the secretion of many hormones. The relationship of the cloned receptors to endogenously expressed receptors is not yet well established in some cases. Endogenous ligands for these receptors are somatostatin-14 (SRIF-14) and somatostatin-28 (SRIF-28). Cortistatin (CST-14) has also been suggested to be an endogenous ligand for somatostatin receptors (Delecea *et al.*, 1996).

Nomenclature	sst ₁	sst ₂	sst ₃	sst ₄	sst ₅
Alternative names	SSTR1, SRIF ₂ , SRIF _{2A}	SSTR2, SRIF ₁ , SRIF _{1A}	SSTR3, SRIF ₁ , SRIF _{1C}	SSTR4, SRIF ₂ , SRIF _{2B}	SSTR5, SRIF ₁ , SRIF _{1B}
Ensembl ID	ENSG00000139874	ENSG00000180616	ENSG00000183473	ENSG00000132671	ENSG00000162009
Principal transduction	G _i	G _i	G _i	G _i	G _i
Selective agonists	des-Ala ^{1,2,5} -[DTrp ⁸ , lamp ⁹]SRIF, L797591	Octreotide, seglitide, BIM23027, L054522	L796778	NNC269100, L803087	BIM23268, BIM23052, L817818
Selective antagonists	NVP-SRA880	Cyanamid 154806 (7.7–8.0)	–	–	BIM23056 (7.4–8.3)
Probes	–	[¹²⁵ I]-[Tyr ³]octreotide (0.13 nM) [¹²⁵ I]-BIM23027	–	–	[¹²⁵ I]-[Tyr ³]octreotide (0.23 nM)

[¹²⁵I]-[Tyr¹¹]SRIF-14, [¹²⁵I]-LTT-SRIF-28, [¹²⁵I]-CGP23996 and [¹²⁵I]-[Tyr¹⁰]CST-14 may be used to label somatostatin receptors non-selectively; BIM23052 is said to be selective in rat but not human receptor (Patel and Srikant, 1994). A number of non-peptide subtype-selective agonists have been synthesized (see Rohrer *et al.*, 1998).

Abbreviations: BIM23027, *cyc*(N-Me-Ala-Tyr-D-Trp-Lys-Abu-Phe); BIM23052, DPhe-Phe-Phe-D-Trp-Lys-Thr-Phe-Thr-NH₂; BIM23056, DPhe-Phe-Tyr-D-Trp-Lys-Val-Phe-dNal-NH₂; BIM23268, *cyc*(Cys-Phe-Phe-D-Trp-Lys-Thr-Phe-Cys)-NH₂; CGP23996, *cyc*(Asn-Lys-Asn-Phe-Phe-Trp-Lys-Thr-Tyr-Thr-Ser); Cyanamid 154806, Ac-(4-NO₂-Phe)-*cyc*(D-Cys-Tyr-D-Trp-Lys-Thr-Cys)-D-Tyr-NH₂; L797591, (2R)-N-(6-amino-2,2,4-trimethylhexyl)-3-(1-naphthyl)-2-(((2-phenylethyl)-2-pyridin-2-ylethyl)amino)carbonyl)amino)propanamide; L054522, tert-butyl (bS)-b-methyl-N-[[4-(2-oxo-2,3-dihydro-1H-benzimidazol-1-yl)piperidin-1-yl]carbonyl]-D-tryptophyl-L-lysinate; L796778, methyl (2S)-6-amino-2-(((2R)-2-(((1S)-1-benzyl-2-[(4-nitrophenyl)amino]-2-oxoethyl)amino)carbonyl)amino)hexanoate; L803087, methyl (2S)-5-[[amino(imino)methyl]amino]-2-[[4-(5,7-difluoro-2-phenyl-1H-indol-3-yl)butanoyl]amino]pentanoate; L817818, (2R)-2-aminopropyl N2-[[2-(2-naphthyl)-1H-benzol[g]indo-3-yl]acetyl]-L-lysinate; LTT-SRIF-28, [Leu⁸,DTrp²²,DTyr²⁵]SRIF-28; NNC269100, 1-[3-[N-(5-bromopyridin-2-yl)-N-(3,4-dichlorobenzyl)amino]propyl]-3-[3-(¹H-imidazol-1-yl)propyl]thiourea

Further Reading

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