

VIP and PACAP

Overview: Vasoactive intestinal peptide (VIP) and pituitary adenylate cyclase-activating peptide (PACAP) receptors (nomenclature recommended by the NC-IUPHAR Subcommittee on Vasoactive Intestinal Peptide Receptors, Harmar *et al.*, 1998) are activated by the endogenous peptides VIP, PACAP₁₋₃₈, PACAP₁₋₂₇, peptide histidine isoleucineamide (PHI), peptide histidine methionineamide (PHM), peptide histidine valine and growth hormone-releasing factor (GRF). PACAP Type II receptors have been defined as those for which PACAP and VIP display comparable affinity. Both VPAC₁ and VPAC₂ meet this definition. [Arg¹⁶]chicken secretin is an agonist at both VPAC₁ and secretin receptors, but can be used as an agonist at VPAC₁ receptors in tissues that do not express secretin receptors (Gourlet *et al.*, 1997a). PACAP₆₋₃₈ also shows significant affinity for VPAC₂ receptors. Helodermin discriminates VPAC₁ and VPAC₂ in a species-dependent manner (Gourlet *et al.*, 1998).

Nomenclature	VPAC ₁	VPAC ₂	PAC ₁
Other names	VIP ₁ /PACAP, VIP, VIP ₁ , PACAP Type II, PVR2	VIP ₂ /PACAP, VIP ₂ , PACAP ₃ , PVR2	PACAP, PACAP Type I, PVR1
Ensembl ID	ENSG00000114812	ENSG00000106018	ENSG00000078549
Principal transduction	G _s	G _s	G _s
Rank order of potency	VIP, PACAP-(1-27) = PACAP-(1-38) > GRF >> PHI >> secretin	VIP, PACAP-(1-38) > PACAP-(1-27) > PHI >> GRF, secretin	PACAP-(1-27), PACAP-(1-38) >> VIP > PHI
Selective agonists	[Arg ¹⁶]chicken secretin, [Lys ¹⁵ ,Arg ¹⁶ ,Leu ²⁷]VIP-(1-7)-GRF-(8-27)-NH ₂	Ro251553 (Gourlet <i>et al.</i> , 1997a,b), Ro251392 (Xia <i>et al.</i> , 1997)	Maxadilan (Moro and Lerner, 1997)
Selective antagonists	[Ac-His ¹ ,D-Phe ² ,Lys ¹⁵ ,Arg ¹⁶]VIP-(3-7)-GRF-(8-27)-NH ₂ (Gourlet <i>et al.</i> , 1997a)	–	PACAP-(6-38)
Probes	[¹²⁵ I]-VIP, [¹²⁵ I]-PACAP	[¹²⁵ I]-VIP, [¹²⁵ I]-PACAP	[¹²⁵ I]-PACAP

Subtypes of PAC₁ receptors have been proposed based on tissue differences in the potencies of PACAP₁₋₂₇ and PACAP₁₋₃₈; these might result from differences in G protein coupling and second messenger mechanisms (Van Ramplebergh *et al.*, 1996), or from alternative splicing of PAC₁ receptor mRNA (Spengler *et al.*, 1993).

Abbreviations: Ro251392, Ac-His¹[Glu⁸,OCH₃-Tyr¹⁰,Lys¹²,Nle¹⁷,Ala¹⁹,Asp²⁵,Leu²⁶,Lys^{27,28}]VIP (cyclo 21–25); Ro251553, Ac-His¹[Glu⁸,Lys¹²,Nle¹⁷,Ala¹⁹,Asp²⁵,Leu²⁶,Lys^{27,28},Gly^{29,30},Thr³¹]VIP-NH₂ (cyclo 21–25)

Further Reading

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