Product Data Sheet

Product Name: [Ala1,3,11,15]-Endothelin
Cat. No.: GC17744

Chemical Properties

Cas. No.	121204-87-3		
SMILES	CC[C@]([C@@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/[C@](/N=C(O)/		
Formula	$C_{109}H_{163}N_{25}O_{32}S$	M.Wt	2367.67
Solubility	Soluble to 1 mg/ml in Water	Storage	Desiccate at -20°C
General tips	For obtaining a higher solubility , please warm the tube at 37 ℃ and shake it in the ultrasonic bath for a while.Stock solution can be stored below -20℃ for several months.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		
Structure	[Ala1,3,11,15]-Endothelin		

Protocol

Cell experiment [1]:

Cell lines	Human umbilical vein endothelial cells (HUVEC)
Preparation Method	HUVEC were isolated from umbilical veins and cultured in Medium E199 supplemented with 15% fetal calf serum, 2mM L-glutamine, and antibiotics at 37°C under 5% CO_2. Confluent monolayers were wounded using a Perspex comb and treated with [Ala1,3,11,15]-Endothelin (10–100nM) in medium.
Reaction Conditions	10–100nM; 18 hours post-wounding.

Caution: Product has not been fully validated for medical applications. For research use only.

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Applications	[Ala1,3,11,15]-Endothelin significantly enhanced wound repair in HUVEC monolayers by promoting cell proliferation, as confirmed by increased cell counts. This effect was concentration-dependent and unaffected by ETA or ETA/ETB receptor antagonists (BQ-123 or PD142893). Actinomycin D abolished the proliferative response, indicating dependence on de novo protein synthesis. The peptide acted directly without involving cyclo-oxygenase pathways or basic fibroblast growth factor (bFGF) signaling.

Animal experiment [2]:

Animal models	Anesthetized Sprague-Dawley rats
Preparation Method	Rats were instrumented with ultrasonic Doppler flow probes on carotid, coeliac, mesenteric, renal, and iliac arteries. [Ala1,3,11,15]-Endothelin was administered intravenously as a bolus injection (0.1–10nmol/kg), with hemodynamic parameters monitored for 30 minutes.
Dosage form	0.1–10nmol/kg; i.v.; Single injection.

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Applications	[Ala1,3,11,15]-Endothelin induced a biphasic hemodynamic response: an initial marked decrease in mean arterial pressure accompanied by vasodilation in carotid, coeliac, and iliac beds, and concurrent vasoconstriction in mesenteric and renal beds. This was followed by a mild secondary pressor effect with systemic vasoconstriction. Pretreatment with the ETA receptor antagonist BQ-123 (1.6μmol/kg) abolished the secondary vasoconstrictor response but did not affect the early vasodilator component, confirming ETB receptor-mediated vasodilation and partial ETA-dependent vasoconstriction.

References:

[1] Wren AD, Hiley CR, Fan TP. Endothelin-3 mediated proliferation in wounded human umbilical vein endothelial cells. Biochem Biophys Res Commun. 1993 Oct 15;196(1):369-75.

[2] Bigaud M, Pelton JT. Discrimination between ETA- and ETB-receptor-mediated effects of endothelin-1 and [Ala1,3,11,15]endothelin-1 by BQ-123 in the anaesthetized rat. Br J Pharmacol. 1992 Dec;107(4):912-8.

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Background

[Ala1,3,11,15]-Endothelin is a modified linear analogue of endothelin-1, characterized by the substitution of alanine for the native amino acids at positions 1, 3, 11, and 15 of the original sequence[1-2]. [Ala1,3,11,15]-Endothelin acts as a selective endothelin B (ETB) receptor agonist with an IC_{50} ranging from 0.33nM to 0.61nM and is commonly used in studies related to vasoconstriction and receptor function[3-4].

In vitro, when Chinese hamster ovary (CHO) cells stably expressing human ETB receptors were treated with 100nM [Ala1,3,11,15]-Endothelin for 20 minutes, [Ala1,3,11,15]-Endothelin significantly stimulated cytosolic phospholipase A_2 activity and promoted prostaglandin E_2 secretion[5]. In wounded human umbilical vein endothelial cell (HUVEC) monolayers, treatment with 10–100nM [Ala1,3,11,15]-Endothelin for 18 hours. [Ala1,3,11,15]-Endothelin enhanced wound repair by promoting cell proliferation rather than migration[6].

In vivo, intravenous administration of [Ala1,3,11,15]-Endothelin (0.1–10nmol/kg) induced a biphasic hemodynamic response in anesthetized rats. During the initial phase (1–3 minutes), [Ala1,3,11,15]-Endothelin caused a significant decrease in mean arterial pressure accompanied by vasodilation in the carotid, coeliac, and iliac arterial regions, along with marked vasoconstriction in the mesenteric and renal arteries. In the later phase (15–20 minutes), [Ala1,3,11,15]-Endothelin increased in blood pressure and systemic vasoconstriction[7].

References:
[1] Nakamichi K, Ihara M, Kobayashi M, et al. Different distribution of endothelin receptor subtypes in pulmonary tissues revealed by the novel selective ligands BQ-123 and [Ala1,3,11,15]ET-1. Biochem Biophys Res Commun. 1992 Jan 15;182(1):144-50.
[2] Webber KM, Pennefather JN, Head GA, et al. Endothelin induces dopamine release from rat striatum via endothelin-B receptors. Neuroscience. 1998 Oct;86(4):1173-80.
[3] Saeki T, Ihara M, Fukuroda T, et al. [Ala1,3,11,15]endothelin-1 analogs with ETB agonistic activity. Biochem Biophys Res Commun. 1991 Aug 30;179(1):286-92.
[4] Wong J, Reddy VM, Hendricks-Munoz K, et al. Endothelin-1 vasoactive responses in lambs with pulmonary hypertension and increased pulmonary blood flow. Am J Physiol. 1995 Dec;269(6 Pt 2):H1965-72.

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[5] Schramek H, Wang Y, Konieczkowski M, et al. Endothelin-1 stimulates cytosolic phospholipase A2 in Chinese hamster ovary cells stably expressing the human ETA or ETB receptor subtype. Biochem Biophys Res Commun. 1994 Mar 15;199(2):992-7.
[6] Wren AD, Hiley CR, Fan TP. Endothelin-3 mediated proliferation in wounded human umbilical vein endothelial cells. Biochem Biophys Res Commun. 1993 Oct 15;196(1):369-75.
[7] Bigaud M, Pelton JT. Discrimination between ETA- and ETB-receptor-mediated effects of endothelin-1 and [Ala1,3,11,15]endothelin-1 by BQ-123 in the anaesthetized rat. Br J Pharmacol. 1992 Dec;107(4):912-8.