Product Data Sheet

Product Name: Transdermal Peptide (TD 1 (peptide))
Cat. No.: GC30535

Chemical Properties

Cas. No.	918629-48-8		
SMILES	Ala-Cys-Ser-Ser-Ser-Pro-Ser-Lys-His-Cys-Gly		
Formula	$C_{40}H_{66}N_{14}O_{16}S_2$	M.Wt	1063.17
Solubility	Soluble in Water	Storage	Store 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			

Protocol

Kinase experiment [1]:

Preparation Method	Transdermal Peptide (TD 1 (peptide)) or ATP1B1 were incubated in 96-well plates with 0.05 M NaHCO 3 for 12 h at 4 °C. Cell lysates were incubated with fixed Transdermal Peptide (TD 1 (peptide)) for 2 h at 37°C.
Reaction Conditions	0.5 mg/mL Transdermal Peptide (TD 1 (peptide)) for 2 h at 37°C.
Applications	The interaction between Transdermal Peptide (TD 1 (peptide)) (0.5 mg/mL) and the full-length ATP1B1 or the C-terminus of ATP1B1 was dose-dependent.

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Cell experiment [1]:

Cell lines	HaCaT cells
Preparation Method	HaCaT cells were treated with Transdermal Peptide (TD 1 (peptide)) to study the expression of ATP1B1.
Reaction Conditions	20 μg/mL Transdermal Peptide (TD 1 (peptide))
Applications	Transdermal Peptide (TD 1 (peptide)) affects the localization of ATP1B1 in HaCaT cells, ATP1B1 is initially uniformly distributed in cells, whereas after treatment with Transdermal Peptide (TD 1 (peptide)), it accumulates near the cell membrane.

Animal experiment [1]:

Animal models	Adult male SD rats (200 ± 10 g)
Preparation Method	For in vivo skin permeation, 50 μg of Transdermal Peptide (TD 1 (peptide))-hEGF was coadministered with 500 μg of ouabain, 50 μg of GST-ATP1B1, or 50 μg of GST (control group) on the abdomen of rats for 6 h.
Dosage form	50 μg Transdermal Peptide (TD 1 (peptide)) for 6h(i.p).

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Applications	When ouabain was coadministered, the transdermal delivery of Transdermal Peptide (TD 1 (peptide))-hEGF, a fusion protein composed of Transdermal Peptide (TD 1 (peptide)) and hEGF, was significantly reduced. The addition of the exogenous competitor can also cause a decrease in the transdermal delivery of Transdermal Peptide (TD 1 (peptide))-hEGF. Therefore, ATP1B1 played a key role in the peptide-directed drug delivery across the skin.

References:

[1].Wang C, Ruan R,et,al. Role of the Na(+)/K(+)-ATPase beta-subunit in peptide-mediated transdermal drug delivery. Mol Pharm. 2015 Apr 6;12(4):1259-67. doi: 10.1021/mp500789h. Epub 2015 Mar 23. PMID: 25734358.

Background

Transdermal Peptide (TD 1 (peptide)), consisting of 11 amino acids, is the first transdermal enhancing peptide discovered by phage display. Transdermal Peptide binds to Na+/K+-ATPase beta-subunit (ATP1B1), and enhances the transdermal delivery of many macromolecules[1,2]. Transdermal Peptide (TD 1 (peptide))1 has been found to facilitate the transdermal delivery of many macromolecules such as botulinum neurotoxin type A (BoNT-A), growth hormone (GH), siRNA and human epidermal growth factor (hEGF) [3,4]. Energy is required for the Transdermal Peptide (TD 1 (peptide))-mediated transdermal protein delivery through rat and human skins.A novel energy-dependent permeation process during the Transdermal Peptide (TD 1 (peptide))-

mediated transdermal protein delivery[7].

When ouabain was coadministered, the transdermal delivery of Transdermal Peptide (TD 1 (peptide))-hEGF, a fusion protein composed of Transdermal Peptide (TD 1 (peptide)) and hEGF, was significantly reduced. The addition of the exogenous competitor can also cause a decrease in the transdermal delivery of Transdermal Peptide (TD 1 (peptide))-hEGF. Therefore, ATP1B1 played a key role in the peptide-directed drug delivery across the skin[1].

Coadministration of Transdermal Peptide (TD 1 (peptide)) and insulin to the abdominal skin of diabetic rats resulted in elevated systemic levels of insulin and suppressed serum glucose levels for at least 11 h. Significant systemic bioavailability of human growth hormone was also achieved when topically coadministered with Transdermal Peptide (TD 1 (peptide)) [2]. Blood glucose level lowered to about 26% of initial after administrating 2.1 IU insulin with 0.5 μmol of TD-34 in 100 μL of saline for 8 h to diabetic rats in vivo[6]. Transdermal Peptide (TD 1 (peptide)) delivery of anti-GAPDH siRNA significantly reduced the level of GAPDH in 72 h. Transdermal Peptide (TD 1 (peptide)) can create a transient opening in non-follicle rat skin for delivery of siRNA and reveal a novel mechanism of transdermal delivery of Transdermal Peptide (TD 1 (peptide)) and siRNA into the epidermis for gene knockdown[5].

References:
[1]: Wang C, Ruan R, et,al. Role of the Na(+)/K(+)-ATPase beta-subunit in peptide-mediated transdermal drug delivery. Mol Pharm. 2015 Apr 6;12(4):1259-67. doi: 10.1021/mp500789h. Epub 2015 Mar 23. PMID: 25734358.
[2]: Chen Y, Shen Y, et,al. Transdermal protein delivery by a coadministered peptide identified via phage display. Nat Biotechnol. 2006 Apr;24(4):455-60. doi: 10.1038/nbt1193. Epub 2006 Mar 26. PMID: 16565728.
[3]: Carmichael NME, Dostrovsky JO, et,al. Peptide-mediated transdermal delivery of botulinum neurotoxin type A reduces neurogenic inflammation in the skin. Pain. 2010 May;149(2):316-324. doi: 10.1016/j.pain.2010.02.024. Epub 2010 Mar 23. PMID: 20223589.
[4]: Zhang T, Qu H, et,al. Transmembrane delivery and biological effect of human growth hormone via a phage displayed peptide in vivo and in vitro. J Pharm Sci. 2010 Dec;99(12):4880-91. doi: 10.1002/jps.22203. PMID: 20821386.
[5]: Lin CM, Huang K, et,al. A simple, noninvasive and efficient method for transdermal

delivery of siRNA. Arch Dermatol Res. 2012 Mar;304(2):139-44. doi: 10.1007/s00403-011-1181-5. Epub 2011 Oct 19. PMID: 22009459.
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[7]: Ruan R, Jin P, et,al. Peptide-chaperone-directed transdermal protein delivery requires energy. Mol Pharm. 2014 Nov 3;11(11):4015-22. doi: 10.1021/mp500277g. Epub 2014 Oct 13. PMID: 25269793.