Product Data Sheet

Product Name: Yoda1
Cat. No.: GC18233

Chemical Properties

Cas. No.	448947-81-7		
Chemical Name	2-[5-[[(2,6-dichlorophenyl)methyl]thio]-1,3,4-thiadiazol-2-yl]-pyrazine		
SMILES	ClC(C=CC=C1Cl)=C1CSC2=NN=C(C3=CN=CC=N3)S2		
Formula	$C_{13}H_8Cl_2N_4S_2$	M.Wt	355.3
Solubility	DMSO□50mg/mL	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	Yoda1		

Protocol

Cell experiment [1]:

Cell lines	Human coronary artery endothelial cells (HCAECs)
Preparation Method	Human coronary endothelial cells (HCAEC) were treated with the indicated concentration of Yoda1 for 5 min.
Reaction Conditions	1.5/3.0/6.0 μM for 5min

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com
Address: 10292 Central Ave. #205, Montclair, CA, USA

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Applications	Yoda1 induced the activation of Akt and ERK1/2, and the increase of their respective phosphorylation levels reflected that the phosphorylation of the two signaling molecules also increased with the increase of Yoda1 concentration.

Animal experiment [2]:

Animal models	Eight-week-old SPF male C57BL/6 mice
Preparation Method	Hypertensive mice were injected with GSMTX-4, Yoda1 (Yod, 4 μg/kg/day) or LY294002 through tail vein for 3 days
Dosage form	4 μg/kg/day Yoda1 for 3 days
Applications	Agonist Yoda1 effectively inhibited calcium influx caused by hypertension. Antithrombotic studies proved that the inhibition of Piezo1 effectively inhibited arterial thrombosis and reduced the infarct size of stroke in hypertensive mice.

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References:

[1]: Dela Paz NG, Frangos JA. Yoda1-induced phosphorylation of Akt and ERK1/2 does not require Piezo1 activation. Biochem Biophys Res Commun. 2018 Feb 26;497(1):220-225. doi: 10.1016/j.bbrc.2018.02.058. Epub 2018 Feb 8. PMID: 29428723; PMCID: PMC5835220.
[2]: Zhao W, Wei Z, et,al. Piezo1 initiates platelet hyperreactivity and accelerates thrombosis in hypertension. J Thromb Haemost. 2021 Dec;19(12):3113-3125. doi: 10.1111/jth.15504. Epub 2021 Oct 8. PMID: 34411418.

Background

Yoda1 is an agonist for both human and mouse Piezo1. Yoda 1 activates purified Piezo1 channels□The EC50 of mouse was 17.1 μm, and that of human was 26.6 μm[1].Yoda1 has been widely used to study the gating mechanism of Piezo and various PIEzO-related biological processes[5].

Yoda1 induces activation of both Akt and ERK1/2 in endothelial cells (ECs), which is not dependent on Piezo1[2].Yoda1 induced the activation of Akt and ERK1/2, and the increase of their respective phosphorylation levels reflected that the phosphorylation of the two signaling molecules also increased with the increase of Yoda1 concentration[4].Activation of Piezo1 by Yoda1, a Piezo1 agonist, caused calcium influx and profibrotic responses in HK2 cells and induced calcium-dependent protease calpain2 activation, followed by adhesion complex protein talin1 cleavage and upregulation of integrin β1. Also, Yoda1 promoted the link between ECM and integrin β1[7].Yoda1 Enhanced Low-Magnitude High-Frequency Vibration on Osteocytes in Regulation of MDA-MB-231 Breast Cancer Cell Migration[8].

Agonist Yoda1 effectively inhibited calcium influx caused by hypertension.

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Antithrombotic studies proved that the inhibition of Piezo1 effectively inhibited arterial thrombosis and reduced the infarct size of stroke in hypertensive mice[6].A Yoda1-like exercise pill has the ability to specifically target and enhance Piezo1 activity during exercise[3].

References:

[1]: Syeda R, Xu J, et,al. Chemical activation of the mechanotransduction channel Piezo1. Elife. 2015 May 22;4:e07369. doi: 10.7554/eLife.07369. PMID: 26001275; PMCID: PMC4456433.
[2]:Dela Paz NG, Frangos JA. Yoda1-induced phosphorylation of Akt and ERK1/2 does not require Piezo1 activation. Biochem Biophys Res Commun. 2018 Feb 26;497(1):220-225. doi: 10.1016/j.bbrc.2018.02.058. Epub 2018 Feb 8. PMID: 29428723; PMCID: PMC5835220.
[3]:Beech DJ. Endothelial Piezo1 channels as sensors of exercise. J Physiol. 2018 Mar 15;596(6):979-984. doi: 10.1113/JP274396. Epub 2018 Jan 9. PMID: 29194632; PMCID: PMC5851887.
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[5]: Douguet D, Patel A, et,al. Piezo Ion Channels in Cardiovascular Mechanobiology. Trends Pharmacol Sci. 2019 Dec;40(12):956-970. doi: 10.1016/j.tips.2019.10.002. Epub 2019 Nov 5. PMID: 31704174.
[6]: Zhao W, Wei Z, et,al.Piezo1 initiates platelet hyperreactivity and accelerates thrombosis in hypertension. J Thromb Haemost. 2021 Dec;19(12):3113-3125. doi: 10.1111/jth.15504. Epub 2021 Oct 8. PMID: 34411418.
[7]: Zhao X, Kong Y, et,al. Mechanosensitive Piezo1 channels mediate renal fibrosis. JCI Insight. 2022 Apr 8;7(7):e152330. doi: 10.1172/jci.insight.152330. PMID: 35230979; PMCID: PMC9057604.
[8]: Lin CY, Song X, et,al. Yoda1 Enhanced Low-Magnitude High-Frequency Vibration on Osteocytes in Regulation of MDA-MB-231 Breast Cancer Cell Migration. Cancers (Basel). 2022 Jul 13;14(14):3395. doi: 10.3390/cancers14143395. PMID: 35884459; PMCID: PMC9324638.

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