

Product Name: Ionomycin calcium salt
Cat. No.: GC15148

Cas. No. 56092-82-1

Chemical Name	calcium (4S,6S,8S,10E,12R,14R,16E,18S,19S,20R,21S)-19,21-dihydroxy-22-((2R,2'R,5R,5'S)-5'-((R)-1-hydroxyethyl)-2,5'-dimethyloctahydro-[2,2'-bifuran]-5-yl)-4,6,8,12,14,18,20-heptamethyl-11-oxido-9-oxodocosa-10,16-dienoate
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SMILES O[C@H](C)[C@@]1(C)O[C@H](CC1)[C@]2(C)O[C@@H](C[C@@H]([C@@H](C)[C@H]([C@H]([C@H]([C@@H](C)C[C@@H](C)/C=C/C[C@@H](C)C[C@@H](C)/C([O-])=C\C([C@@H](C)C[C@@H](C)C[C@@H](C)CCC([O-])=O)=O)C)O)O)CC2.[Ca+2]

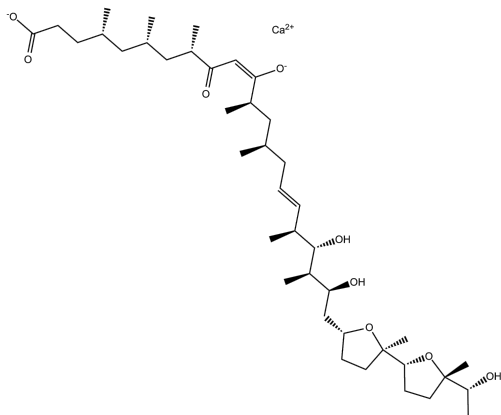
Formula	C ₄₁ H ₇₀ O ₉ .Ca	M.Wt	747.08
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Solubility	20mg/mL in enathol, 1.6mg/mL in DMSO, 1.2mg/mL in DMF	Storage	Store at -20°C,protect from light
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General tips	For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°C for several months.
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Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.
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Structure



Cell experiment [1]:

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Cell lines N1E-115 cells

Cells were treated with various concentrations (0, 0.2, 0.5, 1, 2, and 10 μ M) and Preparation Method incubation times (3, 6, 12, and 24 h) of ionomycin, and cell survival was determined using the trypan blue dye exclusion assay.

Reaction Conditions 0, 0.2, 0.5, 1, 2, and 10 μ M ; 3, 6, 12, and 24 h

Applications Ionomycin treatment induced cell death in a concentration- and time-dependent manner.

Animal experiment [2]:

Animal models Adult male C57BL/6 wild type (20-25 g, 8-10 weeks old) and FXR KO mice (20-25 g, 8-10 weeks old)

In order to investigate the biological function of FXR in vivo, an L-type calcium channel agonist, Bayk8644 (2 mg/kg) was given intraperitoneally at 10 min after reperfusion. Bayk8644 stock solution (1 mmol/L in dimethyl sulfoxide, DMSO) was diluted in 1 $\times$ phosphate-buffered saline (PBS) with a final DMSO Preparation Method concentration of 4.6%. Similarly, PBS with 4.6% DMSO was given intraperitoneally in sham, wild-type vehicle, and FXR knockout vehicle groups as control. A dose range of ionomycin (50 nmol/L), GW4064 (0, 1, 1.5, 3, and 6 μ mol/L), or Z-guggulsterone (Z-GS, 0, 2.5, 5, and 10 μ mol/L) was given for 18 h before oxygen and glucose deprivation (OGD).

Dosage form 50 nmol/L (4.6% DMSO); 18 h; i.p.

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Applications

TUNEL staining demonstrated that Z-GS treatment reduced neuronal apoptosis and addition of IM (Ionomycin) significantly increased apoptotic neurons compared to OGD group, suggesting that inhibition of FXR (Farnesoid X receptor) can reduce neuronal apoptosis through reducing calcium influx after OGD/R.

References:

Nakamura S, et al. Ionomycin-induced calcium influx induces neurite degeneration in mouse neuroblastoma cells: analysis of a time-lapse live cell imaging system. Free Radic Res. 2016;50(11):1214-1225.

Shan HM, et al. Farnesoid X receptor knockout protects brain against ischemic injury through reducing neuronal apoptosis in mice. J Neuroinflammation. 2020 May 25;17(1):164.

Background

Ionomycin calcium salt is a narrow spectrum antibiotic being active against Gram-positive bacteria, which produced by the bacterium *Streptomyces conglobatus*[1]. Ionomycin calcium salt promotes apoptosis. Ionomycin also induces the activation of protein kinase C (PKC)[2].

In vitro, treatment with 2 μ M Ionomycin in LCLC 103H cells results in an instantaneous increase in intracellular Ca^{2+} concentration from 50 to 180 nM. And in Ionomycin-treated cultures, there is obvious DNA fragmentation and PARP cleavage to an 85-kDa fragment, and necrosis could be detected in ~1-5% of the Ionomycin treated cells[2]. In ras oncogene expressing cells, Ionomycin leads to a dose dependent increase of intracellular calcium activity. At 100 nmol/l Ionomycin intracellular calcium is increased from 114 ± 17 nmol/l to 342 ± 24 nmol/l, a value within the range of intracellular calcium concentrations following application of bradykinin[3].

In vivo efficacy test, treatment with 1 μ m Ionomycin for 6 h, ubiquitination of ENaC- β was robustly enhanced in cells overexpressing wild-type Nedd4-2a[4].

References:

[1] Liu WC, et al. Ionomycin, a new polyether antibiotic. J Antibiot (Tokyo). 1978 Sep;31(9):815-9.

[2] Chatila T, et al. Mechanisms of T cell activation by the calcium ionophore Ionomycin. J Immunol.

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1989 Aug 15;143(4):1283-9.

[3] Wöhl E, et al. The role of calcium in cell shrinkage and intracellular alkalinization by bradykinin in Ha-ras oncogene expressing cells. FEBS Lett. 1993 May 17;322(3):261-5.

[4] Wang J, et al. Calcium activates Nedd4 E3 ubiquitin ligases by releasing the C2 domain-mediated auto-inhibition. J Biol Chem. 2010 Apr 16;285(16):12279-88.

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