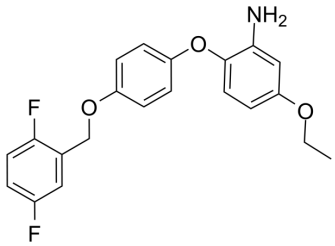
SEA0400

Cat. No.:	HY-15515
CAS No.:	223104-29-8
Molecular Formula:	$C_{21}H_{19}F_2NO_3$
Molecular Weight:	371
Target:	Na+/Ca2+ Exchanger
Pathway:	Membrane Transporter/Ion Channel
Storage:	Powder -20°C 3 years 4°C 2 years In solvent -80°C 2 years -20°C 1 year



SOLVENT & SOLUBILITY

In Vitro

DMSO : ≥ 32 mg/mL (86.25 mM)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	2.6954 mL	13.4771 mL	26.9542 mL
5 mM	0.5391 mL	2.6954 mL	5.3908 mL
10 mM	0.2695 mL	1.3477 mL	2.6954 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: 2.5 mg/mL (6.74 mM); Suspended solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (6.74 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

SEA0400 is a novel and selective inhibitor of the Na^+-Ca^{2+} exchanger (NCX), inhibiting Na^+-dependent Ca^{2+} uptake in cultured neurons, astrocytes, and microglia with IC_{50}s of from 5 to 33 nM.

IC_{50} & Target

IC50: 5-33 nM (NCX)

In Vitro

SEA0400 inhibits Na^+-dependent $^{45}Ca^{2+}$ uptake in cultured neurons, astrocytes, and microglia. IC_{50} values of SEA0400 are 33 nM (neurons), 5.0 nM (astrocytes), and 8.3 nM (microglia)[1]. SEA0400 prevents sodium nitroprusside (SNP) to increase ERK and p38 MAPK phosphorylation, and production of reactive oxygen species (ROS) in an extracellular Ca^{2+}-dependent manner[2].

	MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	SEA0400 (3 mg/kg + 3 mg/kg/h for 2 h, i.v.) attenuates the infarct volume in the cerebral cortex and striatum, does not affect the mean the regional cortical blood flow in anesthetized rats[1]. SEA0400 protects against the dopaminergic neurotoxicity (determined by dopamine levels in the midbrain and striatum, tyrosine hydroxylase immunoreactivity in the substantia nigra and striatum, striatal dopamine release, and motor deficits) in MPTP-treated C57BL/6J mice[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Kinase Assay [1]	Na^+-Ca^{2+} exchange activity is determined by assaying Na^+-dependent $^{45}Ca^{2+}$ uptake as reported previously. Briefly, the cells are preincubated in Hanks' balanced saline solution (HBSS) for 20 min, and the medium is switched to HBSS containing $^{45}Ca^{2+}$ and incubated for 5 min. To increase intracellular Na^+ concentration, 1 mM ouabain plus 20 μM monensin (for astrocytes and microglia) and 10 μM monensin (for neurons) are used. Monensin is added simultaneously with the isotope. Ouabain is added 5 min before monensin in astrocytes and microglia. SEA0400 and KB-R7943 are added 5 min before monensin and present during $^{45}Ca^{2+}$ uptake reaction. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Cell Assay [1]	Cells, plated in 96-well plastic tissue culture plates, are incubated at 37°C for 30 min in normal or Ca^{2+}-free HBSS containing 10 μM H2DCF-DA and 0.25 μg/mL Cremophor EL, and then rinsed twice with normal HBSS to remove excess dye. The cells are reperfused in normal HBSS for 1 h, and the conversion of H2DCF-DA to its fluorescent product dichlorofluorescein by ROS, presumably H_2O_2 and hydroxyl radical, is determined with excitation at 485 nm and emission at 535 nm using a Wallac Multilabel counter. ROS production is expressed as a percentage of control cells. The linearity and sensitivity of ROS assay are confirmed using H_2O_2 prior to the experiment. SEA0400 at the indicated concentrations is added 10 min before Ca^{2+} reperfusion and present until assay. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [1]	Male Sprague-Dawley rats, weighing 289 to 325 g, are anesthetized with 1 to 2% halothane. A catheter is inserted into the femoral artery and connected to a pressure transducer to record blood pressure. Regional cortical blood flow is measured by a laser Doppler flowmeter, with probe placement at 2 mm posterior and 6 mm lateral to the bregma. SEA0400 or its vehicle with an equivalent volume is i.v. injected at 3 mg/kg and then infused at 3 mg/kg/h for 2 h under normal conditions without MCA occlusion. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- J Clin Invest. 2016 Jan;126(1):112-22.
- Autophagy. 2021 Nov;17(11):3592-3606.
- EMBO J. 2023 Dec 15.
- JACC Basic Transl Sci. 2016 Jun;1(4):251-266.
- JCI Insight. 2019 Apr 25;5(11):e128765.

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REFERENCES

[1]. Matsuda T, et al. SEA0400, a novel and selective inhibitor of the Na+-Ca2+ exchanger, attenuates reperfusion injury in the in vitro and in vivo cerebral ischemic models. J

Pharmacol Exp Ther. 2001 Jul;298(1):249-56.

[2]. Nashida T, et al. The specific Na(+)/Ca(2+) exchange inhibitor SEA0400 prevents nitric oxide-induced cytotoxicity in SH-SY5Y cells. Neurochem Int. 2011 Aug;59(1):51-8.

[3]. Ago Y, et al. SEA0400, a specific Na+/Ca2+ exchange inhibitor, prevents dopaminergic neurotoxicity in an MPTP mouse model of Parkinson's disease. Neuropharmacology. 2011 Dec;61(8):1441-51.

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