Product Data Sheet

Product Name: Dyngo-4a
Cat. No.: GC17208

Chemical Properties

Cas. No.	1256493-34-1		
Chemical Name	(E)-N'-(2,3,4,5-tetrahydroxybenzylidene)-2-naphthohydrazide		
SMILES	O=C(C1=CC=C2C=CC=CC2=C1)N/N=C/C3=CC(O)=C(O)C(O)=C3O		
Formula	$C_{18}H_{14}N_2O_5$	M.Wt	338.31
Solubility	≥ 33.8mg/mL in DMSO	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	Dyngo-4a		

Protocol

Cell experiment [1]:

Cell lines	Neuro-2a mouse neuroblastoma cells

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Product Data Sheet

Preparation Method	Neuro-2a mouse neuroblastoma cells were maintained in MEM supplemented with 10% FBS, streptomycin (100μg/ml), penicillin (100U/ml), GlutaMAX (1mM), and sodium pyruvate (1mM) in a humidified incubator (5% CO_2) at 37°C. For the induction of neuronal differentiation, the Neuro-2a cells were seeded in maintained medium overnight and then incubated in a control medium (supplemented with 2% FBS), and differentiated with 30μM Dyngo-4a for 6 days. The Dyngo-4a was dissolved in DMSO and diluted as needed immediately prior to use. Cell images were captured by the optical microscope.
Reaction Conditions	30μM; 6 days
Applications	Dyngo-4a inhibited cells proliferation and induced their differentiation.

Animal experiment [2]:

Animal models	Female CD-1 mice
Preparation Method	BoNT/A was diluted in 0.9% saline containing 0.1mg/ml BSA, immediately prior to use. Female CD-1 mice (30– 40g) were injected intraperitoneally with 1mg of Dyngo-4a (which is 30mg/kg body weight) or vehicle (1/9 NMP/PEG300 (1 part NMP to 9 parts PEG300) in PBS). 1.5–2h later, mice were injected with 2LD50BoNT/A via the tail vein. A top-up of 1mg of Dyngo-4a or vehicle was administered 4.5–8h after the initial intraperitoneal injection. Mice were constantly monitored for signs of botulism and euthanized upon development of acute respiratory distress.

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Dosage form	i.p.; 30mg/kg at 0h, then 30mg/kg at 4.5–8h (total 60mg/kg)
Applications	Dyngo-4a treatment significantly delayed the onset of botulism.

References:
[1] Huang J, Zhou Y, Zeng S, et al. Dyngo-4a Induces Neuroblastoma Cell Differentiation Through The AKT and ERK1/2 Pathway. *CNS Neurol Disord Drug Targets*. 2023;22(10):1526-1534.
[2] Harper CB, Martin S, Nguyen TH, et al. Dynamin inhibition blocks botulinum neurotoxin type A endocytosis in neurons and delays botulism. *J Biol Chem*. 2011;286(41):35966-35976.

Background

Dyngo-4a is a potent, novel dynamin inhibitor with IC_{50} values of 0.38μM, 1.1μM, and 2.3μM for DynI (brain), DynI (rec), and DynII (rec), respectively[1]. Dynamin is a large

Product Data Sheet

GTPase that hydrolyzes GTP to mediate membrane scission and serves as the key "membrane scissor" in clathrin-mediated endocytosis(CME)[2]. Dyngo-4a blocks the GTPase activity of dynamin, thereby inhibiting CME and is widely used to study mechanisms of neurotransmission, toxin uptake, and viral infection[3][4].

In vitro, treatment of Neuro-2a neuroblastoma cells with Dyngo-4a (10-30μM; 6 days) dose-dependently inhibited cells proliferation and induced their differentiation into Tuj-1-positive neuron-like cells, while markedly up-regulating p-AKT and p-ERK1/2 phosphorylation without affecting p-EGFR[5].

In vivo, Dyngo-4a (i.p.; 30mg/kg at 0h, then 30mg/kg at 4.5–8h (total 60mg/kg)) treatment suppressed BoNT/A-induced muscle paralysis at the rat hemidiaphragm and significantly delayed the onset of botulism in an in vivo murine model[6]. Dyngo-4a (30mg/kg; i.p.; administered on the day of infection) markedly alleviated rotavirus (RV)-induced diarrhea, reducing the diarrhea score from 1.0 to 0.2, while lowering the viral load in the small intestine by approximately 90% and substantially mitigating RV-triggered vacuolar degeneration of small-intestinal villous epithelial cells in 6–8-day-old BALB/c mice[7].

References:

[1] McCluskey A, Daniel JA, Hadzic G, et al. Building a better dynasore: the dyngo compounds potently inhibit dynamin and endocytosis. *Traffic*. 2013;14(12):1272-1289.
[2] Ferguson SM, De Camilli P. Dynamin, a membrane-remodelling GTPase. Nat Rev Mol Cell Biol. 2012 Jan 11;13(2):75-88.
[3] Ahmed A, Trezza A, Gentile M, et al. Dynamin-independent $Ca_V1.2$ and $K_{Ca}1.1$ channels regulation and vascular tone modulation by the mitochondrial fission inhibitors dynasore and dyngo-4a. *Eur J Pharmacol*. 2023;951:175786.
[4] Harper CB, Popoff MR, McCluskey A, Robinson PJ, Meunier FA. Targeting membrane trafficking in infection prophylaxis: dynamin inhibitors. *Trends Cell Biol*. 2013;23(2):90-101.
[5] Huang J, Zhou Y, Zeng S, et al. Dyngo-4a Induces Neuroblastoma Cell Differentiation Through The AKT and ERK1/2 Pathway. *CNS Neurol Disord Drug Targets*. 2023;22(10):1526-1534.
[6] Harper CB, Martin S, Nguyen TH, et al. Dynamin inhibition blocks botulinum neurotoxin type A endocytosis in neurons and delays botulism. *J Biol Chem*.

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2011;286(41):35966-35976.
[7] Zhang Q, Zhang Q, Xu Z, et al. Dyngo-4a protects mice from rotavirus infection by affecting the formation of dynamin 2 oligomers. *Sci Bull (Beijing)*. 2020;65(21):1796-1799.