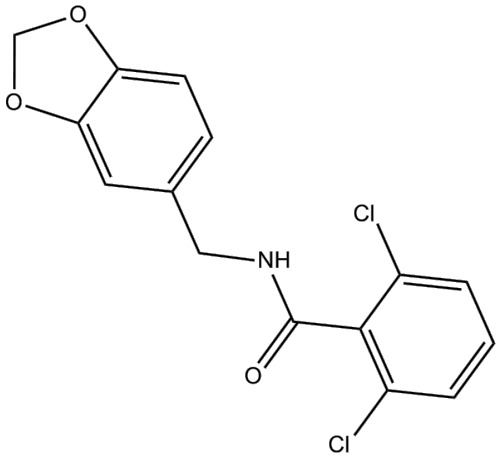
Product Data Sheet

Product Name: Alda 1
Cat. No.: GC16597

Chemical Properties

Cas. No.	349438-38-6		
Chemical Name	N-(benzo[d][1,3]dioxol-5-ylmethyl)-2,6-dichlorobenzamide		
SMILES	ClC1=CC=CC(Cl)=C1C(NCC2=CC=C3OCOC3=C2)=O		
Formula	$C_{15}H_{11}Cl_2NO_3$	M.Wt	324.16
Solubility	≥ 15.15mg/mL in DMSO	Storage	Store at -20°C
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.		
Shipping Condition	Evaluation sample solution : ship with blue ice All other available size: ship with RT , or blue ice upon request.		

Structure



Protocol

Cell experiment [1]:

Cell lines Human pulmonary alveolar epithelial cells

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Preparation Method	Primary human pulmonary alveolar epithelial cells were cultured at 37°C and 5% CO_2, in alveolar epithelial cell medium and endothelial cell-growth medium MV2. Hypoxia was induced by exposing the cells for 24 hours to serum-deprived media in a sealed anaerobic jar fitted with an AnaeroPack to scavenge any free oxygen. The cells were then washed with PBS and were reoxygenated for 2 hours under normal conditions in complete medium. Alda 1, 20μM, was added to the medium for 1 hour before hypoxic exposure of the hypoxia/reoxygenation (H/R) + Alda 1 group.
Reaction Conditions	20μM; 1h
Applications	Alda 1 pretreatment can alleviate lung ischemia-reperfusion injury.

Animal experiment [2]:

Animal models	C57BL/6J mice
Preparation Method	Mice were given 5mg/kg body weight (BW) Alda 1 (dissolved in dimethyl sulfoxide, DMSO) at 9:00 am via three routes, intraperitoneal injection (i.p.). Livers were collected 3 hours after treatments, and hepatic ALDH activity was immediately measured. To assess the specificity of Alda 1 on activating ALDH2, mice were given an ALDH2 specific inhibitor, daidzin, at 50mg/kg BW (dissolved in DMSO) via i.p. along with 5mg/kg BW Alda 1 administration at 9:00 am (n = 4). Three hours later, liver and ileum were collected, mitochondrial and cytosolic fractions from the liver were isolated, and ALDH activity was immediately measured.
Dosage form	5mg/kg; ip; single injection

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Applications	One dose of Alda 1 administration elevated hepatic ALDH activity, which was blocked by the specific ALDH2 inhibitor, daidzin.

References:
[1]. Ding J, Zhang Q, Luo Q, et al. Alda-1 attenuates lung ischemia-reperfusion injury by reducing 4-hydroxy-2-nonenal in alveolar epithelial cells[J]. Critical care medicine, 2016, 44(7): e544-e552.
[2]. Zhong W, Zhang W, Li Q, et al. Pharmacological activation of aldehyde dehydrogenase 2 by Alda-1 reverses alcohol-induced hepatic steatosis and cell death in mice[J]. Journal of hepatology, 2015, 62(6): 1375-1381.

Background

Alda 1 is an aldehyde dehydrogenase 2 (ALDH2) activator [1]. Alda 1 specifically activating the ALDH2 enzyme in mitochondria, enhances the enzyme's ability to metabolize toxic aldehydes such as acetaldehyde, thereby reducing cellular damage caused by these substances [2-3]. Alda 1 is primarily used to study diseases associated with abnormal acetaldehyde metabolism [4].

In human pulmonary alveolar epithelial cells, Alda 1 (20μM; 1h) pretreatment can alleviate lung ischemia-reperfusion injury [5]. In SH-SY5Y cells, pretreatment with Alda 1 (20 μM; 24 h) restored ALDH2 activity and content, increased mitochondrial membrane potential, and reduced reactive oxygen species in cells [6].

In C57BL/6J mice, after Alda 1 (5mg/kg; ip; single injection) administration elevated hepatic ALDH activity, which was blocked by the specific ALDH2 inhibitor, daidzin [7]. In liver ischemia-reperfusion injury (IRI) mice model, Alda 1 (30mg/kg; ip; single injection) mediated ALDH2 activation may improve hepatic IRI by scavenging reactive aldehydes and enhancing autophagy [8]. In hyperoxia mice model, Alda 1 (8mg/kg; sc; 48h) pretreatment attenuates hyperoxia-induced immune cell infiltration [9].

References:
[1]. Stachowicz A, Olszanecki R, Suski M, et al. Proteomic analysis of mitochondria-enriched fraction isolated from the frontal cortex and hippocampus of apolipoprotein E knockout mice treated with

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Alda-1, an activator of mitochondrial aldehyde dehydrogenase (ALDH2)[J]. International Journal of Molecular Sciences, 2017, 18(2): 435.
[2]. Stachowicz A, Głombik K, Olszanecki R, et al. The impact of mitochondrial aldehyde dehydrogenase (ALDH2) activation by Alda-1 on the behavioral and biochemical disturbances in animal model of depression[J]. Brain, Behavior, and Immunity, 2016, 51: 144-153.
[3]. Ikeda T, Takahashi T, Tsujita M, et al. Effects of Alda-1, an aldehyde dehydrogenase-2 agonist, on hypoglycemic neuronal death[J]. PLoS One, 2015, 10(6): e0128844.
[4]. Stachowicz A, Olszanecki R, Suski M, et al. Mitochondrial aldehyde dehydrogenase activation by Alda-1 inhibits atherosclerosis and attenuates hepatic steatosis in apolipoprotein E-knockout mice[J]. Journal of the American Heart Association, 2014, 3(6): e001329.
[5]. Ding J, Zhang Q, Luo Q, et al. Alda-1 attenuates lung ischemia-reperfusion injury by reducing 4-hydroxy-2-nonenal in alveolar epithelial cells[J]. Critical care medicine, 2016, 44(7): e544-e552.
[6]. Deza-Ponzio R, Albrecht P A, Fernandez-Hubeid L E, et al. ALDH2 inhibition by lead and ethanol elicits redox imbalance and mitochondrial dysfunction in SH-SY5Y human neuroblastoma cell line: Reversion by Alda-1[J]. Neurotoxicology, 2023, 97: 12-24.
[7]. Zhong W, Zhang W, Li Q, et al. Pharmacological activation of aldehyde dehydrogenase 2 by Alda-1 reverses alcohol-induced hepatic steatosis and cell death in mice[J]. Journal of hepatology, 2015, 62(6): 1375-1381.
[8]. Li M, Xu M, Li J, et al. Alda-1 Ameliorates Liver Ischemia-Reperfusion Injury by Activating Aldehyde Dehydrogenase 2 and Enhancing Autophagy in Mice[J]. Journal of Immunology Research, 2018, 2018(1): 9807139.
[9]. Sidramagowda Patil S, Hernández-Cuervo H, Fukumoto J, et al. Alda-1 attenuates hyperoxia-induced acute lung injury in mice[J]. Frontiers in pharmacology, 2021, 11: 597942.

Caution: Product has not been fully validated for medical applications. For research use only.
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