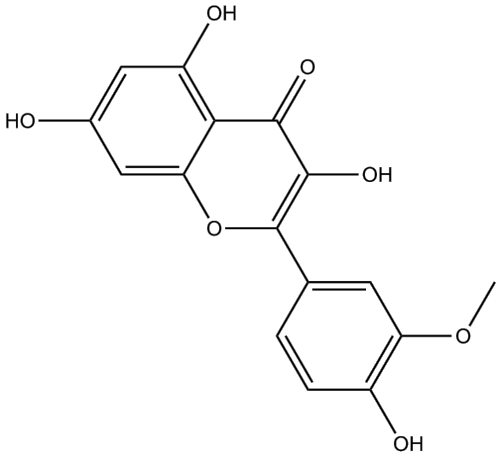
Product Data Sheet

Product Name: Isorhamnetin
Cat. No.: GN10023

Chemical Properties

Cas. No.	480-19-3		
Chemical Name	3,5,7-trihydroxy-2-(4-hydroxy-3-methoxyphenyl)chromen-4-one		
SMILES	COC1=C(C=CC(=C1)C2=C(C(=O)C3=C(C=C(C=C3O2)O)O)O)O		
Formula	$C_{16}H_{12}O_7$	M.Wt	316.27
Solubility	≥ 31.8 mg/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 A549 cells

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Preparation Method	A549 cells were incubated with 10, 20μg/mL (31.6, 63.2μM) of Isorhamnetin for 24h. After treatment, cells were washed with PBS and fixed in ice-cold 75% ethano. Cellular DNA was stained with 0.05% propidium iodide (PI) for 20min at 4°C in darkness. The cell cycle distribution and apoptotic cells were detected with FACScan.
Reaction Conditions	31.6, 63.2μM; 24h
Applications	Isorhamnetin treatment resulted in an accumulation of A549 cellsin the G0/G1 phase with concomitant losses in the S phase.

Animal experiment [2]:

Animal models	Sprague-Dawley rats
Preparation Method	Rats were randomly assigned to four groups. (1) Control group: rats were intraperitoneally (i.p.) injected with saline; (2) Doxorubicin (Dox) group: rats were treated with Dox i.p. with a dose of 3mg/kg every other day for a cumulative dose of 9mg/kg, as previously described; (3) Isorhamnetin group (Iso): rats were pretreated with Isorhamnetin at a dose of 5mg/kg i.p. every day for 6 days; (4) Isorhamnetin doxorubicin group: rats were treated with Isorhamnetin at a dose of 5mg/kg i.p. prior to Dox for 7 days. After 28 days, the rats were then sacrificed and the hearts were removed rapidly. The relative heart weight index (heart weight-to-body weight ratio) was determined. Blood was collected and centrifuged. The serum samples were assayed for LDH, CK, and AST activities. The left ventricles of the hearts were used for histopathological examination and other analyses.
Dosage form	5mg/kg; 7 days; i.p.

Caution: Product has not been fully validated for medical applications. For research use only.
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Applications	Daily pretreatment with Isorhamnetin (5mg/kg, i.p.) for 7 days was found to reduce Dox-induced myocardial damage significantly, including the decline of cardiac index, decrease in the release of serum cardiac enzymes and amelioration of heart vacuolation.

References:
[1] Li Q, Ren F Q, Yang C L, et al. Anti-proliferation effects of isorhamnetin on lung cancer cells in vitro and in vivo[J]. Asian Pacific Journal of Cancer Prevention, 2015, 16(7): 3035-3042.
[2]Sun J, Sun G, Meng X, et al. Isorhamnetin protects against doxorubicin-induced cardiotoxicity in vivo and in vitro[J]. PloS one, 2013, 8(5): e64526.

Background

Isorhamnetin is a flavonoid compound extracted from the traditional Chinese medicine *Hippophae rhamnoides* L., possessing various biological activities including antioxidant, anti-inflammatory, anticancer, and neuroprotective effects[1, 2]. Isorhamnetin exerts its effects by regulating multiple cellular signaling pathways (such as NF-κB and PI3K/AKT), and is beneficial for cardiovascular health, diabetes, and potentially neurodegenerative diseases[3].

In vitro, treatment of A549 cells with Isorhamnetin (31.6, 63.2μM) for 24h resulted in the accumulation of A549 cells in the G0/G1 phase, a decrease in the number of cells in the S phase, and induced apoptosis. Isorhamnetin upregulated the expression of apoptotic genes Bax, caspase-3, and p53, and downregulated the expression of Bcl-2, cyclin D1, and PCNA proteins[4]. Treatment of HepG2 cells with Isorhamnetin (10-100μM) enhanced the nuclear translocation of NF-E2-related factor 2 (Nrf2) in a dose- and time-dependent manner, increased antioxidant response element (ARE) reporter gene activity, and elevated the protein levels of heme oxygenase-1 (HO-1) and glutamate cysteine ligase (GCL), and increased intracellular glutathione (GSH) levels[5].

In vivo, Isorhamnetin (5mg/kg) administered via intraperitoneal injection for 7 days to rats with a chronic cardiotoxicity model significantly reduced myocardial damage, decreased serum cardiac enzyme release, and reduced myocardial vacuolization[6]. Isorhamnetin (5mg/kg) administered via intraperitoneal injection to mice with experimental stroke significantly reduced cerebral edema, improved blood-brain barrier function and neurological function, and upregulated the gene expression

of tight junction proteins (including occludin, ZO-1, and claudin-5)[7].

References:

[1] Khaled R. Biological activities of isorhamnetin: A review[J]. Plantae Scientia, 2020, 3(5): 78-81.
[2] Teng B, Lu Y H, Wang Z T, et al. In vitro anti-tumor activity of isorhamnetin isolated from Hippophae rhamnoides L. against BEL-7402 cells[J]. Pharmacological research, 2006, 54(3): 186-194.
[3] Mao Y, Zha Y, Zang Y, et al. Isorhamnetin improves diabetes-induced erectile dysfunction in rats through activation of the PI3K/AKT/eNOS signaling pathway[J]. Biomedicine & Pharmacotherapy, 2024, 177: 116987.
[4] Li Q, Ren F Q, Yang C L, et al. Anti-proliferation effects of isorhamnetin on lung cancer cells in vitro and in vivo[J]. Asian Pacific Journal of Cancer Prevention, 2015, 16(7): 3035-3042.
[5] Yang J H, Shin B Y, Han J Y, et al. Isorhamnetin protects against oxidative stress by activating Nrf2 and inducing the expression of its target genes[J]. Toxicology and applied pharmacology, 2014, 274(2): 293-301.
[6] Sun J, Sun G, Meng X, et al. Isorhamnetin protects against doxorubicin-induced cardiotoxicity in vivo and in vitro[J]. PloS one, 2013, 8(5): e64526.
[7] Zhao J J, Song J Q, Pan S Y, et al. Treatment with isorhamnetin protects the brain against ischemic injury in mice[J]. Neurochemical Research, 2016, 41(8): 1939-1948.

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