Phlorizin

Cat. No.: HY-N0143

CAS No.: 60-81-1

Molecular Formula: $C_{21}H_{24}O_{10}$

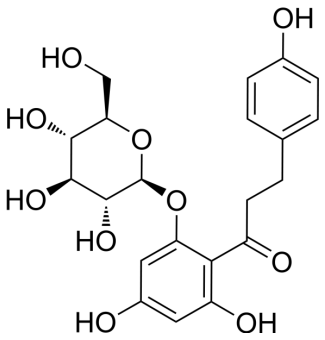
Molecular Weight: 436.41

Target: SGLT; Na+/K+ ATPase

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 : ≥ 50 mg/mL (114.57 mM)

H_2O : 1 mg/mL (2.29 mM; Need ultrasonic)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Mass / Solvent / Concentration	1 mg	5 mg	10 mg
1 mM	2.2914 mL	11.4571 mL	22.9142 mL
5 mM	0.4583 mL	2.2914 mL	4.5828 mL
10 mM	0.2291 mL	1.1457 mL	2.2914 mL

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

In Vivo

1. Add each solvent one by one: 20% HP-β-CD in saline
   Solubility: 15.15 mg/mL (34.72 mM); Clear solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2.5 mg/mL (5.73 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2.5 mg/mL (5.73 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2.5 mg/mL (5.73 mM); Clear solution
5. Add each solvent one by one: PBS
   Solubility: 1.75 mg/mL (4.01 mM); Clear solution; Need ultrasonic and warming and heat to 60°C

BIOLOGICAL ACTIVITY

Description

Phlorizin (Floridzin) is a non-selective SGLT inhibitor with K_is of 300 and 39 nM for hSGLT1 and hSGLT2, respectively.

	Phlorizin is also a Na^+/K^+-ATPase inhibitor.	
IC_{50} & Target	SGLT1	SGLT2
In Vitro	Phlorizin is a non-selective SGLT inhibitor with K_is of 300 and 39 nM for hSGLT1 and hSGLT2, respectively[1]. Phlorizin is also a Na^+/K^+-ATPase inhibitor[2]. Phlorizin at 2×10^{-4} M inhibits Na^+ and Rb^+-activated ATPase activities in human red cell membranes by 43 %. At 1 mM and 7 mM RbCl, rubidium uptake is not changed or is slightly inhibited (less than 15 %) by 2×10^{-4} M Phlorizin[2]. Cell viability is not significantly altered by doses of Phlorizin <100 μM. Pretreating cells with Phlorizin does not significantly reduce nitrite or PGE_2 levels. Phlorizin does not suppress IL-6 or TNF-α production, although 100 μM Phlorizin can significantly inhibit TNF-α expression[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	
In Vivo	Prior to Phlorizin treatment, the blood glucose level in SDT fatty rats is 370±49 mg/dL. Six hours after dosing, the blood glucose level in the Phlorizin treated group decreases to an almost normal level (139±32 mg/dL). Phlorizin-treated SDT fatty rats are heavier than vehicle-treated SDT fatty rats after 12 weeks. Phlorizin treatment significantly decreases glucose excretion and delays insulin decreases. Creatinine clearance decreases significantly with Phlorizin treatment. 23 weeks of Phlorizin treatment prevents the decrease of nerve fibers (23.6±3.2 fibers/mm). Retinal abnormalities are completely prevented with Phlorizin[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	

PROTOCOL

Kinase Assay [1]	Resealed ghosts are obtained with the addition of 4×10^{-3} M ATP and 5×10^{-3} M $MgCl_2$ with or without 5×10^{-4} M Phlorizin (final concentration) when red cells are hemolyzed. Ghosts corresponding to 0.4-0.45 mL of the original blood cells are incubated with 0.9 mL of Medium A and $^{86}RbCl$ for 45 or 90 min and the radioactivity in 200 μL of the supernatant is determined. The ATPase activity in the resealed ghosts is determined from the increase in inorganic phosphate after incubation[1]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Cell Assay [3]	The RAW264.7 murine macrophage-derived cell line is used. Cell viability is measured using the 3-(4,5-Dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay. Cells (10^5 cells/well) are cultured in 96-well plates and treated with varying concentrations of Phlorizin for 24 h. Next, the supernatant is removed and the cells are incubated with MTT (50 mg/mL) for 4 h at 37°C. The plates are washed and isopropanol is added to dissolve formazone crystals, then the absorbance values are measured at 570 nm using a microplate reader[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [4]	Female SDT fatty rats are used in this study. At six weeks of age, SDT fatty rats are divided into two groups (n=8); a Phlorizin treated group and a vehicle treated group. Age-matched female Sprague-Dawley (SD) rats are used as control animals (n=8). Animals are housed in a climate-controlled room (temperature 23±3°C, humidity 55±15%, 12 h lighting cycle) and allowed free access to basal diet and water. Phlorizin is injected subcutaneously once daily (100 mg/kg/day) to animals in the Phlorizin treated group for 23 weeks. Twenty % propylene glycol is administered to animals in the vehicle treated group and control SD rats[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Acta Pharm Sin B. 2021 Jan;11(1):143-155.
- Phytomedicine. 2022 Jul;101:154113.
- Carbohyd Polym. 2021, 118383.

- Virus Res. 2020 Apr 15;280:197901.
- RSC Adv. 2018 8:8469-8483.

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REFERENCES

[1]. Pajor AM, et al. Inhibitor binding in the human renal low- and high-affinity Na+/glucose cotransporters. J Pharmacol Exp Ther. 2008 Mar;324(3):985-91.

[2]. Nakagawa A, et al. Localization of the phlorizin site on Na, K-ATPase in red cell membranes. J Biochem. 1977 May;81(5):1511-5.

[3]. Chang WT, et al. Evaluation of the anti-inflammatory effects of phloretin and phlorizin in lipopolysaccharide-stimulated mouse macrophages. Food Chem. 2012 Sep 15;134(2):972-9.

[4]. Katsuda Y, et al. Contribution of hyperglycemia on diabetic complications in obese type 2 diabetic SDT fatty rats: effects of SGLT inhibitor phlorizin. Exp Anim. 2015;64(2):161-9.

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