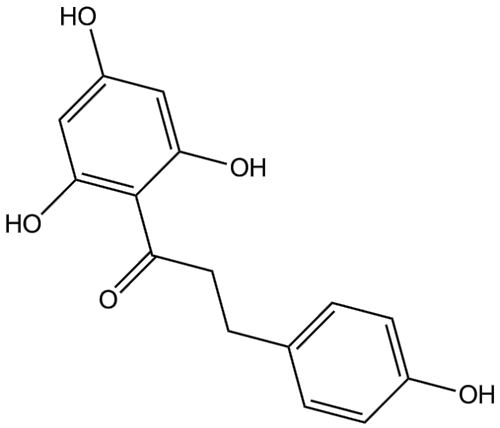
Product Data Sheet

Product Name: Phloretin
Cat. No.: GC17976

Chemical Properties

Cas. No.	60-82-2		
Chemical Name	3-(4-hydroxyphenyl)-1-(2,4,6-trihydroxyphenyl)propan-1-one		
SMILES	O=C(C1=C(O)C=C(O)C=C1O)CCC2=CC=C(O)C=C2		
Formula	$C_{15}H_{14}O_5$	M.Wt	274.27
Solubility	≥ 105 mg/mL in DMSO, ≥ 87.6 mg/mL in EtOH	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	SW-480 cells

Product Data Sheet

Preparation Method	SW-480 cells were cultured in Leibovitz's L-15 medium, supplemented with 10% fetal bovine serum (FBS) and 1% antibiotic–antimycotic, at 37°C in an incubator with 5% CO_2. Cells were inoculated at 4000 cells/well into 96-well plates and treated with Phloretin at various concentrations (10, 25, 50 100, 200, and 300μM) for 48h, the cell proliferation was tested.
Reaction Conditions	10, 25, 50 100, 200, and 300μM; 48h
Applications	Phloretin treatment reduced cell proliferation of SW-480 cells in a dose-dependent manner.
Animal experiment [2]:	
Animal models	C57BL/6 mice
Preparation Method	C57BL/6 mice (4 weeks old) were randomly divided into 3 groups of 10. HFD based on research diets containing 23.1% protein, 34.9% fat, and 25.8% carbohydrates, and fat supplying 60% of energy. The normal control group (N) and HFD control group (HFD) were fed a standard chow diet or HFD, respectively, and administered DMSO solution by intraperitoneal injection. Phloretin groups were fed a HFD and administered 20mg/kg Phloretin by intraperitoneal injection (twice a week) for 12 weeks. Liver tissues from mice were collected for analysis.
Dosage form	20mg/kg; twice a week; 12 weeks; i.p.
Applications	Phloretin treatment suppressed liver lipid accumulation and improved hepatocyte steatosis in mice with HFD.

Product Data Sheet

References:

[1] Kapoor S, Padwad Y S. Phloretin induces G2/M arrest and apoptosis by suppressing the β-catenin signaling pathway in colorectal carcinoma cells[J]. Apoptosis, 2023, 28(5): 810-829.

[2] Liou C J, Wu S J, Shen S C, et al. Phloretin ameliorates hepatic steatosis through regulation of lipogenesis and Sirt1/AMPK signaling in obese mice[J]. Cell & Bioscience, 2020, 10(1): 114.

Background

Phloretin is a dihydrochalcone flavonoid that inhibits yeast-derived GLUT1 and erythrocyte GLUT1 with IC_{50} values of 49μM and 61μM, respectively[1]. Phloretin displays potent antioxidant activity in peroxynitrite scavenging and the inhibition of lipid peroxidation, modulates Ca^{2+} levels and down-regulates the secretion of IL-2 of normal human lymphocytes, and counteracts advanced glycation end product formation[2]. Phloretin can penetrate the skin and has been widely used in dermatological research to prevent excessive skin pigmentation and skin damage[3].

In vitro, Phloretin treatment for 48 hours significantly inhibited the viability of HCT-116, SW-480, and IEC-6 cells, with IC_{50} values of 152.43μM, 127.50μM, and 412.56μM, respectively[4]. Treatment with 200μM Phloretin for 48 hours induced morphological changes in U87 and U251 cells, caused cell cycle arrest and accumulation of reactive oxygen species (ROS), inhibited the PI3K/Akt/mTOR signaling pathway, and increased the expression of PTEN[5]. Treatment with 75μg/ml Phloretin for 24 hours elicited apoptosis in A549 and Calu-1 cells, enhanced the expression of cleaved-caspase-3 and caspase-9, and decreased the levels of MMP-2 and MMP-9[6].

In vivo, Phloretin treatment via intraperitoneal injection at a dose of 20mg/kg, twice a week for 12 weeks, reduced the body weight and fat weight of obese mice on a high-fat diet (HFD), and alleviated hepatocyte steatosis[7]. Daily intraperitoneal injection of Phloretin (20mg/kg/day) for 7 days alleviated acute lung injury induced by lipopolysaccharide (LPS) in mice, inhibited neutrophil infiltration into lung tissue, and reduced the levels of IL-6 and TNF-α in serum and bronchoalveolar lavage fluid[8].

References:

Product Data Sheet

[1] KASAHARA T, KASAHARA M. Expression of the rat GLUT1 glucose transporter in the yeast Saccharomyces cerevisiae[J]. Biochemical Journal, 1996, 315(1): 177-182.

[2] Behzad S, Sureda A, Barreca D, et al. Health effects of phloretin: from chemistry to medicine[J]. Phytochemistry reviews, 2017, 16(3): 527-533.

[3] Casarini T P A, Frank L A, Pohlmann A R, et al. Dermatological applications of the flavonoid phloretin[J]. European Journal of Pharmacology, 2020, 889: 173593.

[4] Kapoor S, Padwad Y S. Phloretin induces G2/M arrest and apoptosis by suppressing the β-catenin signaling pathway in colorectal carcinoma cells[J]. Apoptosis, 2023, 28(5): 810-829.

[5] Liu Y, Fan C, Pu L, et al. Phloretin induces cell cycle arrest and apoptosis of human glioblastoma cells through the generation of reactive oxygen species[J]. Journal of Neuro-oncology, 2016, 128(2): 217-223.

[6] Ma L, Wang R, Nan Y, et al. Phloretin exhibits an anticancer effect and enhances the anticancer ability of cisplatin on non-small cell lung cancer cell lines by regulating expression of apoptotic pathways and matrix metalloproteinases[J]. International Journal of Oncology, 2015, 48(2): 843-853.

[7] Liou C J, Wu S J, Shen S C, et al. Phloretin ameliorates hepatic steatosis through regulation of lipogenesis and Sirt1/AMPK signaling in obese mice[J]. Cell & Bioscience, 2020, 10(1): 114.

[8] Huang W C, Lai C L, Liang Y T, et al. Phloretin attenuates LPS-induced acute lung injury in mice via modulation of the NF-κB and MAPK pathways[J]. International immunopharmacology, 2016, 40: 98-105.

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