Genistein

Cat. No.: HY-14596

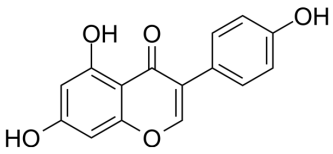
CAS No.: 446-72-0

Molecular Formula: $C_{15}H_{10}O_5$

Molecular Weight: 270.24

Target: EGFR; Autophagy; Apoptosis; Endogenous Metabolite

Pathway: JAK/STAT Signaling; Protein Tyrosine Kinase/RTK; Autophagy; Apoptosis; Metabolic Enzyme/Protease



Storage:

Powder	-20°C	3 years
	4°C	2 years
In solvent	-80°C	1 year
	-20°C	6 months

SOLVENT & SOLUBILITY

In Vitro

DMSO : ≥ 100 mg/mL (370.04 mM)

H_2O : < 0.1 mg/mL (ultrasonic;warming;heat to 60°C) (insoluble)

* "≥" means soluble, but saturation unknown.

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	3.7004 mL	18.5021 mL	37.0041 mL
5 mM	0.7401 mL	3.7004 mL	7.4008 mL
10 mM	0.3700 mL	1.8502 mL	3.7004 mL

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

In Vivo

1. Add each solvent one by one: 50% PEG300 >> 50% saline
   Solubility: 5 mg/mL (18.50 mM); Suspended solution; Need ultrasonic
2. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 3.75 mg/mL (13.88 mM); Clear solution
3. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 3 mg/mL (11.10 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 3 mg/mL (11.10 mM); Clear solution

BIOLOGICAL ACTIVITY

Description

Genistein, a soy isoflavone, is a multiple tyrosine kinases (e.g., EGFR) inhibitor which acts as a chemotherapeutic agent against different types of cancer, mainly by altering apoptosis, the cell cycle, and angiogenesis and inhibiting metastasis.

IC_{50} & Target	EGFR 0.6 μM (IC_{50}, Cell Assay)
In Vitro	Genistein inhibits serum-stimulated growth of MCF-7 and T47D ER^+ cells with IC_{50} values of 7.6 and 8.7 μg/mL by dye exclusion, respectively, and 8.7 and 10.6 μg/mL by [^{3}H]thymidmne incorporation, respectively. These values are similar to the IC_{50} values of 9.4 and 7 μg/mL for MCF-7 and T47D ER^+ cells, respectively, obtained with the MTT assay. Additionally, Genistein at concentrations up to 20 μg/mL does not alter MTT mitochondrial reduction when compared to control cells in an 8 h incubation period. Furthermore, neither biochanin A or daidzein are found to interfere with the MTT assay at IC_{50} concentrations. Therefore, the MTT assay is valid for determining growth inhibition by Genistein at concentrations under 20 μg/mL in the systems studied[1]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
In Vivo	Bisphenol A (BPA) treatment alone and combined with Genistein had no significant effect on the protein expression of LC3II and PPARα in liver of STD- or HFD-fed rats (P>0.05; P>0.05). Significant decreasing of the protein expression of PPARγ in liver is observed when Genistein is added to rats, compared to either HFD group or HFD-BPA group[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.

PROTOCOL

Cell Assay [1]	The IC_{50} values for Genistein are determined by the MTT assay. Briefly, the MTT assay is a colorimetric assay that is based on the ability of living but not dead cells to reduce a tetrazolium-based compound to a blue formazan product. The formazan crystals are solubilized in DMSO, and the absorbance is measured at 540 nm. The absorbance at 540 nm is proportional to the number of viable cells. The lC_{50} values obtained with the MTT assay are compared with the lC_{50} values obtained by counting viable cells using trypan blue dye exclusion and by tritiated thymidine incorporation into DNA[1]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [2][3]	Mice[2] Balb/c male mice are used. Genistein is administered as follows: On days 1-30, Genistein once daily, interaperitoneally injecting. Morphine plus Genistein is administered as follows: On days 1-30, Genistein once daily plus morphine, interaperitoneally injecting (17, 18). The same volume of saline is administered. Mice are randomly divided into 8 groups (n=6). 1) Normal saline group (1 mL DW/daily); 2) Morphine treated group; 3) Genistein 1 mg/kg treated group; 4) Genistein 2 mg/kg treated group 5) Genistein 4 mg/kg treated group; 6) Morphine plus Genistein 1 mg/kg treated group; 7) Morphine plus Genistein 2 mg/kg treated group; 8) Morphine plus Genistein 4 mg/kg treated group. Rats[3] Male 8-week-old Wistar rats (150-180g) are used. After one week acclimation, all rats are randomly divided into 8 groups with 10 rats per group and treated for 35 weeks as follows: (1) STD group is fed with rodent standard chow diet (STD); (2) STD-BPA group is fed with STD and administered with BPA (50 μg/kg/day); (3) STD-(BPA+G) group is fed with STD and administered with BPA (50 μg/kg/day) plus Genistein (10 mg/kg/day); (4) STD-G group is fed with STD and administered with Genistein (10 mg/kg/day); (5) HFD group received high-fat diet (HFD); (6) HFD-BPA group is fed with HFD and administered with BPA (50 μg/kg/day); (7) STD-(BPA+G) group is fed with HFD and administered with BPA (50 μg/kg/day) plus Genistein (10 mg/kg/day); (8) HFD-G group is fed with HFD and administrated with Genistein (10 mg/kg/day). All the male genitors are treated for 35 weeks consecutively. The details of BPA (50 μg/kg/day) and Genistein (10 mg/kg/day) treatment methods have been described previously: BPA is dissolved in corn oil and diluted with three stock solutions (20, 40, 80, and 120 μg/mL). MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Nat Nanotechnol. 2020 Dec;15(12):1043-1052.

- Bioact Mater. 6 (2021) 2158-2172.
- ACS Nano. 2020 Apr 28;14(4):4890-4904.
- Adv Sci (Weinh). 2023 Apr 24;e2207017.
- Small. 2020 Nov;16(44):e2004172.

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REFERENCES

[1]. Peterson G, et al. Genistein inhibits both estrogen and growth factor-stimulated proliferation of human breast cancer cells. Cell Growth Differ. 1996 Oct;7(10):1345-51.

[2]. Ding S, et al. Environmentally Relevant Dose of Bisphenol A Does Not Affect Lipid Metabolism and Has No Synergetic or Antagonistic Effects on Genistein's Beneficial Roles on Lipid Metabolism. PLoS One. 2016 May 12;11(5):e0155352.

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