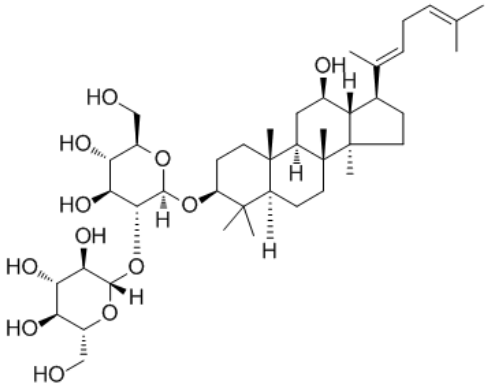
Product Data Sheet

Product Name: Ginsenoside Rg5
Cat. No.: GC31706

Chemical Properties

Cas. No.	186763-78-0		
SMILES	C[C@@]([C@@]12C)(CC[C@@]3([H])C4(C)C)[C@@](C[C@@H](O)[C@]1([H])[C@@H](/C(C)=C/C/C=C(C)\C)CC2)([H])[C@]3(CC[C@@H]4O[C@@](O[C@H](CO)[C@@H](O)[C@@H]5O)([H])[C@@H]5O[C@]([C@@H]([C@@H](O)[C@@H]6O)O)([H])O[C@@H]6CO)C		
Formula	$C_{42}H_{70}O_{12}$	M.Wt	767
Solubility	DMF: 10 mg/ml,DMSO: 10 mg/ml	Storage	Store at -20°C,protect from light
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

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Kinase experiment: HUVECs are cultured in 24-well plates overnight. The cells are changed to serum-free M199 and incubated for 1 h. The medium is removed, and cells are incubated with fresh serum-free medium containing 0.1 μM-50 mM Ginsenoside Rg5 at 37°C for 20 min followed by the addition of 50 μL (1 μCi) of [125I]IGF-1 and then further incubated for 10 min. The medium is decanted, and cell plates are washed twice with serum-free medium. Cells are lysed in 300 μL of 0.1 N NaOH solution containing 0.1% SDS, transferred to scintillation vials, and mixed with 1 mL of Ultima Gold mixture solution. Cell-associated [125I]IGF-1 is analyzed in a scintillation counter. The nonspecific binding is determined by coincubation with unlabeled IGF-1 (50 nM)[1].

Cell experiment: MCF-7 (HER2-/ER+) and MDA-MB-453 (HER2+/ER-) human breast cancer cell lines are maintained using RPMI 1640 medium supplemented with 10% (vol/vol) FBS plus 100 units/mL Penicillin and Streptomycin in a 5% carbon dioxide air incubator at 37°C. Cell cytotoxicity is measured by MTT assay. Cells are seeded in 96-well tissue culture plates at the density of 0.2×104 cells per well with 100 μL medium, and are allowed to become attached for 24 h. One hundred microliters of the medium with different concentrations of Ginsenoside Rg5 (e.g., 0 μM, 25 μM, 50 μM, and 100 μM) are added to each well. At indicated times, 30 μL MTT stock solution (3 mg/mL) are added to each well. After culturing the cells at 37°C for 2 h, DMSO is added to dissolve the formazan crystals. The absorbance is read at the wavelength of 540 nm with a microplate reader[3].

Caution: Product has not been fully validated for medical applications. For research use only.
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Animal experiment: Mice[2]Male ICR mice (6 to 8 weeks old), weighing 25-27 g, are used. After acclimation for one week, mice are randomly assigned into 4 experimental groups with 8 mice in each group: normal control, Cisplatin control, and Cisplatin+Ginsenoside Rg5 groups (10 and 20 mg/kg, respectively). Ginsenoside Rg5 is administered intragastrically at the dose of 10 and 20 mg/kg for 10 days. On the 7th day, animals in Cisplatin control and Ginsenoside Rg5-treated groups receive a single intraperitoneal injection of Cisplatin (25 mg/kg) to induce nephrotoxicity in mice. Mice are anaesthetized with pentobarbital, subsequently sacrificed at 72 h after Cisplatin injection (Day 10). Blood samples are collected and then centrifuged at 3000 rpm to separate the serum and stored at -20 °C for determining blood urea nitrogen (BUN) and creatinine (CRE) levels.

References:

[1]. Cho YL, et al. Specific activation of insulin-like growth factor-1 receptor by ginsenoside Rg5 promotes angiogenesis and vasorelaxation. J Biol Chem. 2015 Jan 2;290(1):467-77.
[2]. Li W, et al. Ginsenoside Rg5 Ameliorates Cisplatin-Induced Nephrotoxicity in Mice through Inhibition of Inflammation, Oxidative Stress, and Apoptosis. Nutrients. 2016 Sep 13;8(9). pii: E566.
[3]. Kim SJ, et al. Anti-breast cancer activity of Fine Black ginseng (Panax ginseng Meyer) and ginsenoside Rg5. J Ginseng Res. 2015 Apr;39(2):125-34.

Background

Ginsenoside Rg5 is the main component of Red ginseng. Ginsenoside blocks binding of IGF-1 to its receptor with an IC50 of ~90 nM. Ginsenoside Rg5 also inhibits the mRNA expression of COX-2 via suppression of the DNA binding activities of NF-κB p65.

Ginsenoside Rg5 plays a novel role as an IGF-1R agonist. Ginsenoside Rg5 binds to IGF-1R with an IC50 value of ~90 and its angiogenic activity is inhibited by IGF-1R knockdown. To investigate the possible interaction of Ginsenoside Rg5 with IGF-1R, a docking analysis is performed. Docking results show that Ginsenoside Rg5 binds strongly at two sites, A and B, with Kd values of 20 and 27 nM, respectively, to the cysteine-rich domain of IGF-1R. Pretreatment with Rg5 blocks the binding of radiolabeled IGF-1 to HUVECs with an IC50 value of ~90 μM, which is greater than an IC50 value of

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~1.4 nM for unlabeled IGF-1[1]. The results from MTT assay show that MCF-7 cell proliferation is inhibited by Ginsenoside Rg5 treatment for 24, 48 and 72 h in a dose-dependent manner. Ginsenoside Rg5 at different concentrations (0, 25, 50 and 100 μM), induce cell cycle arrest in G0/G1 phase through regulation of cell cycle-related proteins in MCF-7 cells[3].

Ginsenoside Rg5 inhibits the mRNA expression of COX-2 via suppression of the DNA binding activities of NF-κB p65 in lipopolysaccharides (LPS)-stimulated BV2 microglial cells. Rg5 pretreated group mice show declined expression of NF-κB p65 and COX-2. In the group treated with low dose of Ginsenoside Rg5 (10 mg/kg), there is remarkable tubular damage and infiltration of inflammatory cells. However, at the higher dose of Ginsenoside Rg5 (20 mg/kg), tubules markedly appeare histologically normal and no inflammation and cast formation is observed in kidney tissues[2].

[1]. Cho YL, et al. Specific activation of insulin-like growth factor-1 receptor by ginsenoside Rg5 promotes angiogenesis and vasorelaxation. J Biol Chem. 2015 Jan 2;290(1):467-77. [2]. Li W, et al. Ginsenoside Rg5 Ameliorates Cisplatin-Induced Nephrotoxicity in Mice through Inhibition of Inflammation, Oxidative Stress, and Apoptosis. Nutrients. 2016 Sep 13;8(9). pii: E566. [3]. Kim SJ, et al. Anti-breast cancer activity of Fine Black ginseng (Panax ginseng Meyer) and ginsenoside Rg5. J Ginseng Res. 2015 Apr;39(2):125-34.

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