Kaempferol

Cat. No.: HY-14590

CAS No.: 520-18-3

Molecular Formula: $C_{15}H_{10}O_6$

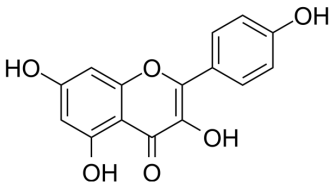
Molecular Weight: 286.24

Target: Estrogen Receptor/ERR; Autophagy; Mitophagy; Apoptosis; HIV; Parasite; Endogenous Metabolite

Pathway: Vitamin D Related/Nuclear Receptor; Autophagy; Apoptosis; Anti-infection; 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 : 20 mg/mL (69.87 mM; Need ultrasonic)

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

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	3.4936 mL	17.4679 mL	34.9357 mL
5 mM	0.6987 mL	3.4936 mL	6.9871 mL
10 mM	0.3494 mL	1.7468 mL	3.4936 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: 10 mg/mL (34.94 mM); Suspended solution; Need ultrasonic
2. Add each solvent one by one: 0.5% CMC/saline water
   Solubility: 5 mg/mL (17.47 mM); Suspended solution; Need ultrasonic
3. Add each solvent one by one: 10% DMSO >> 40% PEG300 >> 5% Tween-80 >> 45% saline
   Solubility: ≥ 2 mg/mL (6.99 mM); Clear solution
4. Add each solvent one by one: 10% DMSO >> 90% (20% SBE-β-CD in saline)
   Solubility: ≥ 2 mg/mL (6.99 mM); Clear solution
5. Add each solvent one by one: 10% DMSO >> 90% corn oil
   Solubility: ≥ 2 mg/mL (6.99 mM); Clear solution

BIOLOGICAL ACTIVITY

Description	Kaempferol (Kempferol), a flavonoid found in many edible plants, inhibits estrogen receptor α expression in breast cancer cells and induces apoptosis in glioblastoma cells and lung cancer cells by activation of MEK-MAPK. Kaempferol can be uesd for the research of breast cancer[1][2][3][4].	
IC_{50} & Target	ERα	Human Endogenous Metabolite
In Vitro	Kaempferol also has anti-inflammatory effects via inhibition of interleukin-4 and cyclo-oxygenase 2 expression by suppressing Src kinase and downregulating the NFκB pathway. Kaempferol is also effective in inhibiting angiogenesis and inducing apoptosis in ovarian cancer cells[1]. Kaempferol is a natural flavonoid that is widely distributed in fruits and vegetables, and prospective studies revealed that over decades, consumption of Kaempferol dramatically and significantly reduces the risk of ovarian cancer in American female nurses. After a 24-hour treatment, Kaempferol causes a significant and concentration-dependent inhibition of proliferation in all 3 ovarian cancer cells tested. This inhibition is observed at 40 μM or higher concentrations of treatment[2]. Kaempferol is a flavonoid which is abundant in a variety of plant derived food and leaves used in traditional medicines. Kaempferol significantly inhibits NADPH oxidase activity. Kaempferol decrease reactive oxygen species (ROS) by directly bound NADPH oxidase. Kaempferol prevents Ang II-induced sinus nodal cell death by lowering CAMKII oxidization[3].10-20 μM Kaempferol dose-dependently suppresses its release in sensitized RBL-2H3 cells. When 10-20 μM Kaempferol is supplemented to DNP-BSA-challenged RBL-2H3 cells for 15 min, the activation of Syk and PLCγ is highly attenuated. When ≥10 μM Kaempferol is added to DNP-BSA-challenged RBL-2H3 cells for 60 min, the COX2 induction is reduced[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	
In Vivo	The COX2 induction is confirmed in the airways of BSA-challenged BALB/c mice. There is lack of COX2 in airways of untreated control mice observed. The BSA inhalation to mice led to enhanced COX2 induction (dark brown staining) in mouse airway, which is reversed by oral administration of Kaempferol. In BSA-challenged mice, there is a marked goblet cell hyperplasia and epithelial thickening observed. When 20 mg/kg Kaempferol is supplemented to BSA-challenged mice, the epithelial thickening completely disappeared[4]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.	

PROTOCOL

Kinase Assay [3]	Right atria or sinus nodal cells are homogenized in lysis buffer consisting of (50 mM Tris-HCl pH 7.5, 100 mM KCl, 1 mM ethylenediamine tetraacetic acid, 1 mM ethylene glycol tetraacetic acid, 1 mM dithiothreitol, 0.1 mM phenylmethylsulfonyl fluoride, 0.5 mM Benzamidine, 20 mg/L Leupeptin, 20 mM sodium pyrophosphate, 50 mM NaF, and 50 mM sodium β-glycerophosphate), and total protein content is determined by the Bradford assay. Caspase-3 activity is determined by EnzChek Caspase-3 Assay Kit[3]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Cell Assay [2]	Ovarian cancer cells are seeded in 96-well plates at 2000 cells/well and incubated overnight before treatment with 0-160 μM Kaempferol for 24 hours in triplicates. The medium is removed, and the plates are freeze-thawed to lyse cells. Each well is added with 200 μL 1× CyQUANT cell lysis buffer containing 5x SYBR Green I and incubated at room temperature (RT) for 5 minutes. The reaction (50 μL) is transferred to PCR strip tubes and the fluorescent signal is measured at 90°C with a real-time Chromo4 PCR instrument. To ensure that cell proliferation assays are performed within a linear range of cell numbers, a standard curve is generated by seeding different amount of OVCAR-3 cells (based on counting with a hemacytometer) in a 96-well plate, and measuring genomic DNA abundance after overnight incubation. Three independent experiments are performed and data is pooled for statistical analysis[2]. MCE has not independently confirmed the accuracy of these methods. They are for reference only.
Animal Administration [4]	Mice[4] Three-week-old male BALB/c mice are randomly assigned to the four treatment groups as follows (n=8 per group). (1) PBS-sensitized mice; (2) BSA-sensitized mice; (3) BSA-sensitized and 10 mg/kg Kaempferol-administered mice; and (4) BSA-sensitized and 20 mg/kg Kaempferol-administered mice. Mice are given a commercial mouse chow diet containing 20.5% protein, 3.5% fat, 8% fiber, 8% ash, and 0.5% phosphorus and are allowed access to food and water ad libitum. The mice are

kept under a 12 h light and dark cycle at 23±1°C with 50%±5% relative humidity in specific pathogen-free conditions. Mice are allowed to become accustomed to their surroundings for one week before starting the allergic experiments. Sensitization of all experimental mice is carried out by subcutaneous injection with 20 μg BSA in 30 μL PBS and 50 μL Imject Alum on days 0 and 14. The control mice are injected with a combination of 50 μL PBS and 50 μL Imject Alum without BSA. On days 28, 29, and 30, only the experimental mice sensitized to BSA are subject to inhalation of 5% BSA, while control mice are challenged with 5% PBS for 20 min in a plastic chamber connected to a Medel aerosol nebulizer. All mice are sacrificed 24 h after the last challenge. Whole blood samples are directly used to measure the contents of eosinophils, basophils and neutrophils. The right lung is stored in 4% paraformaldehyde until use.

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

CUSTOMER VALIDATION

- Nat Biomed Eng. 2022 Jan;6(1):76-93.
- Cell Rep. 2023 Mar 20;42(3):112275.
- Food Chem. 2022: 134807.
- Phytomedicine. 2023 May 12, 154876.
- Biomed Pharmacother. 2023 Jan;157:114087.

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REFERENCES

[1]. Luo H, et al. Kaempferol nanoparticles achieve strong and selective inhibition of ovarian cancer cell viability. Int J Nanomedicine. 2012; 7: 3951-3959.

[2]. Luo H, et al. Kaempferol induces apoptosis in ovarian cancer cells through activating p53 in the intrinsic pathway. Food Chem. 2011 September 15; 128(2): 513-519.

[3]. An M, et al. Protective effects of Kaempferol against cardiac sinus node dysfunction via CaMKII deoxidization. Anat Cell Biol. 2015 Dec;48(4):235-43.

[4]. Shin D, et al. Dietary Compound Kaempferol Inhibits Airway Thickening Induced by Allergic Reaction in a Bovine Serum Albumin-Induced Model of Asthma. Int J Mol Sci. 2015 Dec 16;16(12):29980-95.

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