

Product Data Sheet

Product Name: Allicin
Cat. No.: GC34462

Chemical Properties

Cas. No. 539-86-6

SMILES C=CCS(SCC=C)=O

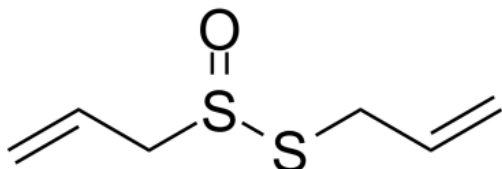
Formula C6H10OS2 M.Wt 162.27

Solubility DMSO : 5 mg/mL (30.81 mM); Water : < 0.1 mg/mL (insoluble) Storage 4°C, away from moisture and 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

Cell experiment [1]:

Cell lines Lung adenocarcinoma cell lines A549 and H1299

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Preparation Method The two lung adenocarcinoma cell lines A549 and H1299 were cultured in Dulbecco's modified Eagle's medium with 10% FBS, 100U/ml penicillin and 100mg/ml streptomycin at 37°C in a humidified atmosphere with 5% CO₂. Cells (10⁴ cells per well) were seeded onto 96 well plates, incubated overnight at 37°C and then incubated in various concentrations of Allicin (0, 1.0, 2.5, 5.0, 7.5, 10.0, 15.0 and 20.0µM) for 24h. The medium was then removed and the MTT solution (0.5mg/ml) was added to the cell culture. Following incubation for 4h at 37°C, the reaction was stopped by adding dimethylsulfoxide (0.5mg/ml). At the end, absorbance was measured spectrophotometrically at 570nm.

Reaction Conditions 0-20µM; 24h

Applications Allicin dose-dependently inhibited cell adhesion, invasion, and migration.

Animal experiment [2]:

Animal models Male and female BALB/c mice

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Randomly selected male and female BALB/c mice were divided into seven groups (n=6), as follows: normal control group (NC), imiquimod(IMQ) group, vehicle control group, Allicin-low-dose group (AL, 1.7mg/g), Allicin-middle-dose group (AM, 3.4mg/g), Allicin-high-dose group (AH, 5.0mg/g), and positive group, with the commonly used first-line treatment for psoriasis, 0.005% calcipotriol cream. Five square centimetres of the dorsal skin of mice were exposed by shaving dorsal hair. A daily topical dose of 62.5mg IMQ for inducing a psoriasis-like skin was administered at 9:00 AM for six consecutive days. Then mice were

Preparation Method treated with Allicin ointment twice, at an interval of 4h. Vehicle control mice were topically treated with a control Allicin-free gel. We used the cumulative psoriasis area and severity index (PASI) score to assess the severity of skin lesions, which consist of erythema, scale, and thickness. The score was graded independently from 0 to 4: 0, none; 1, slight; 2, moderate; 3, marked; 4, very marked. The PASI scores of the mice were recorded on the first day of IMQ treatment. The experiment was terminated on the seventh day, and following humane killing of the mice, the back skin was dissected rapidly and flash frozen in liquid nitrogen and stored at -80°C for subsequent analyses.

Dosage form 1.7, 3.4, and 5.0mg/g; topical bid; 6 days

Applications Allicin significantly improved the epidermal structure by inhibiting keratinocyte proliferation and reducing apoptosis.

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References:

- [1] Huang L, Song Y, Lian J, Wang Z. Allicin inhibits the invasion of lung adenocarcinoma cells by altering tissue inhibitor of metalloproteinase/matrix metalloproteinase balance via reducing the activity of phosphoinositide 3-kinase/AKT signaling. *Oncol Lett.* 2017;14(1):468-474.
- [2] Zhang L, Ma X, Shi R, et al. Allicin ameliorates imiquimod-induced psoriasis-like skin inflammation via disturbing the interaction of keratinocytes with IL-17A. *Br J Pharmacol.* 2023;180(5):628-646.

Background

Allicin is the main biologically active component of the freshly crushed garlic extracts [1]. Allicin has wide-ranging biological effects including antioxidative, anticancer, antimicrobial, and antifungal activities[2-5].

In vitro, treatment of HeLa, SW480, and L-929 cells with Allicin(0-100μM; 24h) inhibited the growth of cancer cells, induced the formation of apoptotic bodies and nuclear condensation, caused a typical DNA ladder, and activated caspases-3, -8, and -9 as well as cleaved poly(ADP-ribose) polymerase[3]. Treatment of lung adenocarcinoma cells with Allicin (0-20μM; 24h) dose-dependently inhibited cell adhesion, invasion, and migration, decreased mRNA and protein levels of MMP-2 and MMP-9, increased TIMP-1 and TIMP-2 levels, and suppressed AKT phosphorylation ($P<0.05$) without affecting total AKT expression[6].

In vivo, in a murine model of sporotrichosis induced by *Sporothrix schenckii*, oral administration of Allicin (400mg/kg/day for 15 days) enhanced antifungal activity by reducing fungal load and increased nitric oxide production, modulated immune responses by influencing cytokine release from peritoneal macrophages[5]. In a murine model of imiquimod-induced psoriasis-like dermatitis, topical application of Allicin (1.7, 3.4, and 5.0mg/g) twice daily for 6 consecutive days significantly improved the epidermal structure by inhibiting keratinocyte proliferation and reducing apoptosis, while decreasing the secretion of inflammatory cytokines (IL-17A/F, IL-22, IL-12, IL-20), chemokines (CXCL2, CXCL5, CCL20), and anti-bacterial peptides (S100a8/9) by directly inhibiting the IL-17-induced TRAF6/MAPK/NF-κB and STAT3/NF-κB signaling cascades[7].

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- [1] Ankri S, Mirelman D. Antimicrobial properties of allicin from garlic. *Microbes Infect.* 1999;1(2):125-129.
- [2] Chan JY, Yuen AC, Chan RY, Chan SW. A review of the cardiovascular benefits and antioxidant properties of allicin. *Phytother Res.* 2013;27(5):637-646.
- [3] Oommen S, Anto RJ, Srinivas G, Karunakaran D. Allicin (from garlic) induces caspase-mediated apoptosis in cancer cells. *Eur J Pharmacol.* 2004;485(1-3):97-103.
- [4] Müller A, Eller J, Albrecht F, et al. Allicin Induces Thiol Stress in Bacteria through S-Allylmercapto Modification of Protein Cysteines. *J Biol Chem.* 2016;291(22):11477-11490.
- [5] Burian JP, Sacramento LVS, Carlos IZ. Fungal infection control by garlic extracts (*Allium sativum* L.) and modulation of peritoneal macrophages activity in murine model of sporotrichosis. *Braz J Biol.* 2017;77(4):848-855.
- [6] Huang L, Song Y, Lian J, Wang Z. Allicin inhibits the invasion of lung adenocarcinoma cells by altering tissue inhibitor of metalloproteinase/matrix metalloproteinase balance via reducing the activity of phosphoinositide 3-kinase/AKT signaling. *Oncol Lett.* 2017;14(1):468-474.
- [7] Zhang L, Ma X, Shi R, et al. Allicin ameliorates imiquimod-induced psoriasis-like skin inflammation via disturbing the interaction of keratinocytes with IL-17A. *Br J Pharmacol.* 2023;180(5):628-646.

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