

Product Data Sheet

Product Name: Deoxyshikonin

Cat. No.: GC38767

Chemical Properties

Cas. No. 43043-74-9

SMILES O=C1C(CC/C=C(C)/C)=CC(C2=C1C(O)=CC=C2O)=O

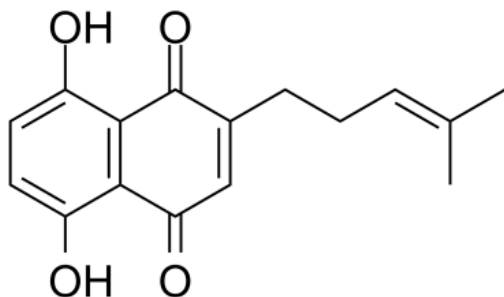
Formula $C_{16}H_{16}O_4$ M.Wt 272.3

Solubility DMSO : 33.33 mg/mL (122.40 mM; ultrasonic and warming and heat to 60°C) Storage 4°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

Cell experiment [1]:

Cell lines Human osteosarcoma U2OS and HOS cells

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

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Preparation Method U2OS cells (osteogenic sarcoma; human, 15-year-old female) were cultured in DMEM supplemented with 10% FBS, 1% penicillin/streptomycin and 5mL of glutamine. HOS cells (human osteosarcoma; 13-year-old female) were cultured in Eagle's MEM supplemented with 10% FBS, 1% penicillin/streptomycin, and 5mL glutamine. Cells were cultured at 37°C in a humidified atmosphere of 5% CO₂ in an incubator and treated with Deoxyshikonin (2.5, 5, 10 and 20µM) for 24h. MTT colorimetric assay was performed to examine cell viability. FITC Annexin V Apoptosis Detection Kit was used to determine the apoptotic effect and flow cytometry was performed to analyse cell cycles.

Reaction Conditions 2.5-20µM; 24h

Applications Deoxyshikonin dose-dependently reduced viability, induced sub-G1 arrest, and triggered apoptosis in human osteosarcoma U2OS and HOS cells.

Animal experiment [2]:

Animal models C57BL/6 mice

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C57BL/6 mice (age=6 weeks, male, weight=21±2g) were kept at 23±2°C in 12h dark/light cycle and 55% humidity with ad libitum access to chow and water. The alopecia mice model was established by topically applying depilatory paste to a 6cm² dorsal skin area using a cotton swab once daily for 21 days. Skin color and hair growth were monitored daily, and photographs were taken to document treatment effects over time. After hair removal, Deoxyshikonin (10mg/kg) were topically applied to mice. On day 14, after the depilator application, regrown hairs were randomly plucked from each mouse to measure average hair length. On day 21, a 1cm diameter circular skin sample was biopsied from the depilated area on each mouse's back using a biopsy punch. Furthermore, hairs were scraped off, and their total weight was measured. Moreover, the lengths of 10 randomly selected hairs from the scraped sample were measured using a vernier caliper. The skin tissue content of TGF-β1, VEGF, and IGF-1 in alopecia mice was assessed by ELISA kit.

Dosage form

10mg/kg/day; 21 days; topical

Applications

Deoxyshikonin shortened telogen and prolonged anagen, increased hair-follicle density, diameter and length, elevated VEGF/IGF-1, and reduced TGF-β1 in depilated alopecia areata C57BL/6 mice.

References:

- [1] Hsieh MC, Hsieh YH, Chou CH, et al. Apoptotic effect and cell arrest of deoxyshikonin in human osteosarcoma cells through the p38 pathway. *J Cell Mol Med.* 2023;27(11):1592-1602.
- [2] Li Y, Mu Y, Chen X, et al. Deoxyshikonin from *Arnebiae Radix* promotes hair growth by targeting the Wnt/β-catenin signaling pathway. *Phytomedicine.* 2025;140:156590.

Background

Deoxyshikonin is a natural product isolated from *Lithospermum erythrorhizon Sieb* with antitumor activity^[1]. Deoxyshikonin has proangiogenesis effect by increasing the expression of VEGF-C and VEGF-A mRNA in human microvascular endothelial cells–dermal lymphatic (HMVEC-dLy), promoting HIF-1α and HIF-1β subunit interaction and binding to specific DNA sequences targeted by HIF^[2].

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Deoxyshikonin is also an antibacterial agent against methicillin-resistant *S. aureus* (MRSA) and *S. pneumonia*^[3]. Deoxyshikonin is usually used in research related to tumors and infections ^{[4][5]}.

In vitro, Deoxyshikonin (2.5-20 μ M; 24h) dose-dependently reduced viability, induced sub-G1 arrest, and triggered apoptosis in human osteosarcoma U2OS and HOS cells^[6].

In vivo, Deoxyshikonin (10mg/kg/day; 21 days; topical) shortened telogen and prolonged anagen, increased hair-follicle density, diameter and length, elevated VEGF/IGF-1, and reduced TGF- β 1 in depilated alopecia areata C57BL/6 mice^[7].

References:

- [1] Zhu Y, Zhong Y, Long X, et al. Deoxyshikonin isolated from *Arnebia euchroma* inhibits colorectal cancer by down-regulating the PI3K/Akt/mTOR pathway. *Pharm Biol.* 2019;57(1):412-423.
- [2] Prangsaengtong O, Park JY, Inujima A, Igarashi Y, Shibahara N, Koizumi K. Enhancement of Lymphangiogenesis In Vitro via the Regulations of HIF-1 α Expression and Nuclear Translocation by Deoxyshikonin. *Evid Based Complement Alternat Med.* 2013;2013:148297.
- [3] Zhang S, Wang J, Xu W, et al. Antibacterial effects of Traditional Chinese Medicine monomers against *Streptococcus pneumoniae* via inhibiting pneumococcal histidine kinase (VikK). *Front Microbiol.* 2015;6:479.
- [4] Zhang S, Wang Y. Deoxyshikonin inhibits cisplatin resistance of non-small-cell lung cancer cells by repressing Akt-mediated ABCB1 expression and function. *J Biochem Mol Toxicol.* 2020;34(10):e22560.
- [5] Cho WK, Ma JY. Deoxyshikonin Inhibits Influenza A Virus Infection at an Early Stage. *Int J Mol Sci.* 2025;26(17):8158.
- [6] Hsieh MC, Hsieh YH, Chou CH, et al. Apoptotic effect and cell arrest of deoxyshikonin in human osteosarcoma cells through the p38 pathway. *J Cell Mol Med.* 2023;27(11):1592-1602.
- [7] Li Y, Mu Y, Chen X, et al. Deoxyshikonin from *Arnebiae Radix* promotes hair growth by targeting the Wnt/ β -catenin signaling pathway. *Phytomedicine.* 2025;140:156590.

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