

Product Data Sheet

Product Name: Macelignan ((+)-Anwulignan)

Cat. No.: GC30878

Chemical Properties

Cas. No. 107534-93-0

SMILES OC1=CC=C(C[C@H](C)[C@H](C)CC2=CC=C(OCO3)C3=C2)C=C1OC

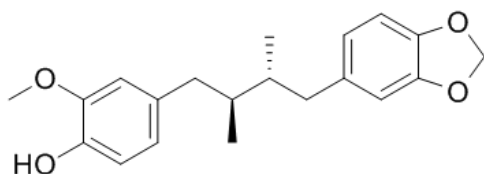
Formula $C_{20}H_{24}O_4$ M.Wt 328.4

Solubility DMSO : ≥ 30 mg/mL (91.35 mM) 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

Cell experiment [1]:

Cell lines HaCaT cells

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

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Preparation Method HaCaT cells were treated with 0.1, 0.5, 1 μ M Macelignan for 24h and then exposed to UVB (30mJ/cm²) radiation. After UVB exposure, fresh media plus samples were added. At 72h after UVB irradiation, percent cell viability was assessed by the MTT assay.

Reaction Conditions 0.1, 0.5, 1 μ M; 24h

Applications Macelignan at a concentration of 0.1-1 μ M restores the viability of UVB-treated HaCaT cells, with the greatest cell viability approaching closely 100%.

Animal experiment [2]:

Animal models C57BL/KsJ-db/db mice

Preparation Method The body weight and fasting blood glucose levels of 10-week-old mice were measured. Then, the mice were equally divided into four groups: (1)diabetic control group, (2)Rosiglitazone group, (3)Macelignan group, and (4) treatment group (with extract). All groups were fed with a standard AIN-76 semi-synthetic diet, and the three experimental groups (Rosiglitazone, Macelignan, and treatment groups) were orally administered with rosiglitazone (10mg/kg), Macelignan (15mg/kg), or multi-herbal extract (150mg/kg) for 3 weeks. After starvation for 12h, the mice were anesthetized with ether and blood samples were taken from the inferior vena cava for follow-up analysis.

Dosage form 15mg/kg/day for 3 weeks; p.o.

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Applications Macelignan treatment significantly reduced the blood glucose levels in db/db mice.

References:

[1]Hwang J K. Effects of macelignan isolated from *Myristica fragrans* Houtt. on UVB-induced matrix metalloproteinase-9 and cyclooxygenase-2 in HaCaT cells[J]. *Journal of dermatological science*, 2010, 57(2): 114-122.

[2]Yeo J, Kang Y M, Cho S I, et al. Effects of a multi-herbal extract on type 2 diabetes[J]. *Chinese Medicine*, 2011, 6: 1-10.

Background

Macelignan ((+)-Anwulignan) is a bioactive lignan isolated from nutmeg seeds. It has antibacterial and anti-caries effects on *Streptococci* such as *Streptococcus mutans*^[1]. Macelignan has multiple pharmacological activities, including anti-inflammatory, anti-cancer, anti-diabetic and neuroprotective activities^[2]. Macelignan can inhibit M2 macrophage polarization^[3].

In vitro, treatment of HaCaT cells with Macelignan (0.1-1 μ M) for 24h can reverse the decrease in cell viability caused by UVB treatment, restore cell viability to nearly 100%, and reduce UVB-induced activation of mitogen-activated protein kinase (MAPK), phosphatidylinositol 3-kinase/Akt (PI3K/Akt) and their downstream transcription factors^[4]. Treatment of HT22 neuronal cells with Macelignan (1-10 μ M) for 24h reversed the decrease in cell viability induced by glutamate in a dose-dependent manner and significantly reduced the production of intracellular reactive oxygen species (ROS)^[5]. Macelignan (2.5-10 μ M) treated BV2 microglia for 24 h, inhibited the production of intracellular inflammatory cytokines and nitric oxide (NO) in a dose-dependent manner, and inhibited the expression of inducible nitric oxide synthase (iNOS) protein^[6].

In vivo, oral treatment of type 2 diabetes model mice with Macelignan (15mg/kg) for 3 weeks significantly reduced the postprandial blood glucose level of mice^[7]. Macelignan (40, 80, 160mg/kg) was used to treat renal ischemia-reperfusion injury (IRI) mice by intraperitoneal injection, and dose-

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dependently reduced the levels of serum creatinine, blood urea nitrogen, interleukin 6 (IL-6), tumor necrosis factor α (TNF- α) and gamma interferon (IFN- γ) in the blood, and inhibited IRI-induced renal tubular epithelial cell apoptosis^[8].

References:

- [1] Chung J Y, Choo J H, Lee M H, et al. Anticariogenic activity of macelignan isolated from *Myristica fragrans* (nutmeg) against *Streptococcus mutans*[J]. *Phytomedicine*, 2006, 13(4): 261-266.
- [2] Paul S, Hwang J K, Kim H Y, et al. Multiple biological properties of macelignan and its pharmacological implications[J]. *Archives of pharmacal research*, 2013, 36: 264-272.
- [3] Che N, Li M, Liu X, et al. Macelignan prevents colorectal cancer metastasis by inhibiting M2 macrophage polarization[J]. *Phytomedicine*, 2024, 122: 155144.
- [4] Hwang J K. Effects of macelignan isolated from *Myristica fragrans* Houtt. on UVB-induced matrix metalloproteinase-9 and cyclooxygenase-2 in HaCaT cells[J]. *Journal of dermatological science*, 2010, 57(2): 114-122.
- [5] Jin D Q, Lim C S, Hwang J K, et al. Anti-oxidant and anti-inflammatory activities of macelignan in murine hippocampal cell line and primary culture of rat microglial cells[J]. *Biochemical and biophysical research communications*, 2005, 331(4): 1264-1269.
- [6] Zong K, Liu X, Sun Z, et al. Macelignan inhibits the inflammatory response of microglia and regulates neuronal survival[J]. *Journal of Neuroimmunology*, 2020, 339: 577123.
- [7] Yeo J, Kang Y M, Cho S I, et al. Effects of a multi-herbal extract on type 2 diabetes[J]. *Chinese Medicine*, 2011, 6: 1-10.
- [8] Long J, Qian K, Tan S, et al. Macelignan protects against renal ischemia-reperfusion injury via inhibition of inflammation and apoptosis of renal epithelial cells[J]. *Cellular and Molecular Biology*, 2020, 66(1): 55-59.

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