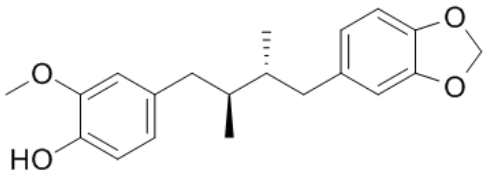
Product Data Sheet

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

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Preparation Method	HaCaT cells were treated with 0.1, 0.5, 1μM Macelignan for 24h and then exposed to UVB (30mJ/cm^2) 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, 1μM; 24h
Applications	Macelignan at a concentration of 0.1-1μM 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.

Caution: Product has not been fully validated for medical applications. For research use only.
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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 (0.1-1μM) 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 (1-10μM) 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 (2.5-10μM) 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-

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.