

Product Data Sheet

Product Name: 4-Methylumbelliferone (4-MU)

Cat. No.: GC13451

Chemical Properties

Cas. No. 90-33-5

Chemical Name 7-hydroxy-4-methyl-2H-chromen-2-one

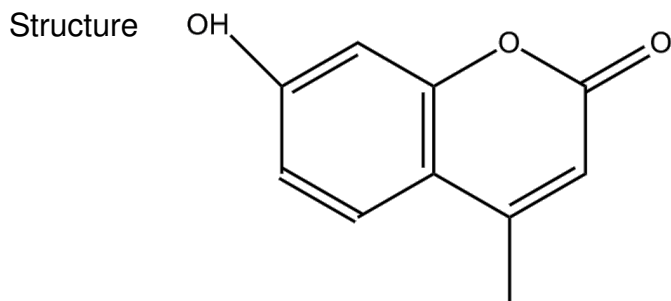
SMILES CC(C1=C(O2)C=C(O)C=C1)=CC2=O

Formula $C_{10}H_8O_3$ M.Wt 176.17

Solubility $\geq 8.8\text{mg/mL}$ in DMSO Storage Store at -20°C

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.



Protocol

Cell experiment[1]:

Cell lines	Human prostate adenocarcinoma PC-3 (metastatic to the bone)
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Caution: Product has not been fully validated for medical applications. For research use only.

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Preparation method	The cells were maintained in RPMI 1640 medium supplemented with 10 % fetal bovine serum containing 1 % penicillin/streptomycin at 37°C in 5 % CO ₂ and 95 % humidified air (normoxia). The cells were treated with 0.6mM 4-Methylumbelliferone for 48h .
Reaction Conditions	0.6mM for 48h .
Applications	4-Methylumbelliferone prevented angiogenesis by inhibiting the synthesis of hyaluronic acid .
Animal experiment[2]:	
Animal models	Choline-deficient amino acid (CDAA) diet murine model
Preparation method	The mice were feed PBS or 4-Methylumbelliferone orally once-daily during the last 2 weeks of the diet feeding .
Dosage form	200mg/kg ; 2 weeks ; Oral administration .
Applications	4-Methylumbelliferone treatment inhibited liver steatosis and steatohepatitis in a mouse model of nonalcoholic steatohepatitis (NASH) .

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References:

- [1] LUO Y, YANG Z, YU Y, et al. HIF1alpha lactylation enhances KIAA1199 transcription to promote angiogenesis and vasculogenic mimicry in prostate cancer [J]. Int J Biol Macromol, 2022, 222(Pt B): 2225-43.
- [2] YANG Y M, WANG Z, MATSUDA M, et al. Inhibition of hyaluronan synthesis by 4-methylumbelliferone ameliorates non-alcoholic steatohepatitis in choline-deficient L-amino acid-defined diet-induced murine model [J]. Arch Pharm Res, 2021, 44(2): 230-40.

Background

4-Methylumbelliferone is a known synthetic inhibitor of hyaluronic acid (HA) [1, 2]. IC₅₀ values are in the proliferation assay were 0.65±0.04mM[3].

4-Methylumbelliferone can inhibit the proliferation of Hepatocellular Carcinoma (HCC) cell lines (0.5mM , 48h) , induce apoptosis (5mM , 48h) , and inhibit the production of HA (Hyaluronan) [4]. Public database analysis predict that 4-Methylumbelliferone stimulated the activity of enzymes , which modulate protein processing (enzymes and transcription factors , including 13 members of the nuclear receptor superfamily regulating lipid and carbohydrate metabolism) , cell motility , membrane glycolipid composition and glycogen breakdown[5].

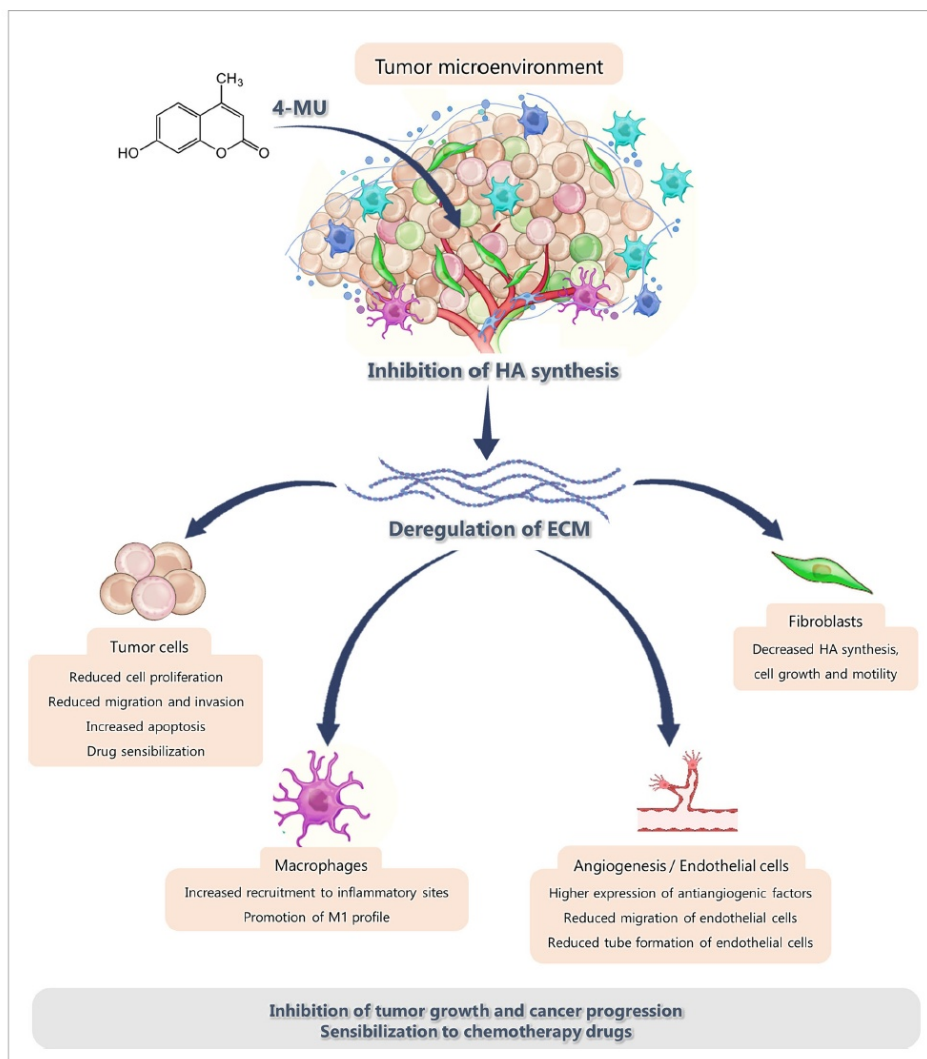
4-Methylumbelliferone (6.5mg/g/day , 6 months , systemic oral administration) reduced perineuronal nets (PNNs) formation around neurons and enhanced memory retention in mice[6]. 4-Methylumbelliferone (25mg/kg for 24 hours dissolved in DMSO/0.9% NaCl (1 : 4) by intraperitoneal injection) had a potential ability to attenuate the cardiac injury by reducing oxidative stress and inflammation in a TLR4/NF-κB/NLRP3-dependent mechanism[7] .

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4-Methylumbelliferone deregulates the tumor microenvironment by inhibiting HA synthesis [2].

References:

- [1] LUO Y, YANG Z, YU Y, et al. HIF1alpha lactylation enhances KIAA1199 transcription to promote angiogenesis and vasculogenic mimicry in prostate cancer [J]. Int J Biol Macromol, 2022, 222(Pt B): 2225-43.
- [2] VITALE D L, ICARDI A, ROSALES P, et al. Targeting the Tumor Extracellular Matrix by the Natural Molecule 4-Methylumbelliferone: A Complementary and Alternative Cancer Therapeutic Strategy [J]. Front Oncol, 2021, 11(710061).

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- [3] GARCIA-VILAS J A, QUESADA A R, MEDINA M A. 4-methylumbelliferone inhibits angiogenesis in vitro and in vivo [J]. J Agric Food Chem, 2013, 61(17): 4063-71.
- [4] PICCIONI F, MALVICINI M, GARCIA M G, et al. Antitumor effects of hyaluronic acid inhibitor 4-methylumbelliferone in an orthotopic hepatocellular carcinoma model in mice [J]. Glycobiology, 2012, 22(3): 400-10.
- [5] TSITRINA A A, HALIMANI N, ANDREICHENKO I N, et al. 4-Methylumbelliferone Targets Revealed by Public Data Analysis and Liver Transcriptome Sequencing [J]. International Journal of Molecular Sciences, 2023, 24(3):
- [6] JANA DUBISOVA J S B, LUCIE SVOBODOVA , PAVOL MAKOVICKY , NOELIA MARTINEZ-VAREA , ANDA CIMPEAN , JAMES W FAWCETT , JESSICA C F KWOK , SARKA KUBINOVA. Oral treatment of 4-methylumbelliferone reduced perineuronal nets and improved recognition memory in mice [J]. 2022,
- [7] BISTOLETTI M, BOSI A, CAON I, et al. Involvement of hyaluronan in the adaptive changes of the rat small intestine neuromuscular function after ischemia/reperfusion injury [J]. Sci Rep, 2020, 10(1): 11521.

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