

Product Data Sheet

Product Name: Fucoxanthin (all-trans-Fucoxanthin)

Cat. No.: GC31364

Chemical Properties

Cas. No. 3351-86-8

SMILES O=C(/C(C)=C/C=C/C(C)=C/C=C/C=C(C)/C=C/C=C(C)/C([H])=[C@@]=C([C@@]1(O)C(C)(C)[C@H](OC(C)=O)C1)C[C@]2(C3(C)C)[C@@](C)(C)[C@@H](O)C3)O2

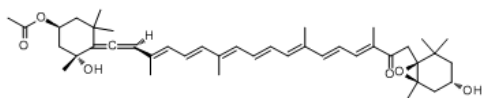
Formula $C_{42}H_{58}O_6$ M.Wt 658.91

Solubility DMSO : ≥ 50 mg/mL (75.88 mM); Water : < 0.1 mg/mL (insoluble) Storage Store at 2-8°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]:

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Cell lines B16-F10 cells

Preparation Method 100μL of 0.2% collagen-fragmented gelatin was applied to the upper side of the filter. Serum-free DMEM (with or without Fucoxanthin (0, 5, 10, 30μM)) was added to the lower part of the chamber. The chamber was incubated at 37°C in a 5% CO₂ atmosphere for 24h. After incubation, the filter insert was removed from the chamber wells and cells on the upper side of the filter were removed using a cotton swab. The filter was fixed, stained with hematoxylin and eosin, and mounted on a microscope slide. Cells located on the lower side of the filter were counted to determine whether they were invasive cells.

Reaction
Conditions 0, 5, 10, 30μM; 24h

Applications Fucoxanthin resulted in a significant decrease in the number of invaded B16-F10 cells.

Animal experiment [2]:

Animal models Kunming mice

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Total animals (N=120) were randomly divided into two groups of equal average body weight. The mice of the control group (N=20) were given pure water only, whereas the animals of the cadmium exposure group (N=100) were given CdCl₂ orally at a dose of 30mg/kg/day for 30 days. In this study, Fucoxanthin was administered at 10, 25 and 50mg/kg/day. To evaluate ameliorative effects of Fucoxanthin on the kidney, the cadmium exposure group was divided into the

Preparation Method following five subgroups: without Fucoxanthin treatment as a negative control group (NCG); positive control group (PCG) was mice received Shenfukang tablets orally at a dose of 50mg/kg/day for 14 days; low (F1), medium (F2), and high (F3) Fucoxanthin concentration treated mice were received Fucoxanthin orally at a dose of 10, 25, and 50mg/kg/day for 14 days, respectively. After the 14-day Fucoxanthin treatment, mice were sacrificed. Kidney tissues and peripheral blood samples were collected directly.

Dosage form 10, 25, 50mg/kg/day for 14 days; p.o.

Applications High doses of Fucoxanthin administration significantly decreased BUN, KIM1, NGAL levels, increasing POD, SOD, CAT, and ascorbate APX levels. Fucoxanthin administration also promoted recovery of the renal functions, micro-structural organization, and ultra-structural organization in the renal cells.

References:

- [1]Chung T W, Choi H J, Lee J Y, et al. Marine algal fucoxanthin inhibits the metastatic potential of cancer cells[J]. Biochemical and biophysical research communications, 2013, 439(4): 580-585.
[2]Yang H, Xing R, Liu S, et al. Role of Fucoxanthin towards Cadmium-induced renal impairment with the antioxidant and anti-lipid peroxide activities[J]. Bioengineered, 2021, 12(1): 7235-7247.

Background

Fucoxanthin (all-trans-Fucoxanthin) is a naturally occurring carotenoid widely distributed in edible

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brown seaweed and diatoms^[1]. Fucoxanthin is highly unsaturated, its molecular structure is unstable and very active. Fucoxanthin has four isomers, namely all-trans Fucoxanthin (the main isomer in the natural environment), 9'-cis Fucoxanthin, 13-cis Fucoxanthin, and 13'-cis Fucoxanthin^[2]. Fucoxanthin can be used in research on obesity, anti-diabetes, antioxidants, inflammation, and cancer^[3]. Fucoxanthin can effectively inhibit the activity of Mycobacterium tuberculosis aromatic amine N-acetyltransferase (TBNAT), with an IC₅₀ value of 4.8μM^[4].

In vitro, treatment of B16-F10 cells with Fucoxanthin (0-30μM) for 24h inhibited cell invasion, migration and adhesion in a dose-dependent manner, and inhibited the expression of transfer factors MMP-9, CD44 and CXCR4^[5]. Treatment of cervical cancer HeLa and SiHa cells with Fucoxanthin (0-25μM) for 24h inhibited cell proliferation and induced cell cycle arrest at the G0/G1 phase^[6]. Treatment of RAW264.7 cells with Fucoxanthin (0-100μg/mL) for 24h inhibited the expression of intracellular TNF-α, PGE2, iNOS and COX-2 proteins in a dose-dependent manner^[7].

In vivo, oral administration of Fucoxanthin (25, 50mg/kg) to mice with cadmium chloride-induced renal injury for 14 days promoted the recovery of renal function, renal cell microstructure and ultrastructure, significantly reduced blood urea nitrogen (BUN), kidney injury marker 1 (KIM1) and neutrophil gelatinase-associated lipocalin (NGAL) levels in mice, and increased peroxidase (POD), superoxide dismutase (SOD), catalase (CAT) and ascorbate peroxidase (APX) levels^[8].

References:

- [1] Din N A S, Mohd Alayudin A S, Sofian-Seng N S, et al. Brown algae as functional food source of fucoxanthin: A review[J]. Foods, 2022, 11(15): 2235.
- [2] Pajot A, Hao Huynh G, Picot L, et al. Fucoxanthin from algae to human, an extraordinary bioresource: Insights and advances in up and downstream processes[J]. Marine drugs, 2022, 20(4): 222.
- [3] Miyashita K, Beppu F, Hosokawa M, et al. Nutraceutical characteristics of the brown seaweed carotenoid fucoxanthin[J]. Archives of biochemistry and biophysics, 2020, 686: 108364.
- [4] Šudomová M, Shariati M A, Echeverría J, et al. A microbiological, toxicological, and biochemical study of the effects of fucoxanthin, a marine carotenoid, on Mycobacterium tuberculosis and the enzymes implicated in its cell wall: A link between mycobacterial infection and autoimmune diseases[J]. Marine drugs, 2019, 17(11): 641.
- [5] Chung T W, Choi H J, Lee J Y, et al. Marine algal fucoxanthin inhibits the metastatic potential of

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cancer cells[J]. Biochemical and biophysical research communications, 2013, 439(4): 580-585.

[6] Ye G, Wang L, Yang K, et al. Fucoxanthin may inhibit cervical cancer cell proliferation via downregulation of HIST1H3D[J]. Journal of International Medical Research, 2020, 48(10): 0300060520964011.

[7] Shiratori K, Ohgami K, Ilieva I, et al. Effects of fucoxanthin on lipopolysaccharide-induced inflammation in vitro and in vivo[J]. Experimental eye research, 2005, 81(4): 422-428.

[8] Yang H, Xing R, Liu S, et al. Role of Fucoxanthin towards Cadmium-induced renal impairment with the antioxidant and anti-lipid peroxide activities[J]. Bioengineered, 2021, 12(1): 7235-7247.

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