
Product Data Sheet

Product Name: λ-Carrageenan

Cat. No.: GC19401

Chemical Properties

Cas. No. 9064-57-7

Chemical Name [5-[4,5-dihydroxy-6-(hydroxymethyl)-3-sulfonatoxyoxan-2-yl]oxy-2,4-dihydroxy-6-(sulfonatoxymethyl)oxan-3-yl] sulfate

SMILES C(C1C(C(C(C(O1)OC2C(OC(C(C2O)OS(=O)(=O)[O-])O)COS(=O)(=O)[O-])OS(=O)(=O)[O-])O)O)O

Formula

M.Wt

Solubility 25 mg/mL in water (ultrasound assisted dissolution) Storage Store at RT

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 HCC1937 and BT-549 cells

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

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Preparation Method	<p>Dendritic cells (DCs) were derived from murine bone marrow cells. On day 7, immature DCs were collected and treated with different concentrations (10, 50 and 100µg/ml) of λ-Carrageenan. Lipopolysaccharide (LPS) at 20ng/ml was used as a positive control. For Toll-like receptor 4 (TLR4) inhibitor experiments, immature DCs were pre-treated with 1µM TAK-242 (TLR4 inhibitor) for 1h, and then treated with 0, 10, 50 and 100µg/ml of λ-Carrageenan or 20ng/ml of LPS for 12h. After treatment, supernatants and cells were collected to analyze cytokine secretion by enzyme-linked immunosorbent assay (ELISA) and DC maturation by flow cytometry, respectively.</p> <p>For endocytosis analysis, DCs treated with λ-Carrageenan were incubated with 50µg/ml FITC-Dextran at 37°C for 1h. After washing with cold PBS, the cells were stained with APC-CD11c and analyzed by flow cytometry.</p>
Reaction Conditions	0, 10, 50 and 100µg/ml; 12h or 1h
Applications	λ-Carrageenan dose-dependently decreased the endocytosis of dendritic cells (DCs), promoted DC maturation and increased cytokine production through TLR4 mediated signaling pathway.
Animal experiment [2, 3]:	
Animal models	Male adult C57BL/6J mice

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Preparation Method	A total volume of 25-30 μ L of 0.1% λ -Carrageenan solution dissolved in saline (at 60°C) and cooled further was subcutaneously injected into the mice through the plantar surface of the left hind paw. The paw size was measured at 1, 2, 3 and 4h after the injection of λ -Carrageenan. Edema was expressed as the percentage of the difference between the paw size after (at respective time points) and before (basal values) the injection of λ -Carrageenan.
Dosage form	25-30 μ L of 0.1%; 1, 2, 3 and 4h; s.c.
Applications	λ -Carrageenan-induced inflammatory mouse model

References:

[1] Li J, Aipire A, Li J, et al. λ -Carrageenan improves the antitumor effect of dendritic cell-based vaccine.

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[2] Upadhyay U, Zhuang GZ, Diatchenko L, et al.

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Background

λ -Carrageenan is a galactan polysaccharide that exists in the intercellular matrix of red algae. λ -Carrageenan has a variety of bioactivities, such as anticoagulant, antiviral, antithrombotic, antibacterial, cholesterol - lowering, antitumor, immunomodulatory, and antihyperlipidemic effects. λ -Carrageenan is also used for treating stomach ulcers and has antioxidant properties^[1].

In vitro, λ -Carrageenan (0, 10, 50 and 100 μ g/ml; 12h or 1h) dose-dependently decreased the endocytosis of dendritic cells (DCs), promoted DC maturation and increased cytokine production through TLR4 mediated signaling pathway^[2]. When the cultured human L - cells (NCI - H716) were deprived of glucose and serum overnight and then exposed to high glucose, 10% fetal bovine serum, and λ -Carrageenan (1 μ g/ml; 10min, 1h, and 24h), the mRNA expression of proglucagon and the secretion of glucagon-like peptide - 1 (GLP - 1) in these cells were significantly reduced compared with the control cells that were not exposed to λ -Carrageenan^[3].

In vivo, Oral administration of λ -Carrageenan (0.001%; 16 days; p.o.) can alleviate ear swelling in hapten-induced atopic dermatitis model mice and significantly inhibit mast

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cell hyperplasia in the local skin^[4]. λ -Carrageenan (50mg/kg; 20 days) inhibits tumor growth in B16-F10 and 4T1 bearing mice^[5].

References:

- [1] Ha HT, Cuong DX, Thuy LH, et al. Carrageenan of Red Algae *Eucheuma gelatinae*: Extraction, Antioxidant Activity, Rheology Characteristics, and Physicochemistry Characterization. *Molecules*. 2022 Feb 14;27(4):1268.
- [2] Li J, Aipire A, Li J, et al. λ -Carrageenan improves the antitumor effect of dendritic cellbased vaccine. *Oncotarget*. 2017 May 2;8(18):29996-30007.
- [3] Bhattacharyya S, Borthakur A, Tobacman JK. Common food additive carrageenan inhibits proglucagon expression and GLP-1 secretion by human enteroendocrine L-cells. *Nutr Diabetes*. 2024 May 16;14(1):28.
- [4] Iwasaki T, Watarai S. Oral λ -carrageenan intake alleviates skin symptoms in a hapten induced atopic dermatitis-like model. *J Vet Med Sci*. 2020 Dec 5;82(11):1639-1642.
- [5] Luo M, Shao B, Nie W, et al. Antitumor and Adjuvant Activity of λ -carrageenan by Stimulating Immune Response in Cancer Immunotherapy. *Sci Rep*. 2015 Jun 22;5:11062.

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