

Product Data Sheet

Product Name: N-3-oxo-dodecanoyl-L-Homoserine lactone

Cat. No.: GC17279

Chemical Properties

Cas. No. 168982-69-2

Chemical Name 3-oxo-N-[(3S)-tetrahydro-2-oxo-3-furanyl]-dodecanamide

SMILES CCCCCCCCC(=O)CC(=O)N[C@H]1CCOC1=O

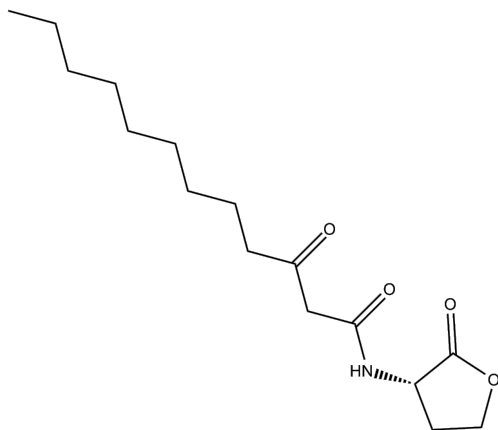
Formula $C_{16}H_{27}NO_4$ M.Wt 297.4

Solubility $\leq 20\text{mg/ml}$ in DMSO; 20mg/ml in dimethyl formamide 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]:

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Cell lines	Platelet cells
Preparation method	Platelet cells were incubated with 5 μ M Fluo-4 AM for 45–50 min at 37 °C in the dark. After 60 s of baseline, 3-oxo-C12 HSL (100 μ M), or DMSO as vehicle control were added in a different set of samples, and after 300 s 1 mM of CaCl ₂ was added, and fluorescence intensity was recorded up to 600 s.
Reaction Conditions	100 μ M ; 300 s
Applications	3-oxo-C12 HSL induces intracellular calcium in a dose-dependent manner, and the maximum rise was obtained at 100 μ M

Animal experiment [2]:

Animal models	8 week-old C57BL/6 mice or in 6 week-old athymic nude mice
Preparation method	For C12 (N-3-oxo-dodecanoyl-L-Homoserine lactone) toxicity studies, DMSO or C12 (25 mg/kg/day) was administered intraperitoneally each day in 8 week-old C57BL/6 mice or in 6 week-old athymic nude mice. For wild-type A549 tumors, animals were treated with C12 for 6 times/week. For Bcl-2 over-expressing A549 cells tumors, DMSO or C12 was administered with C12 each day. For A549-control-shRNA and A549-PON2-shRNA tumors, DMSO or C12 was administered twice every three days. At the end of the experiments, tumors were excised for apoptosis evaluation.

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Dosage form	25 mg/kg/day; i.p.
Applications	C12 inhibits lung tumor growth and induces tumor cell apoptosis in vivo. C12 inhibits LLC tumor growth and induces tumor cell apoptosis in vivo in a dose-dependent fashion. C12 induces tumor apoptotic cell death independent of anti-apoptotic Bcl-2 proteins. PON3 (lactonase paraoxonase) expression recovers C12 cytotoxicity in PON2-deficient tumor cells.
References: [1] Yadav VK, et al. Mechanism underlying N-(3-oxo-dodecanoyl)-L-homoserine lactone mediated intracellular calcium mobilization in human platelets. <i>Blood Cells Mol Dis.</i> 2019 Nov;79:102340. [2] Zhao G, et al. N-(3-oxo-acyl) homoserine lactone inhibits tumor growth independent of Bcl-2 proteins. <i>Oncotarget.</i> 2016 Feb 2;7(5):5924-42.	

Background

N-3-oxo-dodecanoyl-L-Homoserine lactone (3-oxo-C12-HSL), as a quorum-sensing (QS) molecule produced by Gram-negative bacteria in the gastrointestinal tract, is a major inducer of oxidative stress indicated by a high level of intracellular reactive oxygen species (ROS)^[1].

In vitro, 100µM 3-oxo-C12 HSL elevates intracellular free calcium in platelet, and 3-oxo-C12 HSL induces intracellular calcium-dependent ROS generation^[2]. *In vitro*, 3-oxo-12-HSL also significantly inhibited LPS (lipopolysaccharides) induced IL-6 release at 10 µM, while 100 µM reduced IL-6 release by almost 75%^[3]. *In vitro*, treatment of fibroblasts with 50 µM 3O-C12-HSL for 1 or 3 h (in contrast to 10 µM and the control) resulted in a rapid fragmentation of mitochondrial network, as evidenced by decreased mitochondrial length and area and an elevated number of small mitochondria^[4]. In addition, 50 µM 3O-C12-HSL increases the cell area and protrusive activity of macrophages^[5].

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In vivo, Passively sensitized mice that had been treated with 3-oxo-12-HSL (3 mg/kg) 1 h prior to antigen exposure showed a significant (60%) decrease in PCA (passive cutaneous anaphylaxis) response^[3].

References:

- [1] Tao S, et al. Caspase-1-dependent mechanism mediating the harmful impacts of the quorum-sensing molecule N-(3-oxo-dodecanoyl)-L-homoserine lactone on the intestinal cells. *J Cell Physiol.* 2019 Apr;234(4):3621-3633.
- [2] Yadav VK, et al. Pseudomonas aeruginosa quorum sensing molecule N-3-oxo-dodecanoyl-L-homoserine lactone activates human platelets through intracellular calcium-mediated ROS generation. *Int J Med Microbiol.* 2018 Oct;308(7):858-864.
- [3] Khambati I, et al. The bacterial quorum-sensing molecule, N-3-oxo-dodecanoyl-L-homoserine lactone, inhibits mediator release and chemotaxis of murine mast cells. *Inflamm Res.* 2017 Mar;66(3):259-268.
- [4] Josephson H, et al. Pseudomonas aeruginosa N-3-Oxo-Dodecanoyl-Homoserine Lactone Impacts Mitochondrial Networks Morphology, Energetics, and Proteome in Host Cells. *Front Microbiol.* 2020 May 25;11:1069.
- [5] Holm A, et al. Pseudomonas aeruginosa N-3-oxo-dodecanoyl-homoserine Lactone Elicits Changes in Cell Volume, Morphology, and AQP9 Characteristics in Macrophages. *Front Cell Infect Microbiol.* 2016 Mar 24;6:32.

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