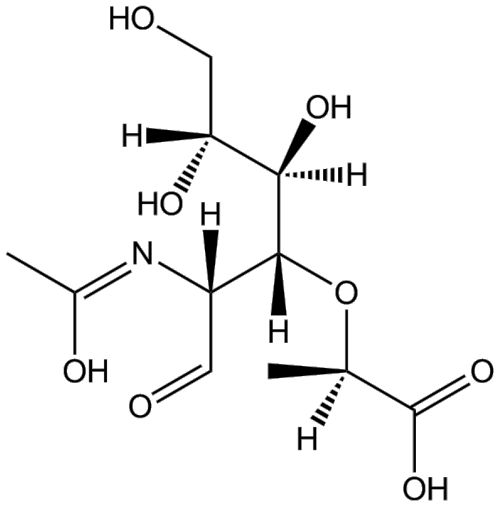
Product Data Sheet

Product Name: Ac-muramic acid
Cat. No.: GA20621

Chemical Properties

Cas. No.	10597-89-4		
Formula	$C_{11}H_{19}NO_8$	M.Wt	293.27
Solubility	DMF: 2.5 mg/ml,DMSO: 30 mg/ml,PBS (pH 7.2): 10 mg/ml	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.		

Structure



Protocol

Cell experiment [1]:

Cell lines RAW 264.7 cells

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Preparation Method	RAW 264.7 cells (3×10^5 cells/mL) were seeded into 12-well plates with 1mL DMEM media containing 10% (v/v) FBS. Cells were pretreated with peptidoglycan (PGN), PGN hydrolysate (hydrolyzed by lysozyme at 37°C, 4h), Ac-muramic acid, (N-acetylglucosamine) NAG and tetrapeptides Ala-Glu-Lys-Ala (AEKA) for 4 hours before stimulated with 100ng/mL LPS. Cells were continually cultured for 18 hours for iNOS, COX-2 and GAPDH detection or 30 in for p-p38, IκBα, p-IκBα detection.
Reaction Conditions	0-300μg/mL; 4h
Applications	Ac-muramic acid concentration-dependent inhibited the expressing on iNOS and COX-2 protein expression, from a concentration of 100μg/mL to 300μg/mL.

Animal experiment [1]:

Animal models	Adult male ICR mice
Preparation Method	The control group was orally given a control diet (normal saline alone); three Ac-muramic acid treatment groups (induced by *E. coli* 0111:B4) (I, II, III) were given Ac-muramic acid doses of 10 (I), 20 (II) and 40 (III) $mg \cdot kg^{-1} \cdot d^{-1}$ body weight, respectively.
Dosage form	10, 20, 40$mg \cdot kg^{-1} \cdot d^{-1}$; oral gavage; 25 days
Applications	Ac-muramic acid inhibited the intestinal villi edema in *E. coli*-induced group.

References:

[1]. Wu, Zhen, et al. "N-acetylmuramic acid triggers anti-inflammatory capacity in LPS-induced RAW 264.7 cells and mice." journal of functional foods 13 (2015): 108-116.

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

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Background

Ac-muramic acid (N-acetylmuramic acid, MurNAc) is a ubiquitous bacterial cell wall sugar that carries a unique D-lactyl ether substituent at the C_3 position [1]. Ac-muramic acid was used as a substrate for Ac-muramic acid etherase MurQ [1]. Ac-muramic acid was obtained either from the environment or from the endogenous cell wall (i.e., recycling). High-level expression of MurQ is required for growth on Ac-muramic acid as the sole source of carbon and energy, whereas constitutive low-level expression of MurQ is sufficient for the recycling of peptidoglycan fragments continuously released from the cell wall during bacterial growth [2].

In vitro, Ac-muramic acid (0-300μg/mL) concentration-dependently inhibited the iNOS and COX-2 protein and mRNA expression in RAW 264.7 cells [3].

In vivo, Ac-muramic acid (40mg/kg; oral gavage; 25 days) inhibited the intestinal villi edema in the *E. coli*-induced ICR mice and decreased the production of IFN-α in the blood [3].

References:
[1] Jaeger, Tina, Momo Arsic, and Christoph Mayer. "Scission of the lactyl ether bond of N-acetylmuramic acid by Escherichia coli “etherase”." Journal of Biological Chemistry 280.34 (2005): 30100-30106.
[2] Jaeger, Tina, and Christoph Mayer. "The transcriptional factors MurR and catabolite activator protein regulate N-acetylmuramic acid catabolism in Escherichia coli." Journal of bacteriology 190.20 (2008): 6598-6608.
[3] Wu, Zhen, et al. "N-acetylmuramic acid triggers anti-inflammatory capacity in LPS-induced RAW 264.7 cells and mice." journal of functional foods 13 (2015): 108-116.

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