Small Molecules

Lactacystin

Inhibits proteasomes

Catalog #100-0885

0.1 mg

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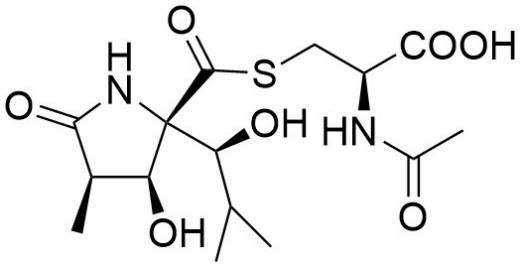
Product Description

Lactacystin is a metabolite isolated from *Streptomyces* and is an irreversible proteasome inhibitor that binds to the catalytic β-subunit (IC_{50} = 4.8 µM; Ōmura & Crump). It also induces neurite outgrowth in mouse neuroblastoma and apoptosis in human monoblast U937 cells (Imajoh-Ohmi et al.; Ōmura & Crump). Lactacystin can cause Parkinson's-like symptoms when injected into the substantia nigra of mice, making it useful to model protein degradation defects in Parkinson's disease (Savolainen et al.).

Alternative Names:	Not applicable
CAS Number:	133343-34-7
Chemical Formula:	$C_{15}H_{24}N_2O_7S$
Molecular Weight:	376.4 g/mol
Purity:	≥ 98%
Chemical Name:	3S-hydroxy-2R-(1-hydroxy-2-methylpropyl)-4R-methyl-5-oxo-2-pyrrolidinecarboxylate-N-acetyl-L-cysteine
Structure:	



Properties

Physical Appearance:	A clear film (not easily visible)
Storage:	Product stable at -20°C as supplied. Protect product from prolonged exposure to light. For long-term storage, store with a desiccant. Stable as supplied for 12 months from date of receipt.
Solubility:	· PBS (pH 7.2) ≤ 5.3 mM · DMSO ≤ 50 mM · Absolute ethanol ≤ 2.6 mM For example, to prepare a 10 mM stock solution in DMSO, resuspend 0.1 mg in 27 µL of DMSO. Prepare stock solution fresh before use; add diluent directly to the vial and vortex vigorously. Information regarding stability of small molecules in solution has rarely been reported, however, as a general guide we recommend storage in DMSO at -20°C. Aliquot into working volumes to avoid repeated freeze-thaw cycles. The effect of storage of stock solution on compound performance should be tested for each application. For use as a cell culture supplement, stock solution should be diluted into culture medium immediately before use. Avoid final DMSO concentration above 0.1% due to potential cell toxicity.

Published Applications

DIFFERENTIATION
· Induces neuroblastoma cell differentiation (ōmura et al.).

References

Imajoh-Ohmi S et al. (1995) Lactacystin, a specific inhibitor of the proteasome, induces apoptosis in human monoblast U937 cells. Biochem Biophys Res Commun 217(3): 1070–7.

ōmura S et al. (1991) Structure of lactacystin, a new microbial metabolite which induces differentiation of neuroblastoma cells. J Antibiot (Tokyo) 44(1): 117–8.

ōmura S & Crump A. (2019) Lactacystin: first-in-class proteasome inhibitor still excelling and an exemplar for future antibiotic research. J Antibiot (Tokyo) 72(4): 189–201.

Savolainen MH et al. (2017) Nigral injection of a proteasomal inhibitor, lactacystin, induces widespread glial cell activation and shows various phenotypes of Parkinson's disease in young and adult mouse. Exp Brain Res 235(7): 2189–202.

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