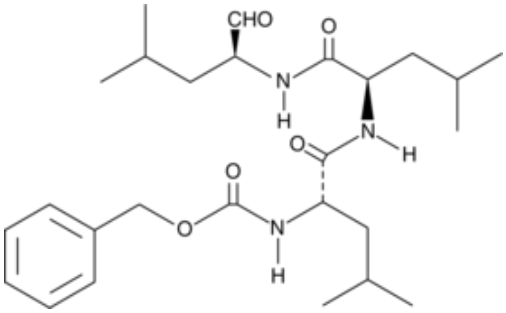
Product Data Sheet

Product Name: (R)-MG132
Cat. No.: GC41233

Chemical Properties

Cas. No.	1211877-36-9		
SMILES	O=CC[C@H](CC(C)C)NC(=O)[C@@H](CC(C)C)NC(=O)[C@H](CC(C)C)NC(=O)OCc1ccccc1		
Formula	C26H41N3O5	M.Wt	475.6
Solubility	DMF: 30 mg/ml,DMSO: 30 mg/ml,Ethanol: 25 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	Rat C6 glioma cells

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Preparation Method	Cells were seeded onto 96-well microplates and cultured for 24 hours. Subsequently, the cells were treated with (R)-MG132 at final concentrations ranging from 10 to 40 μM for durations of 3 to 24 hours.
Reaction Conditions	10-μM ; 3-24h
Applications	(R)-MG132 inhibited the proliferation of C6 glioma cells in a time- and dose-dependent manner.

Animal experiment [2]:

Animal models	Male BALB/c mice (CVB3 cell induced acute viral myocarditis models)
Preparation Method	Mice were administered (R)-MG132 intraperitoneally on a daily basis starting the day after CVB3 inoculation.
Dosage form	10μg/kg; i.p; daily for 7days
Applications	(R)-MG132 demonstrates anti-apoptotic and anti-inflammatory properties in the context of myocardial injuries induced by CVB3.

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

[1]:Fan WH, Hou Y,et,al. Proteasome inhibitor MG-132 induces C6 glioma cell apoptosis via oxidative stress. Acta Pharmacol Sin. 2011 May;32(5):619-25. doi: 10.1038/aps.2011.16. Epub 2011 Apr 18. PMID: 21499287; PMCID: PMC4002511.

[2]:Zhang XM, Li YC, et,al. MG-132 attenuates cardiac deterioration of viral myocarditis via AMPK pathway. Biomed Pharmacother. 2020 Jun;126:110091. doi: 10.1016/j.biopha.2020.110091. Epub 2020 Apr 8. PMID: 32278272.

Background

(R)-MG132 is a proteasome inhibitor with an IC_{50} of 100 nM. This compound of (R)-MG132 and IC50 effectively inhibits the proteolytic function of the 26S proteasome complex, leading to induced autophagy and apoptosis. Moreover, (R)-MG132 exhibits notable efficacy in inhibiting tumor growth[1-2].

(R)-MG132(10- 40 μM ; 3-24h) suppressed the proliferation of C6 glioma cells and also inhibited the chymotrypsin-like activity of the proteasome[3]. (R)-MG132(1 μM;24h) triggers the nuclear translocation of AIF by down-regulating the ERK and Akt/mTOR pathways[4]. The combination of GSK-470 and (R)-MG132 (200 nM; 24 hours) leads to nearly complete inhibition of AKT activity and mTORC1/mTORC2 activity[5].

(R)-MG132(10μg/kg; i.p; daily for 7 days) regulated the AMPK signaling pathway, thereby modulating apoptosis and inflammation, enhancing hemodynamics, and inhibiting ventricular structural remodeling in a myocarditis mouse model [6]. Treatment with (R)-MG132(0.1mg/kg; i.p) significantly mitigated cancer cachexia, as evidenced by reduced weight loss, altered carbohydrate metabolism, decreased muscle atrophy, increased spontaneous activity, and extended survival time in tumor-bearing mice[7].

References:
[1]. Harhouri K, Navarro C, et.al. MG132-induced progerin clearance is mediated by autophagy activation and splicing regulation. EMBO Mol Med. 2017 Sep;9(9):1294-1313. doi:

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[2]. Tsubuki S, Saito Y, , et.al. Differential inhibition of calpain and proteasome activities by peptidyl aldehydes of di-leucine and tri-leucine. J Biochem. 1996 Mar;119(3):572-6. doi: 10.1093/oxfordjournals.jbchem.a021280. PMID: 8830056.
[3]. Fan WH, Hou Y, , et.al. Proteasome inhibitor MG-132 induces C6 glioma cell apoptosis via oxidative stress. Acta Pharmacol Sin. 2011 May;32(5):619-25. doi: 10.1038/aps.2011.16. Epub 2011 Apr 18. PMID: 21499287; PMCID: PMC4002511.
[4]. Ko JK, Choi CH, , et.al. The proteasome inhibitor MG-132 induces AIF nuclear translocation through down-regulation of ERK and Akt/mTOR pathway. Neurochem Res. 2011 May;36(5):722-31. doi: 10.1007/s11064-010-0387-9. Epub 2011 Jan 4. PMID: 21203833.
[5]. Zhang J, Yang C, , et.al. PDK1 inhibitor GSK2334470 synergizes with proteasome inhibitor MG-132 in multiple myeloma cells by inhibiting full AKT activity and increasing nuclear accumulation of the PTEN protein. Oncol Rep. 2018 Jun;39(6):2951-2959. doi: 10.3892/or.2018.6369. Epub 2018 Apr 12. PMID: 29658600.
[6]. Zhang XM, Li YC, et.al. MG-132 attenuates cardiac deterioration of viral myocarditis via AMPK pathway. Biomed Pharmacother. 2020 Jun;126:110091. doi: 10.1016/j.biopha.2020.110091. Epub 2020 Apr 8. PMID: 32278272.
[7]. Zhang L, Tang H, et.al. MG132-mediated inhibition of the ubiquitin-proteasome pathway ameliorates cancer cachexia. J Cancer Res Clin Oncol. 2013 Jul;139(7):1105-15. doi: 10.1007/s00432-013-1412-6. Epub 2013 Mar 28. PMID: 23535871; PMCID: PMC7087863.

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