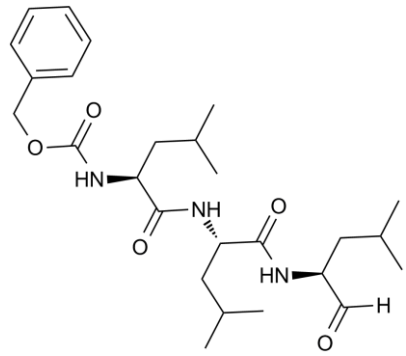
Product Data Sheet

Chemical Properties



Product Name: MG-132

Cas No.: 133407-82-6

M.Wt: 475.6

Formula: C26H41N3O5

Synonyms: MG132,Z-LLL-al,Z-Leu-Leu-Leu-CHO

Chemical Name: benzyl N-[(2S)-4-methyl-1-[[(2S)-4-methyl-1-[[(2S)-4-methyl-1-oxopentan-2-yl]amino]-1-oxopentan-2-yl]amino]-1-oxopentan-2-yl]carbamate

Canonical SMILES: CC(C)CC(C=O)NC(=O)C(CC(C)C)NC(=O)C(CC(C)C)NC(=O)OCC1=CC=CC=C1

Solubility: ≥23.78mg/mL in DMSO

Storage: Store at -20°CThe product is not stable in solution, please dissolve it immediately before use.

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.

Shopping Condition: Evaluation sample solution : ship with blue ice
All other available size: ship with RT , or blue ice upon request

Biological Activity

Targets : Ubiquitination/ Proteasome

Pathways: Proteasome

Description:

MG132 (carbobenzoxy-Leu-Leu-leucinal) as a peptide aldehyde effectively blocks the proteolytic activity of proteasome complex.9 Proteasome inhibitors including MG132 have been shown to

induce apoptotic cell death through formation of ROS. ROS formation and GSH depletion due to proteasome inhibitors may cause mitochondrial dysfunction and subsequent cytochrome c release, which leads to cell viability loss1, 2.
MG132 dose dependently inhibited the growth of A549 cells with an IC50 of approximately 20 μM. MG132 also reduced the growth of human cervical HeLa cancer cells with an IC50 of approximately 5 μM. Treatment with 0.5 μM MG132 significantly decreased the growth of HeLa cells and induced cell death as well. Cell growth inhibition by MG132 depends on incubation doses of that and cell types3.
MG132 significantly induced a G1 phase arrest of the cell cycle. It inhibits the growth of HT-29 colon cancer cells via inducing G2/M cell cycle arrest4, causes MG-63 osteosarcoma cell arrest at G2/M phase5, prolongs the duration of G0/G1 arrest in MnCl2-treated A549 cells21 and induces a G1 arrest in gastric carcinoma cells6. Deregulation of the ubiquitin-proteasomal system by MG132 can result in different cell cycle phase arrests depending on various cancer cell lines.
Proteasome inhibitors including MG132 have been shown to induce apoptotic cell death through formation of ROS1, 2, 7. MG132 inhibited the growth of human A549 cells via inducing the cell cycle arrest as well as triggering apoptosis, which was in part correlated with the changes of ROS and GSH levels.

***Reference**:*

1. Ling YH, Liebes L, Zou Y and Perez-Soler R. Reactive oxygen species generation and mitochondrial dysfunction in the apoptotic response to Bortezomib, a novel proteasome inhibitor, in human H460 non-small cell lung cancer cells, 2003; 278: 33714–33723.
2. Qiu JH, Asai A, Chi S, et al. Proteasome inhibitors induce cytochrome c-caspase-3-like protease-mediated apoptosis in cultured cortical neurons. J Neurosci 2000; 20: 259–265.
3. YH. Han, WH. Park, MG132 as a proteasome inhibitor induces cell growth inhibition and cell death in A549 lung cancer cells via influencing reactive oxygen species and GSH level, Human and Experimental Toxicology, 29(7) 607–614.
4. Wu WK, Wu YC, Yu L, et al. Induction of autophagy by proteasome inhibitor is associated with proliferative arrest in colon cancer cells. Biochem Biophys Res Commun 2008; 374: 258–263.
5. Yan XB, Yang DS, Gao X, et al. Caspase-8 dependent osteosarcoma cell apoptosis induced by proteasome inhibitor MG132. Cell Biol Int 2007; 31: 1136–1143.
6. ZhangW, Tong Q, Li S, Wang X andWang Q.MG-132 inhibits telomerase activity, induces apoptosis and G(1) arrest associated with upregulated p27kip1 expression and downregulated survivin expression in gastric carcinoma cells. Cancer Invest 2008; 26:1032–1036.
7. Wu HM, Chi KH, Lin WW. Proteasome inhibitors stimulate activator protein-1 pathway via reactive oxygen species production. FEBS Lett 2002; 526: 101–105.

Protocol

Cell experiment:

Cell lines	A549 cells, human cervical HeLa cancer cells, HT-29 colon cancer cells, MG-63 osteosarcoma cell etc.
Preparation method	The solubility of this compound in DMSO is >23.8mg/mL. General tips for obtaining a higher concentration: Please warm the tube at

	37 °C for 10 minutes and/or shake it in the ultrasonic bath for a while.Stock solution can be stored below -20°C for several months.
Reacting conditions	24-48 h
Applications	MG-132 is a membrane-permeable proteasome inhibitor. It is used to Induce neurite outgrowth in PC12 cells at 10 μM. MG132 dose dependently inhibited the growth of A549 cells with an IC50 of approximately 20 μM. MG-132 also reduced the growth of human cervical HeLa cancer cells with an IC50 of approximately 5 μM. Treatment with 0.5 μM MG-132 significantly decreased the growth of HeLa cells and induced cell death as well [3]. MG-132 inhibits the growth of HT-29 colon cancer cells via inducing G2/M cell cycle arrest [4], causes MG-63 osteosarcoma cell arrest at G2/M phase [5], prolongs the duration of G0/G1 arrest in MnCl2-treated A549 cells and induces a G1 arrest in gastric carcinoma cells [6].

Animal experiment [3]:

Animal models	C57BL mice
Dosage form	~10 ug/kg/day, injection from tail vein or belly
Other notes	Please test the solubility of all compounds indoor, and the actual solubility may slightly differ with the theoretical value. This is caused by an experimental system error and it is normal.

***Reference**:*

1. Ling YH, Liebes L, Zou Y and Perez-Soler R. Reactive oxygen species generation and mitochondrial dysfunction in the apoptotic response to Bortezomib, a novel proteasome inhibitor, in human H460 non-small cell lung cancer cells, 2003; 278: 33714–33723.
2. Qiu JH, Asai A, Chi S, et al. Proteasome inhibitors induce cytochrome c-caspase-3-like protease-mediated apoptosis in cultured cortical neurons. J Neurosci 2000; 20: 259–265.
3. YH. Han, WH. Park, MG132 as a proteasome inhibitor induces cell growth inhibition and cell death in A549 lung cancer cells via influencing reactive oxygen species and GSH level, Human and Experimental Toxicology, 29(7) 607–614.
4. Wu WK, Wu YC, Yu L, et al. Induction of autophagy by proteasome inhibitor is associated with proliferative arrest in colon cancer cells. Biochem Biophys Res Commun 2008; 374: 258–263.
5. Yan XB, Yang DS, Gao X, et al. Caspase-8 dependent osteosarcoma cell apoptosis induced by proteasome inhibitor MG132. Cell Biol Int 2007; 31: 1136–1143.
6. ZhangW, Tong Q, Li S, Wang X andWang Q.MG-132 inhibits telomerase activity, induces apoptosis and G(1) arrest associated with upregulated p27kip1 expression and downregulated survivin expression in gastric carcinoma cells. Cancer Invest 2008; 26:1032–1036.

Product Citations

1. Dongdong Zhao, Jian Meng, et al. "RPS23RG1 is Required for Synaptic Integrity and Rescues Alzheimer's Associated Cognitive Deficits." Biological Psychiatry Available online 25 August 2018.
2. Xiao G, Li Y, et al. "FBXW7 suppresses epithelial-mesenchymal transition and chemo-resistance of non-small-cell lung cancer cells by targeting snai1 for ubiquitin-dependent degradation." Cell Prolif. 2018 Aug 9:e12473. PMID:30094882
3. Chao Qin, Rui Zhang, et al. "Bclaf1 critically regulates the type I interferon response and is degraded by alphaherpesvirus US3" bioRxiv. 2018 August 16.
4. Bao Y, Yang F, et al. "Angiopoietin-like protein 3 blocks nuclear import of FAK and contributes to sorafenib response." Br J Cancer. 2018 Jul 23. PMID:30033448
5. Selvarangan Ponnazhagan, Vinayak Khattar, et al. "Structural determinants and genetic modifications enhance BMP2 stability and extracellular secretion." bioRxiv. 2018 July 20.
6. Ji J, Xu R, et al. "Actin like-6A promotes glioma progression through stabilization of transcriptional regulators YAP/TAZ."Cell Death Dis. 2018 May 3;9(5):517. PMID:29725063
7. Lv XM, Li MD, et al."Neotuberostemonine inhibits the differentiation of lung fibroblasts into myofibroblasts in mice by regulating HIF-1α signaling." Acta Pharmacol Sin. 2018 Apr 12. PMID:29645000
8. Lee S, Tumolo JM, et al. "Ubiquitin turnover and endocytic trafficking in yeast are regulated by Ser57 phosphorylation of ubiquitin." Elife. 2017 Nov 13;6. pii:e29176. PMID:29130884
9. Wang Y, Lu S, et al. "Sonic hedgehog induces GLT-1 degradation via PKC delta to suppress its transporter activities." Neuroscience. 2017 Oct 6;365:217-225. PMID:28993237
10. Wang Z, Gao Y, et al. "Quinolinate Phosphoribosyltransferase is an Antiviral Host Factor Against Hepatitis C Virus Infection." Sci Rep. 2017 Jul 19;7(1):5876. PMID:28724915
11. Wang X, Liu X, et al. "Sensitivity to antitubulin chemotherapeutics is potentiated by a photoactivable nanoliposome." Biomaterials. 2017 Jun 23;141:50-62. PMID:28667899
12. Ho HC, MacGurn JA, et al. "Deubiquitinating enzymes Ubp2 and Ubp15 regulate endocytosis by limiting ubiquitination and degradation of ARTs." Mol Biol Cell.2017 May 1;28(9):1271-1283. PMID:28298493
13.Shanzer M, Adler J, et al. "The nonreceptor tyrosine kinase c-Src attenuates SCF(β-TrCP) E3-ligase activity abrogating Taz proteasomal degradation. "Proc Natl Acad Sci U S A. 2017 Feb 14;114(7):1678-1683. PMID:28154141
14.Scott N. Ashley. "Impact Of Host Factors On The Adaptive Immune Response To Aav Gene Therapy." University of Pennsylvania. 2017.
15.Dr. Brenda Lilly, Advisor Dr. Joy Lincoln, et al. "The Roles of the Notch2 and Notch3 Receptors in Vascular Smooth Muscle Cells" The Ohio State University. 2016 Nov.
16. Liu Z, Moran GP, et al. "Amplification of TLO Mediator Subunit Genes Facilitate Filamentous Growth in Candida Spp." PLoS Genet. 2016 Oct 14;12(10):e1006373. PMID:27741243
17. Boyd Tressler, Andrea Michelle. "Mechanisms of Extracellular Nucleotide Accumulation During Regulated Cell Death in Tumor Cells."rave.ohiolink.edu,May 2016.
18. Gunderwala A, Porter J. "A luminescence assay for natural product inhibitors of the Mycobacterium tuberculosis proteasome." Phytochem Anal. 2016 Mar;27(2):126-32. PMID:26778282
19. Moshe, Adi, et al. "Tomato plant cell death induced by inhibition of HSP90 is alleviated by Tomato yellow leaf curl virus infection." Molecular plant pathology (2015). PMID:25962748

20. Baeten, Jeremy T., and Brenda Lilly. "Differential Regulation of NOTCH2 and NOTCH3 Contribute to their Unique Functions in Vascular Smooth Muscle Cells." Journal of Biological Chemistry (2015): jbc-M115. PMID:25957400
21. Boyd-Tressler, Andrea, et al. "Chemotherapeutic Drugs Induce ATP Release via Caspase-gated Pannexin-1 Channels and a Caspase/Pannexin-1-Independent Mechanism." Journal of Biological Chemistry (2014): jbc-M114. PMID:25112874
22. Giovinazzi S, Sirleto P, et al. "Usp7 protects genomic stability by regulating Bub3." Oncotarget. 2014 Jun 15;5(11):3728-42. PMID:25003721

Caution

FOR RESEARCH PURPOSES ONLY.

NOT FOR HUMAN, VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

Specific storage and handling information for each product is indicated on the product datasheet. Most ApexBio products are stable under the recommended conditions. Products are sometimes shipped at a temperature that differs from the recommended storage temperature. Shortterm storage of many products are stable in the short-term at temperatures that differ from that required for long-term storage. We ensure that the product is shipped under conditions that will maintain the quality of the reagents. Upon receipt of the product, follow the storage recommendations on the product data sheet.

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