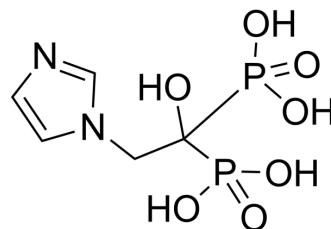


Zoledronic Acid

Cat. No.:	HY-13777
CAS No.:	118072-93-8
Molecular Formula:	C ₅ H ₁₀ N ₂ O ₇ P ₂
Molecular Weight:	272.09
Target:	Apoptosis; Autophagy; Bacterial
Pathway:	Apoptosis; Autophagy; Anti-infection
Storage:	4°C, stored under nitrogen * In solvent : -80°C, 6 months; -20°C, 1 month (stored under nitrogen)



SOLVENT & SOLUBILITY

In Vitro	H ₂ O : 4.81 mg/mL (17.68 mM); ultrasonic and warming and adjust pH to 6 with NaOH and heat to 60°C				
		Solvent Concentration	Mass 1 mg	5 mg	10 mg
	Preparing Stock Solutions	1 mM	3.6753 mL	18.3763 mL	36.7525 mL
		5 mM	0.7351 mL	3.6753 mL	7.3505 mL
		10 mM	0.3675 mL	1.8376 mL	3.6753 mL
Please refer to the solubility information to select the appropriate solvent.					
In Vivo	1. Add each solvent one by one: PBS Solubility: 8.7 mg/mL (31.97 mM); Clear solution; Need ultrasonic and adjust pH to 8 with 1M NaOH				

BIOLOGICAL ACTIVITY

Description	Zoledronic Acid (Zoledronate) is a third-generation bisphosphonate (BP), with potent anti-resorptive activity. Zoledronic Acid inhibits the differentiation and apoptosis of osteoclasts. Zoledronic Acid also has anti-cancer effects ^[1] .
In Vitro	<p>Zoledronic Acid (0.1-1 μM; 48 hours) increases receptor activator of nuclear factor κB ligand (RANKL) and sclerostin mRNA expressions in osteocyte-like MLO-Y4 cells^[2].</p> <p>Zoledronic Acid increases the expression of osteoclastogenesis supporting factor from MLO-Y4 cells^[2].</p> <p>Zoledronic Acid enhances the RANKL expression via IL-6/ JAK2/STAT3 pathway in MLO-Y4 cells^[2].</p> <p>Zoledronic acid inhibits osteoclast differentiation and function through the regulation of NF-κB and JNK signalling pathways^[3].</p> <p>Zoledronic Acid (10-100 μM; 1-7 days) markedly reduces the viability of MC3T3-E1 cells^[4].</p> <p>Zoledronic Acid (10-100 μM; 1-7 days) induces apoptosis in MC3T3-E1 cells^[4].</p> <p>Zoledronic Acid (10-100 μM; 4 days) inhibits cell viability due to the induction of apoptosis^[4].</p> <p>Zoledronic Acid exerts inhibitory effects on the differentiation and maturation of MC3T3-E1 cells at concentrations <1 μM^[4].</p> <p>MCE has not independently confirmed the accuracy of these methods. They are for reference only.</p>

Cell Viability Assay^[4]

Cell Line:	MC3T3-E1 cells
Concentration:	0.01 μ M , 0.1 μ M, 1 μ M, 10 μ M, 100 μ M
Incubation Time:	1 day, 3 days, 5 days, 7 days
Result:	Reduced cells viability at 10 μ M and 100 μ M.

Apoptosis Analysis^[4]

Cell Line:	MC3T3-E1 cells
Concentration:	0.01 μ M , 0.1 μ M, 1 μ M, 10 μ M, 100 μ M
Incubation Time:	1 days, 4 days, 7 days
Result:	Increased the number of early apoptotic cells and late apoptotic or necrotic cells at dose-dependent and time-dependent (high concentrations).

Western Blot Analysis^[4]

Cell Line:	MC3T3-E1 cells
Concentration:	0.01 μ M , 0.1 μ M, 1 μ M, 10 μ M, 100 μ M
Incubation Time:	4 days
Result:	Down-regulated the protein level of inactive caspase-3 and up-regulated the protein level of active caspase-3 at the concentrations of 10 and 100 μ M.

In Vivo

Zoledronic Acid (0.05 mg/kg; i.p.; weekly; for 3 weeks) increases bone mineral density and content^[5].
Zoledronic Acid (0.5-1 mg/kg; i.p.; weekly; for 3 weeks) inhibits both osteoclast and osteoblasts function and bone remodeling in vivo interfering with bone mechanical properties^[5].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Animal Model:	Five-week-old C57BL6 mice ^[5]
Dosage:	0.05 mg/kg, 0.5 mg/kg, 1 mg/kg
Administration:	Intraperitoneal injection, weekly, for 3 weeks
Result:	Inhibited both osteoclast and osteoblasts function and bone remodeling at 0.5 mg/kg and 1 mg/kg.

CUSTOMER VALIDATION

- Int Immunopharmacol. September 2022, 109030.
- Med Oncol. 2023 Apr 10;40(5):141.
- Dis Markers. 2021 Oct 15;2021:5838582.
- Oxid Med Cell Longev. 2021 Mar 31.

REFERENCES

- [1]. Shea GKH, et al. Oral Zoledronic acid bisphosphonate for the treatment of chronic low back pain with associated Modic changes: A pilot randomized controlled trial. *J Orthop Res.* 2022 Feb 23.
 - [2]. Lianwei Wang, et al. Various pathways of zoledronic acid against osteoclasts and bone cancer metastasis: a brief review. *BMC Cancer.* 2020; 20: 1059.
 - [3]. Hyung Joon Kim, et al. Zoledronate Enhances Osteocyte-Mediated Osteoclast Differentiation by IL-6/RANKL Axis. *Int J Mol Sci.* 2019 Mar; 20(6): 1467.
 - [4]. Xiao-Lin Huang, et al. Zoledronic acid inhibits osteoclast differentiation and function through the regulation of NF- κ B and JNK signalling pathways. *Int J Mol Med.* 2019 Aug;44(2):582-592.
 - [5]. XIN HUANG, et al. Dose-dependent inhibitory effects of zoledronic acid on osteoblast viability and function in vitro. *Mol Med Rep.* 2016 Jan; 13(1): 613-622.
 - [6]. Samantha Pozzi, et al. High-dose zoledronic acid impacts bone remodeling with effects on osteoblastic lineage and bone mechanical properties. *Clin Cancer Res.* 2009 Sep 15;15(18):5829-39.
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Caution: Product has not been fully validated for medical applications. For research use only.

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