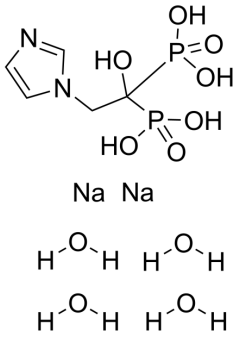
Zoledronic acid disodium tetrahydrate

Cat. No.:	HY-13777B
CAS No.:	165800-07-7
Molecular Formula:	$C_5H_{18}N_2Na_2O_{11}P_2$
Molecular Weight:	390.13
Target:	Apoptosis; Autophagy; Bacterial
Pathway:	Apoptosis; Autophagy; Anti-infection
Storage:	Please store the product under the recommended conditions in the Certificate of Analysis.



BIOLOGICAL ACTIVITY

Description

Zoledronic Acid (Zoledronate) disodium tetrahydrate is a third-generation bisphosphonate (BP), with potent anti-resorptive activity. Zoledronic Acid disodium tetrahydrate inhibits the differentiation and apoptosis of osteoclasts. Zoledronic Acid disodium tetrahydrate also has anti-cancer effects[1].

In Vitro

Zoledronic Acid disodium tetrahydrate (0.1-1 μM; 48 hours) increases receptor activator of nuclear factor kB ligand (RANKL) and sclerostin mRNA expressions in osteocyte-like MLO-Y4 cells[2].

Zoledronic Acid disodium tetrahydrate increases the expression of osteoclastogenesis supporting factor from MLO-Y4 cells [2].

Zoledronic Acid disodium tetrahydrate enhances the RANKL expression via IL-6/ JAK2/STAT3 pathway in MLO-Y4 cells[2].

Zoledronic acid disodium tetrahydrate inhibits osteoclast differentiation and function through the regulation of NF-κB and JNK signalling pathways[3].

Zoledronic Acid disodium tetrahydrate (10-100 μM; 1-7 days) markedly reduces the viability of MC3T3-E1 cells and induces apoptosis in MC3T3-E1 cells[4].

Zoledronic Acid disodium tetrahydrate (10-100 μM; 4 days) inhibits cell viability due to the induction of apoptosis[4].

Zoledronic Acid disodium tetrahydrate exerts inhibitory effects on the differentiation and maturation of MC3T3-E1 cells at concentrations <1 μM[4].

MCE has not independently confirmed the accuracy of these methods. They are for reference only.

Cell Viability Assay[4]

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

Apoptosis Analysis[4]

Cell Line:	MC3T3-E1 cells
Concentration:	0.01 μM , 0.1 μM, 1 μM, 10 μM, 100 μM
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 μM , 0.1 μM, 1 μM, 10 μM, 100 μM
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 μM.

In Vivo

Zoledronic Acid disodium tetrahydrate (0.05 mg/kg; i.p.; weekly; for 3 weeks) increases bone mineral density and content[5]. Zoledronic Acid disodium tetrahydrate (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

- Oxid Med Cell Longev. 2021 Mar 31.
- Int Immunopharmacol. September 2022, 109030.
- Dis Markers. 2021 Oct 15;2021:5838582.

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REFERENCES

[1]. Lianwei Wang, et al. Various pathways of zoledronic acid against osteoclasts and bone cancer metastasis: a brief review. BMC Cancer. 2020; 20: 1059.

[2]. 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.

[3]. Xiao-Lin Huang, et al. Zoledronic acid inhibits osteoclast differentiation and function through the regulation of NF-κB and JNK signalling pathways. Int J Mol Med. 2019 Aug;44(2):582-592.

[4]. 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.

[5]. 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.

[6]. 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

Tel: 609-228-6898 Fax: 609-228-5909 E-mail: tech@MedChemExpress.com
Address: 1 Deer Park Dr, Suite Q, Monmouth Junction, NJ 08852, USA