Pamidronic acid

Cat. No.: HY-B0012

CAS No.: 40391-99-9

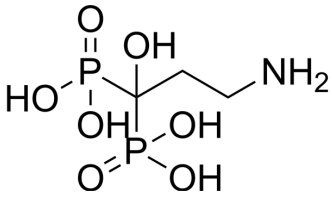
Molecular Formula: $C_3H_{11}NO_7P_2$

Molecular Weight: 235.07

Target: Wnt; β-catenin; Bacterial

Pathway: Stem Cell/Wnt; Anti-infection

Storage: -20°C, protect from light
* In solvent : -80°C, 6 months; -20°C, 1 month (protect from light)



SOLVENT & SOLUBILITY

In Vitro

H_2O : 5 mg/mL (21.27 mM; ultrasonic and warming and heat to 80°C)
DMSO : < 1 mg/mL (insoluble or slightly soluble)

Preparing Stock Solutions

Solvent / Mass / Concentration	1 mg	5 mg	10 mg
1 mM	4.2541 mL	21.2703 mL	42.5405 mL
5 mM	0.8508 mL	4.2541 mL	8.5081 mL
10 mM	0.4254 mL	2.1270 mL	4.2541 mL

Please refer to the solubility information to select the appropriate solvent.

In Vivo

1. Add each solvent one by one: PBS
Solubility: 2 mg/mL (8.51 mM); Clear solution; Need ultrasonic

BIOLOGICAL ACTIVITY

Description

Pamidronic acid is a agent used to treat a broad spectrum of bone absorption diseases.

IC_{50} & Target

Wnt, β-catenin[1]

In Vitro

Osteosarcoma cell viability decreases significantly in a concentration- and time-dependent manner at pamidronate concentrations ranging from 100 to 1000 μM, most consistently after 48 and 72 hours' exposure. In treated osteosarcoma cells, the lowest percentage cell viability is 34% (detected after 72 hours' exposure to 1000μM pamidronate)[1]. Pamidronate disodium inhibits Wnt and β-catenin signaling, which controls osteogenic differentiation in BMMSCs. Wnt3a, a Wnt and β-catenin signaling activator, reverses the negative effects caused by pamidronate disodium to salvage the osteogenic defect in BMMSCs[2].
MCE has not independently confirmed the accuracy of these methods. They are for reference only.

In Vivo

Pamidronic acid can significantly inhibit and even reverse early osteoarthritic subchondral bone loss, thus alleviating the

process of cartilaginous degeneration. The mechanisms involved may be associated with the upregulation of OPG expression, and downregulation of RANKL, MMP-9 and TLR-4 expression[3].

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PROTOCOL

Cell Assay [1]

Cell counts and cell viability assays are performed in cultures of osteosarcoma cells (POS, HMPOS, and COS31 cell lines) and fibroblasts after 24, 48, and 72 hours of incubation with pamidronate at concentrations of 0.001 to 1000 microM or with no drug (control treatment). Percentage viability is determined in cell samples for each concentration of pamidronate and each incubation time. A DNA fragmentation analysis is performed to assess bisphosphonate-induced apoptosis[1].

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Animal Administration [3]

Rabbits: The rabbits are randomly divided into four groups. Sham-operated with vehicle treatment, OA induced by ACLT with vehicle treatment, OA-induced ACLT treated with short-term pamidronic acid treatment after ACLT, and ACLT treated with long-term PAM treatment. PAM is injected at the 4th week after ACLT in PAM-S and PAM-L groups, and followed by once monthly ear vein injections at a dosage of 3 mg/kg body weight. In the other groups, only saline infusions of equal volumes are administered. 10 animals are humanely sacrificed at both 2 and 10 weeks after pamidronic acid treatment. In the ACLT and Sham groups, five animals are sacrificed at 2, 4, 6, and 14 weeks after model establishment[3].

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

REFERENCES

[1]. Ashton JA, et al. Investigation of the effect of pamidronate disodium on the in vitro viability of osteosarcoma cellsfrom dogs. Am J Vet Res. 2005 May;66(5):885-91.

[2]. Xu Y, et al. Pamidronate Disodium Leads to Bone Necrosis via Suppression of Wnt/β-Catenin Signaling in Human Bone Marrow Mesenchymal Stem Cells In Vitro. J Oral Maxillofac Surg. 2017 Mar 22.

[3]. Lv Y, et al. Effects of pamidronate disodium on the loss of osteoarthritic subchondral bone and the expression of cartilaginous and subchondral osteoprotegerin and RANKL in rabbits. BMC Musculoskelet Disord. 2014 Nov 6;15:370.

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