Small Molecules

Zoledronic Acid

Inhibitor of bone resorption; Inhibits farnesyl diphosphate (FPP) synthase

Catalog # 73572

50 mg

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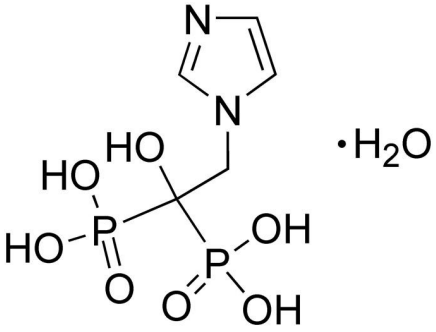
Product Description

Zoledronic acid is a nitrogen-containing bisphosphonate that inhibits farnesyl diphosphate (FPP) synthase (IC_{50} = 5 nM), thereby preventing protein prenylation and osteoclast-mediated bone resorption (Dunford et al.). In addition, it has a high affinity for hydroxyapatite (Ki = 3.5 µM) which allows it to bind directly to mineralized bone (Nancollas et al.). This product is supplied as the hydrate form of the molecule.

Molecular Name:	Zoledronic Acid (Hydrate)
Alternative Names:	Zoledronate
CAS Number:	165800-06-6
Chemical Formula:	$C_5H_{10}N_2O_7P_2 \cdot H_2O$
Molecular Weight:	290.1 g/mol
Purity:	≥ 95%
Chemical Name:	(1-Hydroxy-2-imidazol-1-ylethylidene)diphosphonic acid monohydrate
Structure:	

Properties

Physical Appearance:	A crystalline solid
Storage:	Product stable at -20°C as supplied. Protect from prolonged exposure to light. For product expiry date, please contact techsupport@stemcell.com.
Solubility:	· PBS (pH 7.2) ≤ 5 mM For example, to prepare a 1 mM stock solution in PBS, resuspend 50 mg in 172 mL of PBS (pH 7.2). Prepare stock solution fresh before use. Information regarding stability of small molecules in solution has rarely been reported, however, as a general guide we recommend storage in PBS at -20°C. Aliquot into working volumes to avoid repeated freeze-thaw cycles. The effect of storage of stock solution on compound performance should be tested for each application. For use as a cell culture supplement, stock solution should be diluted into culture medium immediately before use.

Published Applications

CANCER
· Inhibits proliferation, angiogenesis, and adhesion to bone, in several cancer cell lines (Li & Davis; Zekri et al.).
· Inhibits breast and prostate carcinoma cell invasion in vitro (Boissier et al.; Li & Davis).
· Induces apoptosis of osteoclastoma cells in vitro (Benford et al.).

References

Benford H. et al. (2001) Visualization of bisphosphonate-induced caspase-3 activity in apoptotic osteoclasts in vitro. Bone 28(5): 465–473.
Boissier S et al. (2000) Bisphosphonates inhibit breast and prostate carcinoma cell invasion, an early event in the formation of bone metastases. Cancer Res 60(11): 2949–2954.
Dunford JE et al. (2001) Structure-activity relationships for inhibition of farnesyl diphosphate synthase in vitro and inhibition of bone resorption in vivo by nitrogen-containing bisphosphonates. J Pharmacol Exp Ther 296(2): 235–42.
Li EC & Davis LE. (2003) Zoledronic acid: A new parenteral bisphosphonate. Clin Ther 25(11): 2669–2708.
Nancollas GH et al. (2006) Novel insights into actions of bisphosphonates on bone: differences in interactions with hydroxyapatite. Bone 38(5): 617–27.
Zekri J et al. (2014) The anti-tumour effects of zoledronic acid. J Bone Oncol 3(1): 25–35.

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This product is hazardous. Please refer to the Safety Data Sheet (SDS).