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# Zoledronic Acid

National Cancer Institute

## Source

National Cancer Institute. *Zoledronic Acid*. NCI Thesaurus. Code C1699.

A synthetic imidazole bisphosphonate analog of pyrophosphate with anti-bone-resorption activity. A third-generation bisphosphonate, zoledronic acid binds to hydroxyapatite crystals in the bone matrix, slowing their dissolution and inhibiting the formation and aggregation of these crystals. This agent also inhibits farnesyl pyrophosphate synthase, an enzyme involved in terpenoid biosynthesis. Inhibition of this enzyme prevents the biosynthesis of isoprenoid lipids, donor substrates of farnesylation and geranylgeranylation during the post-translational modification of small GTPase signalling proteins, which are important in the process of osteoclast turnover. Decreased bone turnover and stabilization of the bone matrix contribute to the analgesic effect of zoledronic acid with respect to painful osteoblastic lesions. The agent also reduces serum calcium concentrations associated with hypercalcemia.