
Product Data Sheet

Product Name: α -Tocopherol phosphate disodium

Cat. No.: GC67618

Chemical Properties

Cas. No. 60934-46-5

Formula $C_{29}H_{49}Na_2O_5P$ M.Wt 554.65Solubility Storage Store at $-20^{\circ}C$, protect from light

General tips For obtaining a higher solubility, please warm the tube at $37^{\circ}C$ and shake it in the ultrasonic bath for a while. Stock solution can be stored below $-20^{\circ}C$ for several months.

Shipping Condition Evaluation sample solution: ship with blue ice All other available size: ship with RT, or blue ice upon request.

Structure **Protocol****Cell experiment****[1]:**

Cell lines ALDH+ MDA-MB-231 cells (triple-negative breast cancer stem cell-enriched population)

Preparation Method ALDH+ MDA-MB-231 cells were co-treated with α -Tocopherol phosphate disodium ($100\mu M$) and PS-T. The ALDH+ cells were sorted and maintained in culture.

Reaction Conditions $100\mu M$; 24 hours.

Caution: Product has not been fully validated for medical applications. For research use only.

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Applications α -Tocopherol phosphate disodium reversed the PS-T-induced increase in lipid oxidation and malondialdehyde concentration. α -Tocopherol phosphate disodium also prevented the inhibitory effects of PS-T on stemness markers (POU5F1, SOX2, NANOG), as well as colony and mammosphere formation.

Animal experiment [2]:

Animal models SKG/Jcl mice (laminarin-induced rheumatoid arthritis model)

Preparation Method Laminarin dissolved in PBS was intraperitoneally administered to mice to induce arthritis. Seven days after laminarin administration, α -Tocopherol phosphate disodium (100mg/kg) dissolved in PBS was intraperitoneally administered to the mice. Control group received PBS only.

Dosage form 100mg/kg; intraperitoneal injection; 3 times a week for 7 weeks.

Applications α -Tocopherol phosphate disodium administration ameliorated the edema of the foot and joint, improved the arthritis score, and inhibited pannus formation.

Background

α -Tocopherol phosphate disodium is a water-soluble form of α -tocopherol. α -Tocopherol phosphate disodium functions by scavenging reactive oxygen species and regulating gene expression. α -Tocopherol phosphate disodium can also inhibit tumor cell proliferation and induce apoptosis by modulating the activity of signaling pathways such as Hedgehog, PI3K/Akt, and Src/STAT3^[1-2]. α -Tocopherol phosphate disodium can be

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used in research related to antioxidation and cardiovascular diseases^[3-4].

In vitro, ALDH+ MDA-MB-231 cells were co-treated with α -Tocopherol phosphate disodium (100 μ M) and PS-T for 24 hours. α -Tocopherol phosphate disodium reversed the PS-T-induced increase in lipid oxidation and malondialdehyde concentration, and prevented the inhibitory effects of PS-T on colony formation and mammosphere formation^[5]. U87MG and U251 glioblastoma cells were treated with α -Tocopherol phosphate disodium (5 μ M) and ferrostatin-1 for 24 hours. α -Tocopherol phosphate disodium blocked the NKAP knockdown-induced slowdown in cell proliferation and reversed the increased cell death, apoptosis rate, and lactate dehydrogenase release caused by NKAP knockdown^[6].

In vivo, SKG/Jcl mice with laminarin-induced rheumatoid arthritis were intraperitoneally administered α -Tocopherol phosphate disodium (100mg/kg; three times a week for 7 weeks). α -Tocopherol phosphate disodium suppressed edema in the paws and joints, improved the arthritis score, and inhibited pannus formation^[7]. Male Swiss mice received a single intracerebroventricular injection of α -Tocopherol phosphate disodium (0.1 or 1nmol/site; 3 μ L). Two days after the injection, α -Tocopherol phosphate disodium reduced the expression of glutathione reductase and peroxiredoxin 2, and decreased glutathione reductase activity in the hippocampus and cerebral cortex^[8].

References:

- [1] Saleh MM, Lawrence KP, Jones SA, et al. The photoprotective properties of α -Tocopherol phosphate disodium against long-wave UVA1 (385 nm) radiation in keratinocytes in vitro. *Sci Rep.* 2021 Nov 17;11(1):22400.
- [2] Wu Z, Zheng X, Meng L, et al. α -Tocopherol, especially α -Tocopherol phosphate disodium, exerts antiapoptotic and angiogenic effects on rat bone marrow-derived endothelial progenitor cells under high-glucose and hypoxia conditions. *J Vasc Surg.* 2018 Apr;67(4):1263-1273.e1.
- [3] Li X, Liao XQ, Chen WR, et al. Paeonol Inhibits Cell Growth by Inducing Ferroptosis in Human Glioma Cells. *Pharmacol Res Perspect.* 2026 Feb;14(1):e70213.
- [4] Nishio K, Ishida N, Saito Y, et al. α -Tocopheryl phosphate: uptake, hydrolysis, and antioxidant action in cultured cells and mouse. *Free Radic Biol Med.* 2011 Jun 15;50(12):1794-800.
- [5] Zhou L, Wu Z, Luo K, et al. Polysaccharides from Huaier induce autophagy-dependent

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ferroptosis to inhibit breast cancer stem cells in triple-negative breast cancer. *Cancer Cell Int.* 2025 Dec 10;26(1):13.

[6] Sun S, Gao T, Pang B, et al. RNA binding protein NKAP protects glioblastoma cells from ferroptosis by promoting SLC7A11 mRNA splicing in an m6A-dependent manner. *Cell Death Dis.* 2022 Jan 21;13(1):73.

[7] Hama S, Kirimura N, Obara A, et al. Tocopheryl Phosphate Inhibits Rheumatoid Arthritis-Related Gene Expression In Vitro and Ameliorates Arthritic Symptoms in Mice. *Molecules.* 2022 Feb 20;27(4):1425.

[8] Uchoa MF, de Souza LF, Dos Santos, et al. Modulation of Brain Glutathione Reductase and Peroxiredoxin 2 by α -Tocopheryl Phosphate. *Cell Mol Neurobiol.* 2016 Aug;36(6):1015-1022.

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