

Product Data Sheet

Product Name: γ -Tocotrienol

Cat. No.: GD23102

Chemical Properties

Cas. No. 14101-61-2

Formula $C_{28}H_{42}O_2$ M.Wt 410.63

Solubility DMSO : 100 mg/mL (243.53 mM; Storage Store at -20°C
Need ultrasonic)

General tips For obtaining a higher solubility , please warm the tube at 37 °C and shake it in the ultrasonic bath for a while. Stock solution can be stored below -20°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.

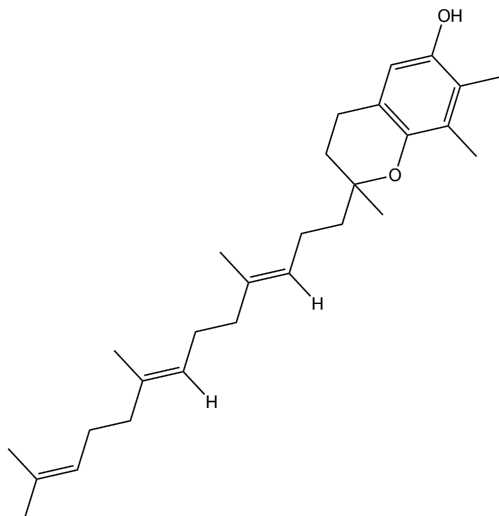
Caution: Product has not been fully validated for medical applications. For research use only.

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Structure



Protocol

Cell experiment [1]:

Cell lines human gastric cancer cell line MKN-45

Preparation Method MKN-45 cells were seeded into 96-well plates at 5,000 cells per well and allowed to adhere overnight. MKN-45 cells were treated with γ -Tocotrienol (30 μ mol/L) or not for 24h. Cells were collected and total cellular RNA was isolated using TRIzol reagent.

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Reaction
Conditions 30μmol/L; 24h

Applications Significantly altered signaling pathways after γ-Tocotrienol treatment were enriched for human papillomavirus infection (HPV) pathway and notch signaling pathway. The same significantly down-regulated genes notch1 and notch2 were present in both pathways in γ-Tocotrienol-treated gastric cancer cells compared to controls.

Animal experiment [2]:

Animal models C3H/HeN male mice, irradiated with 14 or 16Gy/min

Preparation Method For lung-PBI, C3H/HeN male mice were exposed to 14 or 16Gy doses of radiation to the lung area (below the neck to diaphragm). Irradiated mice were administered either saline or γ-Tocotrienol (200mg/kg; SC) 24h prior to PBI. γ-Tocotrienol (200mg/kg) or saline (n=12 per group) were administered SC 24h prior to irradiation. In addition to the irradiated groups of animals, blood and tissues from an age-matched naïve group (n=12) was collected at each time point.

Dosage form 100 or 200mg/kg; SC administration

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Applications

Regeneration and increase of cellularity and megakaryocytes on γ -Tocotrienol treatment was compared to significant loss of cellularity in saline group. Peak alveolitis was observed on day 14 post-PBI and protection from alveolitis by γ -Tocotrienol was noted. In irradiated lung tissue, thirty proteins were found to be differentially expressed but modulated by γ -Tocotrienol to reverse the effects of irradiation.

References:

- [1]Xie, Ling, and Juan Yan. “ γ -tocotrienol regulates gastric cancer by targeting notch signaling pathway.” **Hereditas** vol. 160,1 15. 13 Apr. 2023, doi:10.1186/s41065-023-00277-w
- [2]. Kumar, Vidya P et al. “Gamma Tocotrienol Protects Mice From Targeted Thoracic Radiation Injury.” **Frontiers in pharmacology** vol. 11 587970. 12 Nov. 2020, doi:10.3389/fphar.2020.587970

Background

γ -Tocotrienol (γ -T3) is a subtype of tocotrienol and a major type of vitamin E with two substituted methyl groups^[1]. γ -Tocotrienol has effects on anti-inflammation, anti-oxidation, chemoprevention against malignancies (verified *in vitro*), acute radiation syndrome, and house dust mite-induced asthma [2,3,4].

In vitro studies show that γ -Tocotrienol (0-90 μ mol/L) inhibited the proliferation of gastric cancer MKN45 cells and AGS cells, and arrested the cell cycle at the G0/G1 phase in a dose-dependent manner. Moreover, autophagy was increased in MKN45 cells treated with γ -Tocotrienol (0-45 μ mol/L)^[2]. γ -Tocotrienol (30 μ mol/L; 24h) also regulates gastric cancer by targeting notch signaling pathway^[5]. And γ -Tocotrienol (PC-3 cells; 10 μ g/mL; 72h) induces apoptosis in prostate cancer cells by targeting the Ang-1/Tie-2 signaling pathway^[6].

In vivo experiments show that γ -Tocotrienol ([¹⁸F]F- γ -T-3; 14.8MBq; administration by injection) has upper abdominal accumulation with evidence of renal clearance, only low concentrations in the thorax (lung/heart) and head, and rapid clearance from blood^[7]. γ -Tocotrienol also protects mice from targeted thoracic radiation injury(100 or 200mg/kg; 14 or 16Gy/min; SC administration)^[8].

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- [1] Komiyama, K et al. "Studies on the biological activity of tocotrienols." *Chemical & pharmaceutical bulletin* vol. 37,5 (1989): 1369-71. doi:10.1248/cpb.37.1369
- [2] Zhu, Hao et al. "γ-Tocotrienol enhances autophagy of gastric cancer cells by the regulation of GSK3β/β-Catenin pathway." *Molecular carcinogenesis* vol. 63,10 (2024): 2013-2025. doi:10.1002/mc.23790
- [3] Peh, Hong Yong et al. "Vitamin E Isoform γ-Tocotrienol Downregulates House Dust Mite-Induced Asthma." *Journal of immunology (Baltimore, Md. : 1950)* vol. 195,2 (2015): 437-44. doi:10.4049/jimmunol.1500362
- [4] Singh, Vijay K, and Martin Hauer-Jensen. "γ-Tocotrienol as a Promising Countermeasure for Acute Radiation Syndrome: Current Status." *International journal of molecular sciences* vol. 17,5 663. 3 May. 2016, doi:10.3390/ijms17050663
- [5] Xie, Ling, and Juan Yan. "γ-tocotrienol regulates gastric cancer by targeting notch signaling pathway." *Hereditas* vol. 160,1 15. 13 Apr. 2023, doi:10.1186/s41065-023-00277-w
- [6] Tang, Kai Dun et al. "Gamma-Tocotrienol Induces Apoptosis in Prostate Cancer Cells by Targeting the Ang-1/Tie-2 Signalling Pathway." *International journal of molecular sciences* vol. 20,5 1164. 7 Mar. 2019, doi:10.3390/ijms20051164
- [7] Roselt, Peter et al. "Synthesis of [18F]F-γ-T-3, a Redox-Silent γ-Tocotrienol (γ-T-3) Vitamin E Analogue for Image-Based In Vivo Studies of Vitamin E Biodistribution and Dynamics." *Molecules (Basel, Switzerland)* vol. 25,23 5700. 3 Dec. 2020, doi:10.3390/molecules25235700
- [8] Kumar, Vidya P et al. "Gamma Tocotrienol Protects Mice From Targeted Thoracic Radiation Injury." *Frontiers in pharmacology* vol. 11 587970. 12 Nov. 2020, doi:10.3389/fphar.2020.587970

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