

Product Data Sheet

Product Name: Glycerol 3-phosphate

Cat. No.: GC36159

Chemical Properties

Cas. No. 17989-41-2

SMILES O[C@H](CO)COP(O)(O)=O

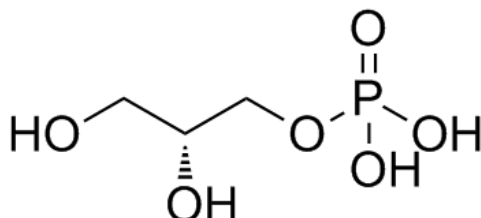
Formula $C_3H_9O_6P$ M.Wt 172.07

Solubility Water: ≥ 50 mg/mL (290.58 mM) Storage Store at -20°C

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.

Structure



Protocol

Cell experiment [1]:

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Cell lines DU145 and A549 cells

Preparation Method DU145 and A549 cells were treated with different concentrations of Glycerol 3-phosphate and 2.5mmol/L metformin, and cell viability was detected by CCK-8 method.

Reaction Conditions 1-200mmol/L

Applications Glycerol 3-phosphate alone inhibited the proliferation of DU145 and A549 cells, and Glycerol 3-phosphate significantly improved the anti-proliferation ability of metformin.

Animal experiment [2]:

Animal models C57Bl/6J mice

Preparation Method Glycerol 3-phosphate, LPA, sodium phosphate dibasic, G-2-P, glycerol , 1,25(OH)₂D , and IL-6 were i.p. injected into 3–10 mice per group. Mice were sacrificed 24h after i.p. injection, and blood, femur, bone marrow, and other tissues were collected for further analysis.

Dosage form 50, 150 and 300mg/kg, 24h, i.p.

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Applications In C57Bl/6J mice, plasma iFGF23 and C-terminal FGF23 (cFGF23) levels demonstrated a dose-dependent increase following a single dose of Glycerol 3-phosphate, with no change in the cFGF23/iFGF23 ratio.

References:

[1] Xie J, Ye J, Cai Z, et al. GPD1 enhances the anticancer effects of metformin by synergistically increasing total cellular glycerol-3-phosphate[J]. Cancer research, 2020, 80(11): 2150-2162.

[2] Simic P, Kim W, Zhou W, et al. Glycerol-3-phosphate is an FGF23 regulator derived from the injured kidney[J]. The Journal of clinical investigation, 2020, 130(3): 1513-1526.

Background

Glycerol 3-phosphate is produced by the cytosolic glycerol 3-phosphate dehydrogenase pathway. Cytosolic glycerol 3-phosphate dehydrogenase (GPDH) consumes NADH to produce glycolol 3-phosphate from dihydroxyacetone phosphate (DHAP). The generated glycolol 3-phosphate can cross the permeable outer mitochondrial membrane^[1]. Glycerol 3-phosphate is unstable in its free form, and its stable salt form sn-Glycerol 3-phosphate lithium (GC61482) with the same biological activity is recommended.

Glycerol 3-phosphate alone can inhibit the proliferation of DU145 and A549 cells in a concentration-dependent manner, and Glycerol 3-phosphate can increase the sensitivity of cells to metformin. When the concentration of Glycerol 3-phosphate is equal to or less than 1mmol/L, it has no adverse effect on the oxygen consumption rate (OCR) of DU145 and A549 cells, but as the concentration of Glycerol 3-phosphate increases (10, 100mmol/L), OCR begins to be inhibited^[2].

In C57Bl/6J mice, plasma intact fibroblast growth factor 23 (iFGF23) and C-terminal FGF23 (cFGF23) levels showed a dose-dependent increase after a single intraperitoneal injection of Glycerol 3-phosphate (50, 150 and 300mg/kg). Glycerol 3-phosphate increased the urine phosphate/creatinine ratio and decreased plasma 1,25-dihydroxyvitamin D3 levels^[3]. In a myocardial ischemia-reperfusion (I/R) mouse model, glycerol 3-phosphate reduced myocardial infarction area ($42 \pm 2\%$) compared with the control group ($56 \pm 4\%$) by activating the quinone pool (Q-pool) to

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stimulate the production of ROS in complex III (antimycin A)[4].

References:

- [1] Shen W, Wei Y, Dauk M, et al. Involvement of a glycerol-3-phosphate dehydrogenase in modulating the NADH/NAD⁺ ratio provides evidence of a mitochondrial glycerol-3-phosphate shuttle in Arabidopsis[J]. The Plant Cell, 2006, 18(2): 422-441.
- [2] Xie J, Ye J, Cai Z, et al. GPD1 enhances the anticancer effects of metformin by synergistically increasing total cellular glycerol-3-phosphate[J]. Cancer research, 2020, 80(11): 2150-2162.
- [3] Simic P, Kim W, Zhou W, et al. Glycerol-3-phosphate is an FGF23 regulator derived from the injured kidney[J]. The Journal of clinical investigation, 2020, 130(3): 1513-1526.
- [4] Madungwe N B, Zilberstein N F, Feng Y, et al. Critical role of mitochondrial ROS is dependent on their site of production on the electron transport chain in ischemic heart[J]. American journal of cardiovascular disease, 2016, 6(3): 93.

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