

Product Data Sheet

Product Name: Glycocholic acid

Cat. No.: GC34134

Chemical Properties

Cas. No. 475-31-0

SMILES O=C(O)CNC(CC[C@@H](C)[C@H]1CC[C@@]2([H])[C@]3([H])[C@H](O)C[C@]4([H])C[C@H](O)CC[C@]4(C)[C@@]3([H])C[C@H](O)[C@]12C)=O

Formula $C_{26}H_{43}NO_6$ M.Wt 465.62

Solubility DMSO : ≥ 100 mg/mL (214.77 mM) Storage Store at $-20^{\circ}C$

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.

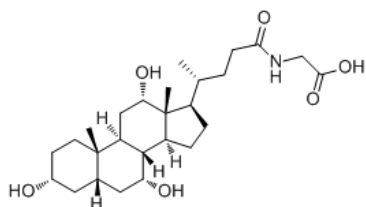
Caution: Product has not been fully validated for medical applications. For research use only.

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Structure



Protocol

Cell experiment [1]:

Cell lines Caco-2 cells

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Preparation Method All Caco-2 cell experiments started on day 14 after seeding. The cells were exposed for 48h with the following: 1:75 dilution (~1mM) of whole human bile (coming from one patient with unknown identity for the researchers) 10 or 100µM chenodeoxycholic acid (CDCA) as primary bile acid, 10 or 100µM lithocholic acid (LCA) as secondary bile acid, and 10 or 100µM Glycocholic acid (GCA) and taurocholic acid (TCA) as conjugated bile acid and 10mM of the short-chain fatty acid butyrate in FBS-free medium in the upper compartments. After incubation, the resistance was measured and the cells were saved for protein expression.

Reaction Conditions 10, 100µM; 48h

Applications Glycocholic acid in combination with butyrate increased the Hsp90β protein expression significantly, at a comparable level to whole bile, while Taurocholic acid had no such effect.

Animal experiment [2]:

Animal models Zebrafish

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Preparation Method	Three days post-fertilization (dpf), zebrafish were divided into control (PBS microinjection), model (LPS microinjection), and administration (LPS microinjection+drug administration) groups. Embryos in the administration groups were pretreated with Babaodan (10µg/mL), C. bovis (10µg/mL), bile acids (including Taurodeoxycholate sodium salt (TDCA), Deoxycholic acid (DCA), Taurocholic acid Sodium Salt (TCA), Glycodeoxycholic acid (GDCA), Glycocholic acid (GCA), Cholic acid (CA), Taurochenodeoxycholic acid (TCDCA), Glycochenodeoxycholic acid (GCDCA)) (All the bile acids were administered at a concentration of 10µg/mL), and dexamethasone (DEX, 20µg/mL) (positive control), respectively. After 24h of treatment, microinjection was performed in a 1nL volume per larva with LPS at a concentration of 2.5mg/mL. The control group used phosphate-buffered saline of the same volume as LPS. Embryos were retreated with drugs for 6h right after recovery from anesthesia (0.02% tricaine).
Dosage form	10µg/mL; microinjection
Applications	Among all the bile acids, Taurocholic acid and Glycocholic acid showed the strongest effects on reducing macrophage accumulation. the LPS-stimulated upregulation of IL-6, TNF-α, and CCL-2 were significantly inhibited by either Taurocholic acid or Glycocholic acid treatment.

References:

- [1]Casselbrant A, Fändriks L, Wallenius V. Glycocholic acid and butyrate synergistically increase vitamin D-induced calcium uptake in Caco-2 intestinal epithelial cell monolayers[J]. Bone reports, 2020, 13: 100294.
- [2]Ge X, Huang S, Ren C, et al. Taurocholic acid and glycocholic acid inhibit inflammation and activate farnesoid X receptor expression in LPS-stimulated zebrafish and macrophages[J]. Molecules, 2023, 28(5): 2005.

Background

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Glycocholic acid is a crystalline bile acid involved in fat emulsification. It is a combination of bile acid and glycine and exists in mammalian bile in the form of sodium salt^[1]. Glycocholic acid has anti-tumor activity and can target resistance pumps and non-resistance pump pathways^[2]. Glycocholic acid can be used as a phenotypic biomarker for cholangiocarcinoma^[3]. Glycocholic acid can treat bile acid amidation defects^[4].

In vitro, treatment of Caco-2 cells with Glycocholic acid (10, 100µM) for 48h significantly increased the expression of Hsp90β protein, and exerted a synergistic effect when used in combination with butyrate^[5].

In vivo, Glycocholic acid (10µg/mL) was used to treat lipopolysaccharide (LPS)-induced zebrafish inflammation model by microinjection, which significantly reduced the accumulation of macrophages in zebrafish and inhibited the upregulation of interleukin-6 (IL-6), tumor necrosis factor-α (TNF-α), and cc motif chemokine ligand-2 (CCL-2)^[6].

References:

- [1] Holm R, Müllertz A, Mu H. Bile salts and their importance for drug absorption[J]. International Journal of Pharmaceutics, 2013, 453(1): 44-55.
- [2] Lo Y L, Ho C T, Tsai F L. Inhibit multidrug resistance and induce apoptosis by using glycocholic acid and epirubicin[J]. European journal of pharmaceutical sciences, 2008, 35(1-2): 52-67.
- [3] Song W S, Park H M, Ha J M, et al. Discovery of glycocholic acid and taurochenodeoxycholic acid as phenotypic biomarkers in cholangiocarcinoma[J]. Scientific Reports, 2018, 8(1): 11088.
- [4] Heubi J E, Setchell K D R, Jha P, et al. Treatment of bile acid amidation defects with glycocholic acid[J]. Hepatology, 2015, 61(1): 268-274.
- [5] Casselbrant A, Fändriks L, Wallenius V. Glycocholic acid and butyrate synergistically increase vitamin D-induced calcium uptake in Caco-2 intestinal epithelial cell monolayers[J]. Bone reports, 2020, 13: 100294.
- [6] Ge X, Huang S, Ren C, et al. Taurocholic acid and glycocholic acid inhibit inflammation and activate farnesoid X receptor expression in LPS-stimulated zebrafish and macrophages[J]. Molecules, 2023, 28(5): 2005.

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