

## Product Data Sheet

Product Name: Uridine diphosphate glucose

Cat. No.: GC37866

### Chemical Properties

Cas. No. 133-89-1

SMILES OC[C@@H]1[C@H]([C@@H]([C@H]([C@H](O1)OP(=O)(O)OP(=O)(O)OC[C@@H]2O[C@@H](N3C=CC(=O)NC3=O)[C@H](O)[C@@H]2O)(O)=O)(O)=O)O)O

Formula  $C_{15}H_{24}N_2O_{17}P_2$

M.Wt 566.3

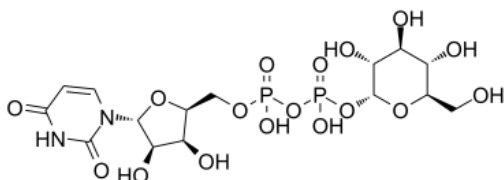
Solubility Water :  $\geq 50$  mg/mL

Storage Store at  $-20^{\circ}\text{C}$ , protect from light, stored under nitrogen

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

INS-1 832/13 cells

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

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|-------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Preparation Method            | INS-1 832/13 cells were seeded at 20000 cells/well into 48-well plates in RPMI 1640 medium with GlutaMax containing 11.1mM glucose and supplemented with 15% fetal calf serum, 50µg/l streptomycin, 75mg/l penicillin sulfate, and 5µl/ml β-mercaptoethanol and cultured at 37°C with 5% ambient CO <sub>2</sub> for 18h. Then the medium was changed to the same culture medium with 20mM glucose in the presence or absence of Uridine diphosphate glucose (0, 0.1, 1, and 10µM) and the cells were cultured for additional 24h, and cell proliferation was measured. |
| Reaction Conditions           | 0, 0.1, 1, and 10µM; 24h                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Applications                  | Uridine diphosphate glucose treatment suppressed the proliferative effect of high glucose on the INS-1 832/13 cells in a dose-dependent manner.                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Animal experiment [2]:</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| Animal models                 | Hy-Line Brown chickens                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

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|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Preparation Method                                                                                                                                                                                                                                                                                                                                                                                        | Hy-Line Brown chickens (6-week-old) were randomly housed in standard stainless-steel cages to ensure uniform activity space per chicken. The housing environment was maintained under artificially controlled conditions, with temperature kept at 15°C-22°C and relative humidity at 55%-60%. The light cycle was controlled by an automatic timer, set to 13.5h of light and 10.5h of darkness to simulate natural circadian rhythms. Chickens at the end of 6 weeks of age were randomly divided into three groups: a control group (fed a basal diet and administered a daily intramuscular injection of an equal volume of sterile saline), a HFD group (fed a high-fat diet and administered a daily intramuscular injection of an equal volume of sterile saline), and a Uridine diphosphate glucose intervention group (fed a high-fat diet and administered a daily intramuscular injection of Uridine diphosphate glucose). Uridine diphosphate glucose was administered at a dose of 8mg/kg once daily at a fixed time, and the experimental period lasted 8 weeks. The liver of each chicken was immediately collected for analysis. |
| Dosage form                                                                                                                                                                                                                                                                                                                                                                                               | 8mg/kg/day; 8 weeks; i.m.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Applications                                                                                                                                                                                                                                                                                                                                                                                              | Uridine diphosphate glucose markedly reduced lipid accumulation in the livers of HFD-induced chickens.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| References:<br><br>[1] Parandeh F, Amisten S, Verma G, et al. Inhibitory effect of UDP-glucose on cAMP generation and insulin secretion[J]. Journal of Biological Chemistry, 2020, 295(45): 15245-15252.<br><br>[2] Wang J, Liu J, Xiao N, et al. Uridine diphosphate glucose reduces embryonic and diet-induced hepatic lipid accumulation in chickens[J]. Research in Veterinary Science, 2026: 106203. |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

### Background

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Uridine diphosphate glucose, one of the most commonly encountered sugar nucleotides, is widely used as a glucosyl donor in glucosyltransferase reactions<sup>[1]</sup>. Uridine diphosphate glucose, serving as an activated glycosyl donor in the enzymatic biosynthesis of carbohydrates, activates the P2Y<sub>14</sub> receptor and is involved in the regulation of diaphragmatic contraction in rats and guinea pigs<sup>[2]</sup>. Uridine diphosphate glucose has been widely employed in purification processes as an internal reference to optimize the parameters of borate-assisted anion exchange high-performance liquid chromatography, enabling the efficient determination of the content of UDP-sugar in the brains, hearts, fats, and livers of rats<sup>[3]</sup>.

In vitro, Uridine diphosphate glucose treatment for 20 minutes stimulated calcium mobilization and the release of  $\beta$ -hexosaminidase (HEX) in RBL-2H3 cells, with EC<sub>50</sub> values of 5.98 $\mu$ M and 1.15 $\mu$ M, respectively<sup>[4]</sup>. Uridine diphosphate glucose (100 $\mu$ M) incubation for 15 minutes promoted Rho activation in differentiated HL60 cells and enhanced cell migration<sup>[5]</sup>. Treatment with 10 $\mu$ M Uridine diphosphate glucose for 24 hours reduced the proliferation of INS-1 832/13 cells induced by 20mM glucose and promoted cell apoptosis<sup>[6]</sup>.

In vivo, Uridine diphosphate glucose administration via subcutaneous injection at a dose of 200mg/kg/day for 6 days promoted the mobilization of hematopoietic stem cells in mice<sup>[7]</sup>. Daily intramuscular injection of Uridine diphosphate glucose (8mg/kg/day) for 8 weeks decreased high-fat diet (HFD)-induced lipid accumulation in the plasma and liver of chickens<sup>[8]</sup>.

### References:

- [1] Dong Q, Ouyang L M, Yu H L, et al. Efficient biosynthesis of uridine diphosphate glucose from maltodextrin by multiple enzymes immobilized on magnetic nanoparticles[J]. Carbohydrate research, 2010, 345(11): 1622-1626.
- [2] Chambers J K, Macdonald L E, Sarau H M, et al. AG protein-coupled receptor for UDP-glucose[J]. Journal of Biological Chemistry, 2000, 275(15): 10767-10771.
- [3] Oikari S, Venäläinen T, Tammi M. Borate-aided anion exchange high-performance liquid chromatography of uridine diphosphate-sugars in brain, heart, adipose and liver tissues[J]. Journal of chromatography A, 2014, 1323: 82-86.

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- [4] Gao Z G, Ding Y, Jacobson K A. UDP-glucose acting at P2Y<sub>14</sub> receptors is a mediator of mast cell degranulation[J]. Biochemical pharmacology, 2010, 79(6): 873-879.
- [5] Sesma J I, Kreda S M, Steinckwich-Besancon N, et al. The UDP-sugar-sensing P2Y<sub>14</sub> receptor promotes Rho-mediated signaling and chemotaxis in human neutrophils[J]. American Journal of Physiology-Cell Physiology, 2012, 303(5): C490-C498.
- [6] Parandeh F, Amisten S, Verma G, et al. Inhibitory effect of UDP-glucose on cAMP generation and insulin secretion[J]. Journal of Biological Chemistry, 2020, 295(45): 15245-15252.
- [7] Kook S, Cho J, Lee S B, et al. The nucleotide sugar UDP-glucose mobilizes long-term repopulating primitive hematopoietic cells[J]. The Journal of clinical investigation, 2013, 123(8): 3420-3435.
- [8] Wang J, Liu J, Xiao N, et al. Uridine diphosphate glucose reduces embryonic and diet-induced hepatic lipid accumulation in chickens[J]. Research in Veterinary Science, 2026: 106203.

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