

Product Data Sheet

Product Name: S-D-Lactoylglutathione

Cat. No.: GC81600

Chemical Properties

Cas. No. 41656-56-8

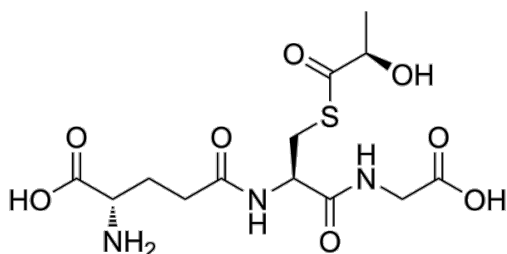
Formula $C_{13}H_{21}N_3O_8S$ M.Wt 379.39

Solubility H_2O : 50 mg/mL (131.79 mM; Need ultrasonic) Storage Sealed storage, away from moisture

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



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

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

Background

S-D-Lactoylglutathione (S-Lactylglutathione; (R)-S-Lactoylglutathione) is a multifunctional metabolic intermediate of the glyoxalase system. S-D-Lactoylglutathione activates K⁺ efflux in bacteria by displacing inhibitory glutathione from KefGB channels, thereby acidifying the cytoplasm. In eukaryotic cells, S-D-Lactoylglutathione mediates S-glutathionylation as a substrate of glyoxalase 2. S-D-Lactoylglutathione serves as a sensitive metabolic biomarker for neodymium nitrate neurotoxicity; when used in combination with MSCs-exo, it upregulates glutathione levels, downregulates lactate dehydrogenase and Glo2 levels, and inhibits cellular inflammatory responses and pyroptosis. S-D-Lactoylglutathione can be used in research related to prostate cancer, breast cancer, non-small cell lung cancer, sepsis-associated encephalopathy, and neurotoxicity [1] [2] [3] [4] [5] [6].

In Vivo, MSCs-exo-mediated delivery of miR-140-3p upregulates hippocampal S-D-Lactoylglutathione levels in mice with sepsis-associated encephalopathy^[4].

In Vitro, S-D-Lactoylglutathione (50-200 μ M; 45 min) significantly enhances anti-IgE-induced histamine release from leukocytes of normal non-atopic human donors^[1]. S-D-Lactoylglutathione (200 μ M; 5 min preincubation, followed by 45 min co-incubation with anti-IgE) reverses the inhibitory effect of glyoxalase I inhibitors on IgE-induced histamine release from human leukocytes, restoring histamine release to levels comparable to or higher than those of the control group^[1]. S-D-Lactoylglutathione (1 mM) serves as a substrate for GlxII; the GlxII activity of Δ gloB *E. coli* MJF595 is approximately 6% of that of the parental strain, while the GlxII activity of MJF274 pGlxII is about 25-fold higher than that of the parental strain^[2]. Accumulation of S-D-Lactoylglutathione in Δ gloB *E. coli* MJF595 leads to excessive activation of K⁺ efflux, whereas reduced levels of S-lactoylglutathione in MJF274 pGlxII prevent the activation of K⁺ efflux following exposure to MG^[2]. In the presence of Glo2, S-D-lactoylglutathione specifically mediates S-glutathionylation of actin at the cysteine 374 (Cys374) site, thereby inhibiting actin polymerization and reducing the hydrolase activity of Glo2^[3]. In the presence of Glo2, S-D-lactoylglutathione specifically induces S-glutathionylation of malate dehydrogenase, promotes its tetramer formation and enhances its enzymatic activity, while reducing the hydrolase activity of Glo2^[3]. S-D-lactoylglutathione (1 mM) induces non-enzymatic lysine lactylation modification of cellular proteins, which mainly acts on glycolytic enzymes and inhibits their activity^[3]. S-D-lactoylglutathione enhances GTP-dependent polymerization of porcine

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

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA

Product Data Sheet

brain tubulin in a cell-free system^[3]. S-D-Lactoylglutathione accumulates in large quantities in Δ gloB *E. coli* MJF595 upon exposure to MG, whereas overexpression of GlxII prevents the accumulation of S-lactoylglutathione, and overexpression of GlxI increases the level of S-lactoylglutathione compared with the parental strain^[2]. S-D-Lactoylglutathione is one of the most sensitive differential metabolites in BV2 microglia (with the lowest BMDL value among the detected metabolites). Its level decreases in a concentration-dependent manner after neodymium nitrate exposure, and correlates with oxidative stress, mitochondrial dysfunction, and impaired cell viability^[5]. S-D-Lactoylglutathione is undetectable in untreated LNCaP prostate cancer cells, but when the cells are treated with 10 μ M SKI for 24 h, its accumulation reaches a peak level of 5790 relative to the control group^[6].

References:

- [1]. Gillespie E. Effects of S-lactoylglutathione and inhibitors of glyoxalase I on histamine release from human leukocytes[J]. Nature, 1979, 277(5692): 135-137.
- [2]. Ozyamak E, et al. The critical role of S-lactoylglutathione formation during methylglyoxal detoxification in Escherichia coli. Molecular microbiology. 2010 Dec;78(6):1577-90.
- [3]. Scirè A, et al. Glyoxalase 2: Towards a Broader View of the Second Player of the Glyoxalase System. Antioxidants (Basel, Switzerland). 2022 Oct 28;11(11):2131.
- [4]. Ma Y, et al. MSC-derived exosomal miR-140-3p improves cognitive dysfunction in sepsis-associated encephalopathy by HMGB1 and S-lactoylglutathione metabolism. Commun Biol. 2024 May 11;7(1):562.
- [5]. Wang J, et al. Redox imbalance and glutathione metabolism disruption drive neodymium - induced neurotoxicity in microglia. Toxicology. 2026 Jun;523:154444.
- [6]. Watson DG, et al. The roles of sphingosine kinases 1 and 2 in regulating the Warburg effect in prostate cancer cells. Cellular signalling. 2013 Apr;25(4):1011-7.

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

Tel: (909) 407-4943 Fax: (626) 353-8530 E-mail: tech@glpbio.com

Address: 10292 Central Ave. #205, Montclair, CA, USA