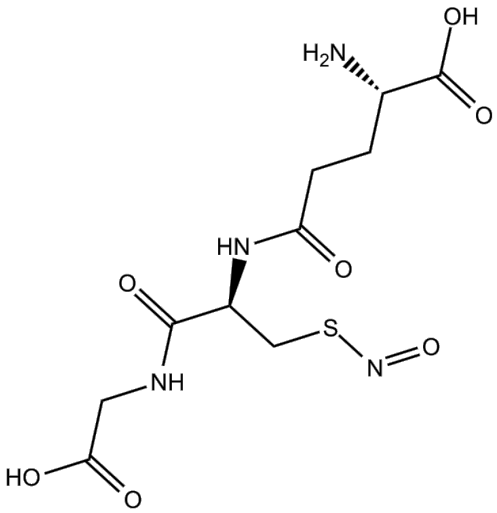
Product Data Sheet

Product Name: Nitrosoglutathione (GSNO)
Cat. No.: GC11815

Chemical Properties

Cas. No.	57564-91-7		
Chemical Name	(S)-2-amino-5-(((R)-1-((carboxymethyl)amino)-3-(nitrosothio)-1-oxopropan-2-yl)amino)-5-oxopentanoic acid		
SMILES	O=C(CC[C@@H](C(O)=O)N)N[C@H](C(NCC(O)=O)=O)CSN=O		
Formula	$C_{10}H_{16}N_4O_7S$	M.Wt	336.32
Solubility	DMSO:67mg/ml	Storage	Store at -20°C, protect from light
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]:

Product Data Sheet

Cell lines	HeLa cells
Preparation Method	HeLa cells (8×10^3) were seeded in a 96-well culture plate and subjected to a 24-h period of starvation with MEM 0.5% FBS at 37°C, 5% CO_2 . Cells were exposed to different concentrations of Nitrosoglutathione for 5h. In the assay that was used, PP2 (a Src kinase inhibitor) or BIBX1382 (an EGFR inhibitor) or LY294002 (PI3K inhibitor) or PD98059 (MEK inhibitor) was added 30min before stimulation with Nitrosoglutathione, EGF, Bk, or FBS. Cells were washed and subsequently incubated with MTT (0.5mg/ml) reagent at 37°C, 5% CO_2, for 2h to measure the daily proliferation rate. The medium was discarded, and 100μl of cold isopropanol was added to monitor the absorbance spectrophotometrically at 570nm. The experiment was repeated three times. Cell pro-liferation was evaluated by a cell count assay. Cells were cultured in six-well plates to attain 40%–50% confluence and stimulated during 5h with Nitrosoglutathione or FBS in a culture medium without supplements. After 24–48h stimulation, cells were trypsinized and counted using an inverted microscope
Reaction Conditions	0, 0.1, 1, 10, 50, 100, and 1000μM; 5h
Applications	Cells pretreated with low concentrations (1.0-100μM) of Nitrosoglutathione showed significant stimulation and proliferation at 24 and 48 hours. However, exposing HeLa cells to 1.0 millimole of Nitrosoglutathioneinhibited cell proliferation.

Animal experiment [2]:

Animal models	Sprague-Dawley rats

Product Data Sheet

Preparation Method	On day 14 of gestation, female Sprague-Dawley rats were separated into five groups and treated intravenously for 7 days as follows: (i) 0.3mL 0.9% saline (control, *n* = 11); (ii) 50mg/kg Body Weight (BW) *N*-nitro-L-arginine methyl ester (L-NAME) in 0.3mL saline (*n* = 10); (iii) 50mg/kg BW L-NAME and 8mg/kg BW Nitrosoglutathione in 0.15mL saline (*n* = 6); (iv) 50 mg/kg BW L-NAME in 0.15mL saline and 8mg/kg BW SNAP in 0.15mL DMSO (*n* = 9); and (v) 0.15mL DMSO and 0.15mL saline (SNAP control, *n* = 7). Blood pressures were measured on day 14 through day 20, a 4-h urine sample was taken on day 20, and animals were sacrificed on day 21. Pups were counted and weighed individually.
Dosage form	8mg/kg/day; 7d; i.v.
Applications	Nitrosoglutathione significantly decreased systolic, diastolic, and mean arterial pressures in Pre-eclampsia (PE)-induced rats from day 14 through day 20.

References:

[1] Batista W L, Ogata F T, Curcio M F, et al. S-nitrosoglutathione and endothelial nitric oxide synthase-derived nitric oxide regulate compartmentalized ras S-nitrosylation and stimulate cell proliferation[J]. Antioxidants & redox signaling, 2013, 18(3): 221-238.
[2] Brown, Caneta et al. “The effects of S-nitrosoglutathione and S-nitroso-N-acetyl-D, L-penicillamine in a rat model of pre-eclampsia.” *Journal of natural science, biology, and medicine* vol. 4,2 (2013): 330-5.

Background

Nitrosoglutathione (GSNO) is an S-nitrosylthiol NO donor based on natural glutathione [1]. Nitrosoglutathione is an effective smooth muscle relaxant and platelet aggregation inhibitor, capable of inhibiting the AT1 receptor responses dependent and independent of brain vascular angiotensin II [2]. Nitrosoglutathione selectively inhibits platelet and NF-κB activation [3].

In vitro, Nitrosoglutathione (1-100μM; 5h) can activate Ras, Src and ERK1/2 MAP kinases and

promote HeLa cell proliferation. However, when HeLa cells are exposed to 1mM Nitrosoglutathione, cell proliferation is inhibited [4]. Nitrosoglutathione (500μM; 2h) treatment of neutrophils reduces TNFα-induced NF-κB activity and inhibits IκBα degradation [5].

In vivo, Nitrosoglutathione (8mg/kg/day; 7d; i.v.) significantly reduces systolic blood pressure, diastolic blood pressure and mean arterial pressure in rats with preeclampsia (PE) from day 14 to day 20 [6]. Nitrosoglutathione (0.2 and 0.6mg/kg; single administration; i.v.) significantly inhibits the production of superoxide in rats with ischemia/reperfusion injury models and inhibits NF-κB activation, iNOS induction and 3-nitrotyrosine expression, and upregulats the expression of endothelial NOS in flap vessels [7].

References:
[1] Bouressam ML, Lecat S, Raoul A, et al. S-nitrosoglutathione inhibits cerebrovascular angiotensin II-dependent and -independent AT receptor responses: A possible role of S-nitrosation. *Br J Pharmacol*. 2019;176(12):2049-2062.
[2] Jensen DE, Belka GK, Du Bois GC. S-Nitrosoglutathione is a substrate for rat alcohol dehydrogenase class III isoenzyme. *Biochem J*. 1998;331 (Pt 2) (Pt 2):659-668.
[3] Fortenberry J D, Owens M L, Brown L A S. S-nitrosoglutathione enhances neutrophil DNA fragmentation and cell death[J]. American Journal of Physiology-Lung Cellular and Molecular Physiology, 1999, 276(3): L435-L442.
[4] Batista W L, Ogata F T, Curcio M F, et al. S-nitrosoglutathione and endothelial nitric oxide synthase-derived nitric oxide regulate compartmentalized ras S-nitrosylation and stimulate cell proliferation[J]. Antioxidants & redox signaling, 2013, 18(3): 221-238.
[5] Fortenberry J D, Owens M L, Chen N X, et al. S-nitrosoglutathione inhibits TNF-α-induced NF κ B activation in neutrophils[J]. Inflammation Research, 2001, 50(2): 89-95.
[6] Brown, Caneta et al. “The effects of S-nitrosoglutathione and S-nitroso-N-acetyl-D, L-penicillamine in a rat model of pre-eclampsia.” *Journal of natural science, biology, and medicine* vol. 4,2 (2013): 330-5.
[7] Kuo YR, Wang FS, Jeng SF, Lutz BS, Huang HC, Yang KD. Nitrosoglutathione promotes flap survival via suppression of reperfusion injury-induced superoxide and inducible nitric oxide synthase induction. *J Trauma*. 2004;57(5):1025-1031.