PRODUCT INFORMATION

GPX4 (human, recombinant; His-tagged)

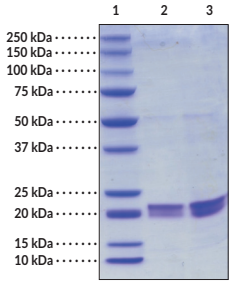
Item No. 26906

Overview and Properties

Synonyms:	Glutathione Peroxidase 4, PHGPx, Phospholipid Hydroperoxide Glutathione Peroxidase
Source:	Active recombinant N-terminal His-tagged protein expressed in *E. coli* strain C321.ΔA.exp
Amino Acids:	1-170 (full length)
Uniprot No.:	P36969-2
Molecular Weight:	21.2 kDa
Storage:	-80°C (as supplied)
Stability:	≥1 year
Purity:	***batch specific*** (≥65% estimated by SDS-PAGE)
Supplied in:	50 mM potassium phosphate buffer, pH 7.6, with 0.1 mM DTT and 5% glycerol
Protein Concentration:	***batch specific*** mg/ml
Activity:	***batch specific*** U/ml
Specific Activity:	***batch specific*** U/mg
Unit Definition:	One unit is defined as the amount of enzyme required to produce 1 nmol of $NADP^+$ per minute at 25°C in 50 mM Tris-HCl, pH 7.6, with 5 mM EDTA, 1 mM GSH, 0.076 units glutathione reductase, 263 µM NADPH and 0.5 mM of cumene hydroperoxide.

Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

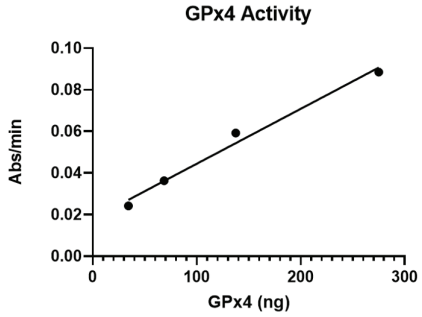
Images



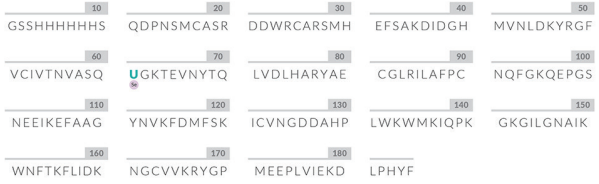
Lane 1: MW Markers
Lane 2: GPX4 (2 µg)
Lane 3: GPX4 (4 µg)

SDS-PAGE analysis of GPX4.

Representative gel image shown; actual purity may vary between each batch.



GPX4 activity was determined using Cayman's Glutathione Peroxidase Assay Kit (Item No. 703102).



Cayman's GPX4 (Item No. 26906) protein has a selenocysteine incorporated in the active site that has been confirmed by mass spectrometry. Selenocysteine (Se) is incorporated in the active site at the UGA stop codon indicated in teal. The Sec incorporation at the active site is approximately 20%, mixed with inactive forms containing Sec to Ser, Sec to Gln, and Sec to Glu substitution.

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Description

Glutathione peroxidase 4 (GPX4) is a selenocysteine-containing glutathione peroxidase that is encoded by the *GPX4* gene in humans and protects cellular membranes from oxidative damage.[1,2] It is a monomeric protein consisting of a thioredoxin motif and a selenocysteine-glutamine-tryptophan catalytic triad that reduces lipid hydroperoxides, including phospholipid, polyunsaturated lipid, and sterol hydroperoxides, to non-toxic lipid alcohols. During this process, the active site selenocysteine becomes oxidized and must subsequently be replenished by the reducing substrate glutathione (GSH).[2] There are three isoforms of GPX4, mitochondrial mGPX4, cytosolic cGPX4, and nuclear nGPX4/snGPX4, that are expressed in all tissue types in rats, with the highest mRNA levels observed in testes.[1-3] GPX4 is a key regulator of ferroptosis that inhibits ferroptotic cell death by preventing iron-dependent accumulation of toxic lipid reactive oxygen species.[2] Mutations in *GPX4* have been found in patients with Sedaghatian-type spondylometaphyseal dysplasia (SSMD), and silencing of *Gpx4* in mice is embryonic lethal.[2,4] Cayman's GPX4 (human, recombinant; His-tagged) protein has a selenocysteine incorporated in the active site that has been confirmed by mass spectrometry. It can be used for Western blot, ELISA, and enzymatic assays.

References

1. Imai, H. and Nakagawa, Y. Biological significance of phospholipid hydroperoxide glutathione peroxidase (PHGPx, GPx4) in mammalian cells. *Free Radic. Biol. Med.* **34(2)**, 145-169 (2003).
2. Forcina, G.C. and Dixon, S.J. GPX4 at the crossroads of lipid homeostasis and ferroptosis. *Proteomics* **19(18)**, e1800311 (2019).
3. Maiorino, M., Scapin, M., Ursin, F., *et al.* Distinct promoters determine alternative transcription of *gpx-4* into phospholipid-hydroperoxide glutathione peroxidase variants. *J. Biol. Chem.* **278(36)**, 34286-34290 (2003).
4. Smith, A.C., Mears, A.J., Bunker, R., *et al.* Mutations in the enzyme glutathione peroxidase 4 cause Sedaghatian-type spondylometaphyseal dysplasia. *J. Med. Genet.* **51(7)**, 470-474 (2014).

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