

PRODUCT INFORMATION



Thioredoxin 1 (C61S, C72S mutant; human, recombinant)

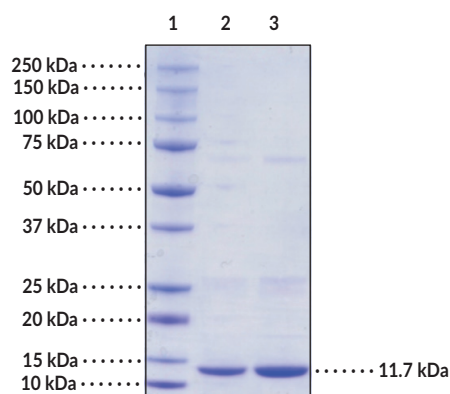
Item No. 11520

Overview and Properties

Synonyms:	Trx1, TrxA, Txn1
Source:	Active recombinant human thioredoxin 1 (C61S/C72S mutant) expressed in <i>E. coli</i>
Amino Acids:	Full length
Uniprot No.:	P10599
Molecular Weight:	11.7 kDa
Storage:	-20°C (as supplied)
Stability:	≥6 months
Purity:	batch specific (≥85% estimated by SDS-PAGE)
Supplied in:	50 mM Tris-HCl, pH 7.5, with 1 mM EDTA
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 eosin per minute at 37°C in 50 mM Tris-HCl, pH 7.5, with 0.2 mg/ml BSA, and 1 mM EDTA containing 8.3 μM eosin-labeled insulin, 250 μM NADPH, and 0.2 U/ml thioredoxin reductase.

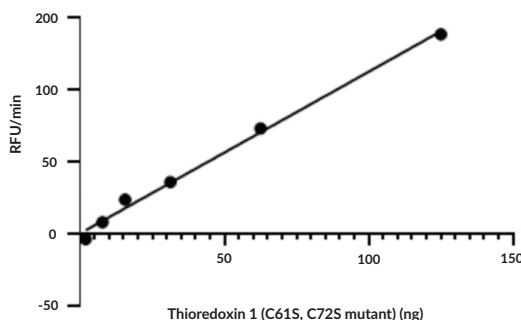
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

Images



Lane 1: MW Markers
Lane 2: Thioredoxin 1 (C61S, C72S mutant) (2 μg)
Lane 3: Thioredoxin 1 (C61S, C72S mutant) (4 μg)

SDS-PAGE Analysis of Thioredoxin 1 (C61S, C72S mutant).



Thioredoxin 1 (C61S, C72S mutant) activity was determined using Thioredoxin Activity Fluorescent Assay Kit with 0.54 μg/ml eosin-labeled insulin substrate.

WARNING

THIS PRODUCT IS FOR RESEARCH ONLY - NOT FOR HUMAN OR VETERINARY DIAGNOSTIC OR THERAPEUTIC USE.

SAFETY DATA

This material should be considered hazardous until further information becomes available. Do not ingest, inhale, get in eyes, on skin, or on clothing. Wash thoroughly after handling. Before use, the user must review the complete Safety Data Sheet, which has been sent via email to your institution.

WARRANTY AND LIMITATION OF REMEDY

Buyer agrees to purchase the material subject to Cayman's Terms and Conditions. Complete Terms and Conditions including Warranty and Limitation of Liability information can be found on our website.

Copyright Cayman Chemical Company, 10/13/2025

CAYMAN CHEMICAL

1180 EAST ELLSWORTH RD

ANN ARBOR, MI 48108 · USA

PHONE: [800] 364-9897

[734] 971-3335

FAX: [734] 971-3640

CUSTSERV@CAYMANCHEM.COM

WWW.CAYMANCHEM.COM

PRODUCT INFORMATION



Description

Thioredoxin 1 (Trx1) is a thiol-disulfide oxidoreductase and part of the antioxidant thioredoxin system that is involved in the maintenance of cellular thiol redox homeostasis.¹⁻³ It is ubiquitously expressed, localizes primarily to the cytoplasm with some nuclear localization, and is upregulated in and released from cells under conditions of oxidative stress.^{1,2,4} Trx1 contains two active site cysteine residues at positions 32 and 35 with additional cysteines at positions 62, 69, and 73.² During the catalytic cycle, the active site cysteines are oxidized to a disulfide upon reduction of oxidized protein disulfide substrates and are subsequently restored to their reduced state by thioredoxin reductase (TrxR) and NADPH.^{1,2} In the human recombinant enzyme, the initiating methionine is removed, and thus the positions of the amino acids are counted without the N-terminal methionine.⁵ Cysteine-to-serine substitutions at Cys61 (C61S) and Cys72 (C72S) in Trx1 (Trx1^{C61S/C72S}) prevent oxidation-induced inhibition of protein disulfide reductase activity in Trx1.⁶ Cayman's Thioredoxin 1 (C61S, C72S mutant; human, recombinant) protein can be used for enzyme activity assays.

References

1. Haendeler, J. Thioredoxin-1 and posttranslational modifications. *Antioxid. Redox Signal.* **8(9-10)**, 1723-1728 (2006).
2. Watanabe, R., Nakamura, H., Masutani, H., *et al.* Anti-oxidative, anti-cancer and anti-inflammatory actions by thioredoxin 1 and thioredoxin-binding protein-2. *Pharmacol. Ther.* **127(3)**, 261-270 (2010).
3. Berndt, C., Lillig, C.H., and Holmgren, A. Thiol-based mechanisms of the thioredoxin and glutaredoxin systems: Implications for diseases in the cardiovascular system. *Am. J. Physiol. Heart Circ. Physiol.* **292(3)**, H1227-H1236 (2007).
4. Raffel, J., Bhattacharyya, A.K., Gallegos, A., *et al.* Increased expression of thioredoxin-1 in human colorectal cancer is associated with decreased patient survival. *J. Lab. Clin. Med.* **142(1)**, 46-51 (2003).
5. Casagrande, S., Bonetto, V., Fratelli, M., *et al.* Glutathionylation of human thioredoxin: A possible crosstalk between the glutathione and thioredoxin systems. *Proc. Natl. Acad. Sci. USA* **99(15)**, 9745-9749 (2002).
6. Ren, X., Björnstedt, M., Shen, B., *et al.* Mutagenesis of structural half-cystine residues in human thioredoxin and effects on the regulation of activity by Selenodiglutathione. *Biochemistry* **32(37)**, 9701-9708 (1993).

CAYMAN CHEMICAL
1180 EAST ELLSWORTH RD
ANN ARBOR, MI 48108 · USA
PHONE: [800] 364-9897
[734] 971-3335
FAX: [734] 971-3640
CUSTSERV@CAYMANCHEM.COM
WWW.CAYMANCHEM.COM