

# PRODUCT INFORMATION



## Thioredoxin 1 (mouse, recombinant; His-tagged)

Item No. 35714

### Overview and Properties

**Synonyms:** Trx1, TrxA, Txn1  
**Source:** Active recombinant mouse His-tagged thioredoxin 1 expressed in *E. coli*  
**Amino Acids:** 2-105  
**Uniprot No.:** P10639  
**Molecular Weight:** 13.8 kDa  
**Storage:** -80°C (as supplied)  
**Stability:** ≥1 year  
**Purity:** ≥75% estimated by SDS-PAGE  
**Supplied in:** 50 mM Tris-HCl, pH 7.8, with 150 mM sodium chloride, 10% glycerol, 1 mM EDTA, and 0.1 mM DTT

#### Protein

**Concentration:** *batch specific* mg/ml

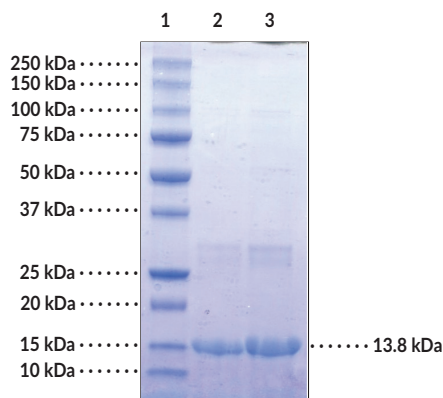
**Activity:** *batch specific* U/ml

**Specific Activity:** *batch specific* U/mg

**Unit Definition:** One unit is defined as the amount of enzyme required to produce 1 nmol of 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.

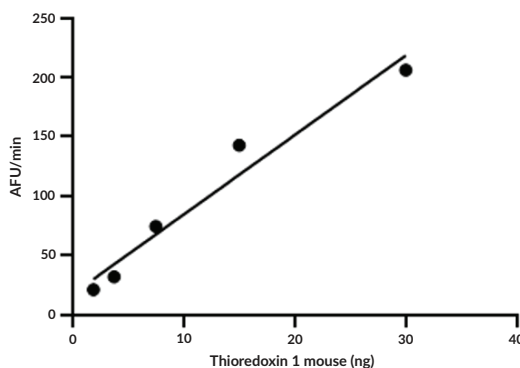
Information represents the product specifications. Batch specific analytical results are provided on each certificate of analysis.

### Images



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

**SDS-PAGE Analysis of Thioredoxin 1.** This protein has a calculated molecular weight of 13.8 kDa.



**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.

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## 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.<sup>1-3</sup> 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.<sup>1,2,4</sup> Trx1 contains two active site cysteine residues at positions 32 and 35, with additional cysteines at positions 62, 69, and 73.<sup>2</sup> 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.<sup>1,2</sup> It regulates redox-sensitive transcription factors including NF- $\kappa$ B, p53, and the glucocorticoid receptor, as well as inhibits apoptosis through redox-sensitive binding and regulation of apoptosis signal-regulating kinase 1 (ASK1).<sup>2,4</sup> Trx1 levels are increased in a variety of human primary tumors, and increased tumor levels of Trx1 are associated with decreased survival in patients with colorectal cancer.<sup>4</sup> Cayman's Thioredoxin 1 (mouse, recombinant; His-tagged) protein can be used for enzyme activity assay and Western blot applications.

## 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).

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