

## BACKGROUND

Thioredoxin (Trx) is a 12 kDa protein ubiquitously expressed in all living cells, which has a variety of biological functions related to cell proliferation and apoptosis. It is characterized by the reduction/oxidation (redox) active site sequence Trp-Cys-Gly-Pro-Cys-Lys, which is conserved through evolution. The two cysteine residues within the redox active center provide the sulfhydryl groups involved in Trx-dependent reducing activity. The oxidized form (Trx-S<sub>2</sub>) contains a disulfide bridge in the active site that is reduced to a dithiol by NADPH and the flavoprotein Trx reductase. Thus, the Trx system is composed of Trx, Trx reductase and NADPH *in vivo*. The reduced form [Trx-(SH)<sub>2</sub>] acts as a potent protein disulfide oxido-reductase. Human Trx is identical to adult T cell leukemia-derived factor (ADF), which was originally characterized as a growth factor secreted by human T lymphotropic virus-I-transformed leukemic cell lines.<sup>1</sup> Trx has been found to modulate the DNA-binding activity of certain transcription factors including NF-κB, glucocorticoid receptor, and to indirectly modulate AP-1 activity through Ref-1. Trx has also been found to act as a powerful antioxidant by reducing ROS, and protects against hydrogen peroxide (H<sub>2</sub>O<sub>2</sub>)-, TNF-alpha- and *cis*-diamminedichloroplatinum (II) (CDDP)-induced cytotoxicity, in which the generation of intracellular ROS is thought to participate. On the other hand, Trx can be oxidized by various ROS molecules including H<sub>2</sub>O<sub>2</sub>, suggesting that Trx may be a molecular target of ROS. Furthermore, It was demonstrated that Trx is a physiological inhibitor of ASK1.<sup>2</sup>

Additionally, Thioredoxin was used as a gene fusion partner. The broad utility of the system is illustrated by the production of a variety of mammalian cytokines and growth factors as Thioredoxin fusion proteins. Thioredoxin fusions can be made in soluble forms that are biologically active. Thioredoxin dramatically increases the solubility of heterologous proteins synthesized in the *E. coli* cytoplasm, and that Thioredoxin fusion proteins usually accumulate to high levels. Two additional properties of Thioredoxin, its ability to be specifically released from the *E. coli* cytoplasm by osmotic shock or freeze/thaw treatments and its intrinsic thermal stability, are retained by some fusions and provide convenient purification steps.<sup>3</sup>

### References:

- Holmgren, A.:Ann. Rev. Biochem. 54:237-71, 1985
- Saitoh, M. et al: EMBO J. 17:2596-2606, 1998
- LaVallie, E.R. et al: Nature Biotech.11:187-93, 1993

## TECHNICAL INFORMATION

### Source:

Thioredoxin Antibody is a Mouse monoclonal antibody raised against recombinant Thioredoxin protein.

### Specificity and Sensitivity:

This antibody detects Thioredoxin proteins without cross-reactivity with other family members.

**Storage Buffer:** PBS and 30% glycerol

### Storage:

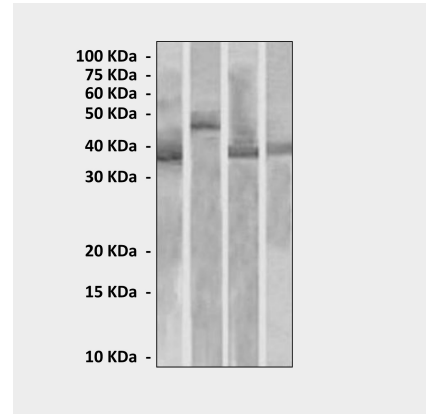
Store at -20°C for at least one year. Store at 4°C for frequent use. Avoid repeated freeze-thaw cycles.

## APPLICATIONS

Application:	*Dilution:
WB	1:1000
IP	1:50
IHC	n/d
ICC	n/d
FACS	n/d

*\*Optimal dilutions must be determined by end user.*

## QUALITY CONTROL DATA



Western Blot detection of various recombinant Thioredoxin fusion proteins expressed in *E. coli* using Thioredoxin Antibody.

