

## Product Information

### Glutathione Reductase human, recombinant expressed in *Escherichia coli*

Catalog Number **G9297**  
Storage Temperature  $-20\text{ }^{\circ}\text{C}$

CAS RN 9001-48-3  
EC 1.8.1.7 (formerly 1.6.4.2)  
Synonyms: GR, NADPH:oxidized glutathione oxidoreductase, glutathione-disulfide reductase

#### Product Description

Glutathione reductase (GR) is an ubiquitous flavoenzyme involved in protecting cells from stress. GR catalyzes the reduction of oxidized glutathione (GSSG) to glutathione (GSH). It is an essential component of the glutathione redox cycle, which maintains adequate levels of reduced cellular GSH. GSH serves as an antioxidant, reacting with free radicals and organic peroxides. Glutathione is also an electron donor for glutathione peroxidases and a substrate for glutathione S-transferases contributing to the detoxification and elimination of toxic electrophilic metabolites and xenobiotics.<sup>1,2</sup>

Glutathione reductase is a homodimeric enzyme containing 1 FAD molecule and 1 NADPH binding domain per subunit.<sup>3</sup> Both human GR (hGR) and *Plasmodium falciparum* GR (PfGR) are essential for the survival of the malaria parasite within human erythrocytes.<sup>4</sup> Thus, this enzyme may be used for studies of antimalaria drug candidates.

This product is supplied as a solution containing 25 mM Tris-HCl, pH 7.4, 1 mM EDTA, and 50% (v/v) glycerol.

Purity:  $\geq 90\%$  (SDS-PAGE)

Specific activity:  $\geq 12$  units/mg protein

Unit definition: 1 unit will reduce 1.0  $\mu\text{mole}$  of DTNB to TNB per minute at  $25\text{ }^{\circ}\text{C}$  at pH 7.5. The assay is based on the reduction of oxidized glutathione by NADPH in the presence of glutathione reductase, followed by transfer of the reducing power to 5,5'-dithiobis (2-nitrobenzoic acid) [DTNB]. The absorbance is measured at 412 nm and the reaction product (TNB) is calculated using  $\epsilon^{\text{mM}} = 14.15$ .<sup>6</sup>

#### Precautions and Disclaimer

This product is for R&D use only, not for drug, household, or other uses. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

#### Storage/Stability

The product ships on wet ice and storage at  $-20\text{ }^{\circ}\text{C}$  is recommended. The product is stable at  $-20\text{ }^{\circ}\text{C}$  for at least 2 years.

#### References

1. Lopez-Mirabal, H.R., and Winther, J.R., Redox characteristics of the eukaryotic cytosol. *Biochim. Biophys. Acta*, **1783**, 629-640 (2008).
2. Qiao, M., et al., Increased expression of glutathione reductase in macrophages decreases atherosclerotic lesion formation on low-density lipoprotein receptor-deficient mice. *Arterioscler. Thromb. Vasc. Biol.*, **27**, 1375-1382 (2007).
3. Worthington, D.J., and Rosemeyer, M.A., Glutathione reductase from human erythrocytes. Catalytic properties and aggregation, *Eur. J. Biochem.*, **67**, 231-238 (1976).
4. Zhang, Y., et al., Glutathione reductase-deficient erythrocytes as host cells of malarial parasites. *Biochem. Pharmacol.*, **37**, 861-865 (1988).
5. Smith, I.K., et al., Assay of glutathione reductase in crude tissue homogenates using 5,5'-Dithiobis (2-nitrobenzoic acid). *Anal. Biochem.*, **175**, 408-413 (1988).
6. Han, J.C., and Han, G.Y., A procedure for quantitative determination of Tris(2-carboxyethyl) phosphine, an odorless reducing agent more stable and effective than dithiothreitol. *Anal. Biochem.*, **220**, 5-10 (1994).

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