



Glutaredoxin (GRX)

Glutaredoxin seems to provide antioxidant protection in human coronary arteries and placental function against the oxidative stress caused by pre-eclampsia; it may even protect cerebellar granule neurons from dopamine-induced programmed cellular death. Glutaredoxin may also help catalyze the regeneration of ascorbic acid. At Skin Actives we produce near-pharmaceutical quality Glutaredoxin, which is suited specifically for skin care applications. This means that we can offer excellent quality at reasonable prices.

Applications

- Decreases oxidative stress
- Re-reduces crucial antioxidant molecules
- Controls activity of many enzymes

Function

Glutaredoxins are small redox enzymes of approximately one hundred amino-acid residues which use glutathione as a cofactor. Glutaredoxins are oxidized by substrates and reduced non-enzymatically by glutathione. In contrast to Thioredoxins, which are reduced by Thioredoxin reductase, no oxidoreductase exists that specifically reduces Glutaredoxins. Instead, Glutaredoxins are reduced by the oxidation of glutathione and reduced glutathione is then regenerated by glutathione reductase. Together these components form the glutathione system.

Like Thioredoxin, which functions in a similar way, Glutaredoxin possesses an active center disulfide bond. It exists in either a reduced or an oxidized form where the two cysteine residues are linked in an intramolecular disulfide bond. Glutaredoxins function as electron carriers in the glutathione-dependent synthesis of deoxyribonucleotides by the enzyme ribonucleotide reductase. Moreover, Glutaredoxins act in antioxidant defence by reducing dehydroascorbate, peroxiredoxins and Methione Sulfoxide Reductase (also supplied by Skin Actives). Beside their function in antioxidant defense, bacterial and plant GRX were shown to bind iron-sulfur clusters and to deliver the cluster to enzymes on demand.

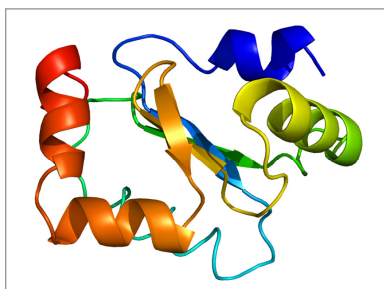
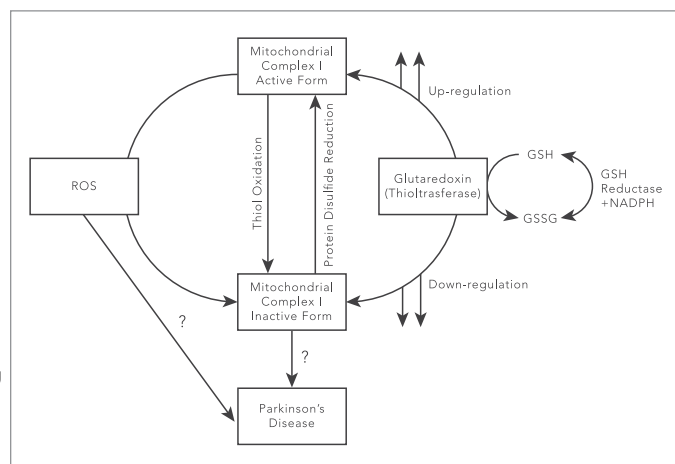


Figure 1: Glutaredoxin (GRX).

Figure 2: Schematic illustration depicting the important role of Glutaredoxin in maintaining functional integrity of mitochondrial complex I under normal conditions and during oxidative stress caused by generation of reactive oxygen species (ROS).²



Use

- We suggest that our Glutaredoxin is used at a final concentration of 0.01 to 0.1% (w/v) and that it is used in conjunction with Glutathione, a cofactor.
- Avoid extremes of pH and alcohols, and add Glutaredoxin at the final stage, once the product has cooled down.



The power
of customized
skin care.
The knowledge
to use it.

www.skinactives.com

480.813.5633

jonatan@skinactives.com

Technical Information

INCI:	Glutaredoxin (Skin Conditioning Agent, Miscellaneous) Submitted to CTFA.
Molecular Weight:	12,400, containing 112 amino acids.
Purity:	Purity is greater than 95% as determined by analysis using SDS-PAGE.
Formulation:	Suspension in ammonium sulfate (80% saturation).
Production:	Produced in <i>E. coli</i> and purified using proprietary chromatographic techniques.
Optimal Concentration:	Should be determined for each specific application.
Storage:	This suspension is stable at 2-8°C. Do not freeze.
Reconstitution:	Add buffered (pH 7.5) saline solution to the protein suspension to re-dissolve GRX.

References

- 1 Starke, David W.; Chock, P. Boon; Miesel, John J. (2003) Glutathione-Thiyl Radical Scavenging and Transferase Properties of Human Glutaredoxin (Thioltransferase). *J. Biol. Chem.*, 278: 14607-14613.
- 2 Kenchappa R.S. and Ravindranath V. (2003) Glutaredoxin is essential for maintenance of brain mitochondrial complex I: studies with MPTP. *FASEB J.* 17:717-719.