

Product Information

Biliverdin Reductase A **human, recombinant** **expressed in *Escherichia coli***

Catalog Number **B3687**
Storage Temperature $-20\text{ }^{\circ}\text{C}$

EC 1.3.1.24

Synonyms: Bilirubin: NAD(P)⁺ oxidoreductase; BVRA; BLVRA

Product Description

Biliverdin reductase (BVR) catalyzes the transformation of the blue-green pigment biliverdin IX to the yellow-orange bile pigment bilirubin IX by converting a double-bond between the second and third pyrrole ring into a single-bond.¹ This enzyme is the only enzyme shown to have two distinct cofactor-dependent pH optima. In the acidic range of pH 6.0–6.7, NADH is utilized; whereas, in the alkaline range of pH 8.5–8.7, NADPH is used.²

Biliverdin reductase is also known to contain a domain that acts as a serine/threonine/tyrosine kinase, which belongs to the insulin receptor substrate family. Whereas most tyrosine kinase activity is membrane bound, BVR is a soluble protein.³ Biliverdin reductase is also considered a major physiologic cytoprotectant and may have other protective properties for disease states. It has been shown to suppress experimental autoimmune encephalomyelitis in rats.⁴ Depletion of the enzyme in the cell leads to accumulation of cellular oxidants and augmented cell death.⁵

This product is supplied as a solution containing 20 mM potassium phosphate buffer, pH 8, 10% glycerol, 0.2% IGEPAL® CA-630, 1 mM EDTA, and 0.1 mM DTT.

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

Specific activity: ≥ 700 units/mg-protein

Unit definition: One unit of biliverdin reductase will transform 1 nanomole of biliverdin to bilirubin per minute in an NADPH dependent reaction at pH 8.5 using 100 mM potassium phosphate buffer at $37\text{ }^{\circ}\text{C}$.

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 dry ice and storage at $-20\text{ }^{\circ}\text{C}$ is recommended. Upon first use, it is recommended to store the remaining enzyme in working aliquots at $-20\text{ }^{\circ}\text{C}$. The product is stable at $-20\text{ }^{\circ}\text{C}$ for at least 2 years.

References

1. Singleton, J.W., and Laster L., Biliverdin reductase of guinea pig liver. *J. Biol. Chem.*, **240**, 4780-4789 (1965).
2. Kutty, R.K., and Maines, M.D., Purification and characterization of biliverdin reductase from rat liver. *J. Biol. Chem.*, **256**, 3956-3962 (1981).
3. Maines, M.D., New insights into biliverdin reductase functions: linking heme metabolism to cell signaling. *Physiol.*, **20**, 382-389 (2005).
4. Liu, Y., et al., Biliverdin reductase, a major physiologic cytoprotectant, suppresses experimental autoimmune encephalomyelitis. *Free Rad. Biol. Med.*, **40**, 960-967 (2006).
5. Kirkby, K.A., and Adin, C.A., Products of heme oxygenase and their potential therapeutic applications. *Am. J. Physiol. Renal Physiol.*, **290**, F563-F571 (2006).

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