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ProductInformation

Dihydrofolate Reductase, human
recombinant, expressed in *E. coli*

Catalog Number **D6566**
Storage Temperature –20 °C

EC 1.5.1.3

Synonyms: Tetrahydrofolate NADP+ oxidoreductase; DHFR

Product Description

Dihydroflate reductase (DHFR), a key enzyme in thymidine synthesis, catalyzes the NADPH dependent reduction of dihydrofolate (DHF) to tetrahydrofolate (THF) and, at a much lower rate, the conversion of folate to THF. The reaction product, THF, is an essential cofactor in the conversion of deoxyuridylate (dUMP) to deoxythymidylate (dTMP) by thymidylate synthetase.[1,2] Therefore, DHFR is a critical enzyme in DNA synthesis and has become a target for drug development and cancer therapy. The variations between DHFR from different sources has enabled the development of species selective DHFR inhibitors, such as trimethoprim antibacterial and antifungal), pyrimethamine (antiprotozoal), and methotrexate, MTX, (antineoplastic, antipsoriatic, and anti-inflammatory).[3]

Human DHFR is an 186 amino acid protein with an apparent molecular weight of 25 kDa. It is 30% homologous to the *E. coli* protein and up to 70% homologous to vertebrate proteins.[2] The human DHFR gene, as well as other mammalian DHFR genes, overcomes the inhibitory effects of methotrexate by the mechanism of gene amplification or by amino acid mutagenesis.[3]

Purity: ≥80% (SDS-PAGE)

Specific Activity: ≥1 unit per mg protein

Unit definition: One unit will convert 1.0 µmole of dihydrofolic acid to tetrahydrofolic acid per 1 minute at pH 7.5 at 22 °C.

Reagent

Supplied as a solution in 10 mM Tris- HCl, pH 8.0, with 1 mM EDTA, 0.5 mM DTT, 5 µM NADPH, protease inhibitors, and 50% glycerol.

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

Store at –20 °C.

References

1. Gready, J.E., Dihydrofolate reductase: binding of substrates and inhibitors and catalytic mechanism. *Adv. Pharmacol. Chem*., **17**, 37-103 (1980).
2. Blakley, R.L., Eukaryotic dihydrofolate reductase. *Adv. Enzymol. Relat. Areas Mol. Biol*., **70**, 23-101 (1995).
3. Schweitzer, B.I., et al., Dihydrofolate reductase as a therapeutic target, *FASEB J*., **4**, 2441-2452 (1990).
4. Hillcoat, B.L., et al., Effect of substrate decomposition on the spectrophotometric assay of dihydrofolate reductase. *Anal. Biochem*., **21**, 178-189 (1967).

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