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ProductInformation

Pyruvate Dehydrogenase Phosphatase from bovine kidney

Product Number **P 2743**
Storage Temperature –70 °C

Synonyms: PDP; PDHP

Product Description
Pyruvate Dehydrogenase Phosphatase (PDP) is a member of the protein phosphatase 2C family, specific for the pyruvate dehydrogenase complex (PDC). PDP is responsible for the phosphorylation and reactivation of PDC and is directly involved in carbohydrate utilization.

This enzyme is a serine/threonine protein phosphatase originating in the mitochondrial matrix space and expressed in multiple mammalian tissues. It exists as a heterodimer consisting of a regulatory, FAD containing subunit (PDPr) and a catalytic, insulin activated, Mg^{2+} dependent, Ca^{2+} stimulated subunit (PDPc). The catalytic subunit has a molecular mass of approximately 50 kDa, while the regulatory subunit has a molecular mass of approximately 100 kDa.

There are 2 known isoforms of PDP identified as PDP1 and PDP2. These isozymes are found in varying concentrations in different tissue, which indicates a tissue specific function unique to each isozyme. PDP1 is much more sensitive to Mg^{2+} and Ca^{2+} concentrations, whereas PDP2 is sensitive to spermine concentration. As a result PDP1 is the predominant isozyme expressed in muscle tissues, while PDP2 is found at higher levels in the liver and adipose tissues. Evidence suggests tissues with high energy demand, such as muscle and brain, will have higher concentrations of PDP1 in order to facilitate fuel processing through the Krebs' cycle, while lipogenic tissues will express more PDP2 in order to process acetyl-CoA for the biosynthesis of fatty acids.

The product is supplied as a solution in 50 mM Tris-HCl, pH 7.0, containing 14 mM 2-mercaptoethanol, 1 mM benzamidine, 0.1 mM PMSF, 1 mM EDTA, and 50% glycerol.

Purity: minimum 90% (SDS-PAGE)
Specific Activity: approximately 850 units per mg protein (approximately 1 unit per vial).

Unit Definition: One unit will release 1 nanomole of inorganic phosphate from ^{32}P-labeled pyruvate dehydrogenase complex (PDC) protein per minute at pH 7.0 at 30 °C.

Precautions and Disclaimer
This product is for laboratory research use only. Please consult the Material Safety Data Sheet for information regarding hazards and safe handling practices.

Storage/Stability
The product ships in dry ice and storage at –70 °C is recommended. Avoid freeze-thaw cycles. Store working aliquots at –70 °C. The product is stable for 24 to 48 hours at 2-8 °C.

References
1. Turkan, A., et al., Structural Requirements within the Lipoyl Domain for the Ca^{2+} -dependent Binding and Activation of Pyruvate Dehydrogenase Phosphatase Isoform 1 or Its Catalytic Subunit. J. Biol. Chem., **277**, 14976-14985 (2002).
2. Roche, T.E., et al., Distinct regulatory properties of pyruvate dehydrogenase kinase and phosphatase isoforms. Prog. Nucleic Acid Res. Mol. Biol., **73**, 33-75 (2001).
3. Huang, B., et al., Isoenzymes of Pyruvate Dehydrogenase Phosphatase. J. Biol. Chem., **273**, 17680-17688 (1998).
4. Lawson, J., et al., Cloning, Expression, and Properties of the Regulatory Subunit of Bovine Pyruvate Dehydrogenase Phosphatase. J. Biol. Chem., **272**, 31625-31629 (1997).

5. Yan, J., et al., Role of the regulatory subunit or bovine pyruvate dehydrogenase phosphatase. Proc. Natl. Acad. Sci. USA, **93**, 4953-4956 (1996).

6. Teague, W.M., et al., Purification and properties of pyruvate dehydrogenase phosphatase from bovine heart and kidney. Biochem., **21**, 5585-5592 (1982).

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