

## Product Information

**Cdc25B, Active**  
**human, recombinant**  
Expressed in *E. coli*

Product Number **C 7609**  
Storage Temperature  $-20\text{ }^{\circ}\text{C}$

### Product Description

Cdc25B, Active is produced from a DNA sequence encoding full-length human Cdc25B with a N-terminal GST-tag expressed in *E. coli*. The apparent molecular mass of Cdc25B is approximately 92 kDa on SDS-PAGE.

During the cell cycle of most somatic cells, DNA synthesis (S-phase) and mitosis (M-phase) are separated by two gap phases ( $G_1$  and  $G_2$ ) of varying duration. Thus, a typical eukaryotic cell sequentially passes through  $G_1$ , S,  $G_2$ , and M and back into  $G_1$  during a single cycle.<sup>1</sup> Regulation of cell cycle progression in eukaryotic cells depends on the expression of proteins called cyclins, which form complexes with several different cyclin dependent kinase (Cdks).<sup>2</sup> Within the complexes, the cyclin subunit serves a regulatory role, whereas the Cdks have a catalytic protein kinase activity.<sup>3</sup> The eukaryotic cell cycle is regulated by the sequential activation and deactivation of Cdks and by proteolysis of cyclins. The association of members of the cyclin family with the kinase subunit forms an active kinase, which can initiate M phase of mitosis and meiosis, or function as key regulators of each step of the cell cycle by phosphorylation of several cellular targets.

A family of Cdc25 phosphatases activates the catalytic activity of the Cdks. These are dual-specificity protein phosphatases, capable of hydrolyzing both phosphotyrosine and phosphothreonine containing substrates. In mammals, at least three different isoforms (denoted Cdc25A, Cdc25B and Cdc25C) are encoded by a multigene family.<sup>4</sup> These act at different phases of the cell cycle and appear to have specificity for different cyclin and cyclin dependent kinase (Cdk) complexes.<sup>5</sup>

Cdc25A plays a crucial role at the  $G_1$ /S phase transition. The natural substrate for Cdc25A is the T14, Y15 bis-phosphorylated cdk2/cyclin A complex (Cdk2-pTpY/CycA). The phosphothreonine is preferred over the phosphotyrosine by greater than 10-fold.<sup>6</sup> Cdc25A may also be part of a positive feedback loop because of its involvement as a substrate for Cdk2/cyclin E.<sup>5</sup> Artificial substrates for Cdc25A and Cdc25B include p-nitrophenyl phosphate and 3-O-methyl-fluorescein phosphate.<sup>7</sup> Cdc25B appears during late S phase and peaks during  $G_2$  phase. It is required for  $G_2$  to M transition.<sup>4</sup> Cdc25C is involved in the dephosphorylation and thus activation of the mitotic kinase, Cdc2/cyclin B complex (MPF, maturation promoting factor). It controls entry into mitosis by dephosphorylating p34Cdc2 on both Thr<sup>14</sup> and Tyr<sup>15</sup>. Cdc25C phosphatase itself is also regulated by phosphorylation/dephosphorylation and presumably by interaction with other cellular proteins.<sup>4</sup>

Cdc25B, Active is supplied in a solution of 50 mM Tris-HCl, pH 8.0, 150 mM NaCl, 25 mM glutathione, 5 mM dithiothreitol, and 25% glycerol.

Specific Activity: 3,000-4,000 units per mg of protein

Unit Definition: One Unit of Cdc25B will hydrolyze 1 pmole phosphate from 3-O-methylfluorescein phosphate (OMFP) per minute at pH 8.2 at  $30\text{ }^{\circ}\text{C}$ .

Purity: Approximately 30% (SDS-PAGE)

### Storage/Stability

Stable for at least 1 year at  $-20\text{ }^{\circ}\text{C}$  from date of shipment. For maximum recovery of product, centrifuge the original vial after thawing and prior to removing the cap. Avoid thawing and freezing.

## References

1. Freeman, R. S., and Donoghue, D. J., *Biochemistry*, **30**, 2293 (1991).
2. Pines, J., and Hunter, T., *J. Cell Biol.*, **115**, 1 (1991).
3. Yamashita, M., et al., *Dev. Growth Differ.*, **33**, 617 (1991).
4. Lammer, C., et al., *J. Cell Sci.*, **111**, 2445 (1998).
5. Fauman, E.B., et al., *Cell*, **93**, 617 (1998).
6. Rudolph, J., et al., *Anal. Biochem.*, **289**, 43 (2001).
7. Gottlin, E.B., et al., *J. Biol. Chem.*, **271**, 27455 (1996).

LLK/RBG/MAM 1/03

Sigma brand products are sold through Sigma-Aldrich, Inc.

Sigma-Aldrich, Inc. warrants that its products conform to the information contained in this and other Sigma-Aldrich publications. Purchaser must determine the suitability of the product(s) for their particular use. Additional terms and conditions may apply. Please see reverse side of the invoice or packing slip.