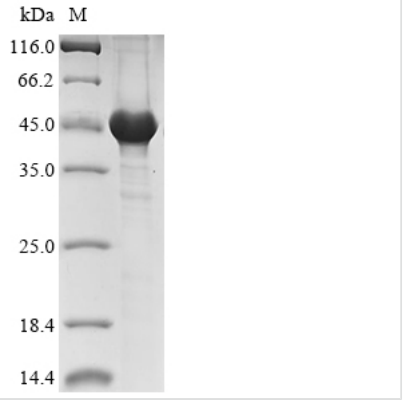
Recombinant Saccharomyces cerevisiae Serine/threonine-protein kinase CAK1 (CAK1)

Product Code	CSB-EP337447SVG
Abbreviation	Recombinant Saccharomyces cerevisiae CAK1 protein
Storage	The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself. Generally, the shelf life of liquid form is 6 months at -20°C/-80°C. The shelf life of lyophilized form is 12 months at -20°C/-80°C.
Uniprot No.	P43568
Storage Buffer	Tris-based buffer,50% glycerol
Product Type	Recombinant Proteins
Immunogen Species	Saccharomyces cerevisiae (strain ATCC 204508 / S288c) (Baker's yeast)
Purity	Greater than 85% as determined by SDS-PAGE.
Sequence	MKLDSIDITHCQLVKSTRTARIYRSDTYAIKCLALDFDIPPHNAKFEVSILNKLGN KCKHILPLLESKATDNNDLLLLFPFEEMNLYEFMQMHYKRDRRKKNPYYDLLN PSIPIVADPPVQKYTNQLDVNRYSLSFFRQMVEGIAFLHENKIIHRDIKPQNIMLT NNTSTVSPKLYIIDFGISYDMANNSQTSAEPMDSKVTDISTGIYKAPEVLFGVKC YDGGVDVWSLLIIISQWFQRETSRMGHVPAMIDDGSDDMNSDGSDFRLICSIF EKLGIPSIQKWEEVAQHGSVDAFVGMFGADGDGKYVLDQEKDVQISIVERNM PRLDEIADVKVKQKFINCILGMVSFSPNERWSCQRILQELEKP
Research Area	Cancer
Source	E.coli
Target Names	CAK1
Protein Names	Recommended name: Serine/threonine-protein kinase CAK1 EC= 2.7.11.22 Alternative name(s): CDK-activating kinase
Expression Region	1-368aa
Notes	Repeated freezing and thawing is not recommended. Store working aliquots at 4°C for up to one week.
Tag Info	N-terminal 10xHis-tagged and C-terminal Myc-tagged
Mol. Weight	49.6 kDa
Protein Length	Full Length
Image	



(Tris-Glycine gel) Discontinuous SDS-PAGE (reduced) with 5% enrichment gel and 15% separation gel.

Description

The protein CAK1, found in Saccharomyces cerevisiae, is a cyclin-dependent kinase-activating kinase (CAK) that plays a crucial role in cell cycle regulation and other cellular processes. CAK1 is responsible for activating the Cdc28p cyclin-dependent kinase (CDK) by phosphorylating threonine-169 in its activation loop [1]. This activation of Cdc28p is essential for cell cycle progression and chromosome stability [2]. Additionally, CAK1 has been found to promote meiosis and spore formation in a CDC28-independent manner [3]. Furthermore, CAK1 has been shown to functionally interact with the PAF1 complex and phosphatase Ssu72 via kinases Ctk1 and Bur1, demonstrating its involvement in various cellular pathways [4]. It is also known to activate two other CDKs in yeast by phosphorylating a threonine within their conserved T-loop domains [5].

CAK1 has been identified as an unusual 44-kilodalton protein kinase that is only distantly related to CDKs [6]. It is the physiological CAK in budding yeast and localizes to the cytoplasm [6]. The sole essential function of CAK1 is to phosphorylate Cdc28p, and its synthetic lethality with certain phosphatases is due to the inactivation of Cdc28p [7]. Moreover, CAK1 has been found to engage in stable, mutation-reinforced association with the most atypical member of the yeast kinome, Cdk-activating kinase (Cak1) [8].

References:

[1] F. Espinoza, A. Farrell, H. Erdjument?Bromage, P. Tempst, & D. Morgan, "A cyclin-dependent kinase-activating kinase (cak) in budding yeast unrelated to vertebrate cak", Science, vol. 273, no. 5282, p. 1714-1717, 1996. https://doi.org/10.1126/science.273.5282.1714
[2] A. Kitazono and S. Kron, "An essential function of yeast cyclin-dependent kinase cdc28 maintains chromosome stability", Journal of Biological Chemistry, vol. 277, no. 50, p. 48627-48634, 2002. https://doi.org/10.1074/jbc.m207247200
[3] M. Schaber, A. Lindgren, K. Schindler, D. Bungard, P. Kaldis, & E. Winter, "cak1 promotes meiosis and spore formation in saccharomyces cerevisiae in a cdc28-independent fashion", Molecular and Cellular Biology, vol. 22, no. 1, p. 57-68, 2002. https://doi.org/10.1128/mcb.22.1.57-68.2002
[4] C. Ganem, C. Miled, C. Facca, J. Valay, G. Labesse, S. Hassineet al., "Kinase cak1 functionally interacts with the paf1 complex and phosphatase ssu72 via kinases ctk1 and bur1", Molecular Genetics and Genomics, vol. 275, no. 2, p. 136-147, 2005. https://doi.org/10.1007/s00438-005-0071-y

[5] S. Yao and G. Prelich, "Activation of the bur1-bur2 cyclin-dependent kinase complex by cak1", Molecular and Cellular Biology, vol. 22, no. 19, p. 6750-6758, 2002. https://doi.org/10.1128/mcb.22.19.6750-6758.2002
[6] P. Kaldis, "The cdk-activating kinase (cak): from yeast to mammals", Cellular and Molecular Life Sciences, vol. 55, no. 2, p. 284-296, 1999. https://doi.org/10.1007/s000180050290
[7] A. Cheng, K. Ross, P. Kaldis, & M. Solomon, "Dephosphorylation of cyclin-dependent kinases by type 2c protein phosphatases", Genes & Development, vol. 13, no. 22, p. 2946-2957, 1999. https://doi.org/10.1101/gad.13.22.2946
[8] S. Millson, P. Oosten-Hawle, M. Alkuriji, A. Truman, M. Siderius, & P. Piper, "Cdc37 engages in stable, s14a mutation-reinforced association with the most atypical member of the yeast kinome, cdk-activating kinase (cak1)", Cell Stress and Chaperones, vol. 19, no. 5, p. 695-703, 2014. https://doi.org/10.1007/s12192-014-0497-4

Shelf Life

The shelf life is related to many factors, storage state, buffer ingredients, storage temperature and the stability of the protein itself.
Generally, the shelf life of liquid form is 6 months at -20°C/-80°C. The shelf life of lyophilized form is 12 months at -20°C/-80°C.