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ProductInformation

ANTI-CDK3
Developed in Rabbit, Affinity Isolated Antibody

Product Number **C 9987**

Product Description

Anti-Cyclin-Dependent Kinase 3 (CDK3) is developed in rabbit using a synthetic peptide corresponding to the amino acids 290-305 of the C-terminus of human CDK3. The antibody is purified by protein A affinity chromatography. Anti-CDK3 specifically recognizes the 36 kDa protein identified as cyclin-dependent kinase 3 (CDK3), also known as $p36^{cdk3}$. Anti-CDK3 does not crossreact with the other members of CDK family. It detects human, mouse and rat CDK3. It is used in immunoblotting, immunoprecipitation and immunofluorescence applications.

Cyclin-dependent kinase 3 (CDK3) is one of ten human serine/threonine kinases structurally related to cell division kinase 2 (CDK2).[1] CDKs become activated through binding to cyclins, formation of cyclin-CDK complexes and reversible phosphorylation reactions. Cyclin-CDK complexes directly control progression through G_1, S, G_2 and M phases of the cell division cycle. The activity of cyclin-CDK complex can be inhibited by phosphorylation at the pair of amino acids in the roof of the active site by a protein kinase WeeI, while dephosphorylation of this site by the phosphatase CDC25 increases CDK activity.

CDK3, together with CDK 2,4 and 6, has been known to participate in the transition from the G_1 phase to S phase of mammalian cell cycle, in which DNA replication occurs. This phase is dependent on tight cell size control. The G_1-CDKs are essential for a proper transition into S phase; however, their physiological activation is not sufficient to directly initiate replication independently of cell size. Evidence obtained from yeast and *Xenopus* indicate the initiation of DNA replication is a two-step process, where the origin recognition complex (CDC6 and Mcm proteins) is required for establishing the prereplicative complex, and the activities of CDKs 2,3,4 and 6 and of CDC7 kinase then trigger the G_1-S transition. The overall mechanism of initiation of replication is conserved in mammalian cells.[2] Examination of the activity of CDK3 during G_1-phase of the cell cycle in Chinese hamster ovary (CHO) fibroblasts, using roscovitine that inhibits CDK1, 2 and 5, but not 4 and 6, provides evidence that a pre-restriction (checkpoint) point of CDK3 activity requires both the synthesis of a regulatory subunit and degradation of an inhibitor.[3]

Binding to cyclin E2 activates both CDK2 and CDK3. The expression of cyclin E2 mRNA oscillates periodically throughout the cell cycle, peaking at the G_1/S transition. Viral E6 oncoprotein in normal human fibroblasts increases the steady-state level of cyclin E2.[4]

There is evidence now that CDKs may also be required for replication of viruses that can replicate in non-dividing cells, such as HIV-1 and herpes simplex virus types 1 and 2 (HSV-1 and -2). Pharmacological CDK inhibitors have potent antiviral activity *in vitro* against HIV-1, HSV-1 and –2 and may be used to target both the etiological agent (the virus) and the pathogenic mechanisms (cell replication).[5]

Reagent

Anti-CDK3 is supplied at approximately 1 mg/ml solution in phosphate buffered saline, pH 7.4 containing 0.2% BSA and 15 mM sodium azide.

Precautions and Disclaimer

Due to the sodium azide content, a material safety data sheet (MSDS) for this product has been sent to the attention of the safety officer of your institution. Consult the MSDS for information regarding hazardous and safe handling practices.

Storage/Stability

Store at –20 °C. For extended storage, upon initial thawing, freeze the solution in working aliquots. Avoid repeated freezing and thawing to prevent denaturing the antibody. Storage in "frost-free" freezers is also not recommended. If slight turbidity occurs upon prolonged storage, clarify the solution by centrifugation before use. The antibody is stable for at least 12 months when stored appropriately. Working dilutions should be discarded if not used within 12 hours.

Product Profile

A recommended working dilution of 1:100 to 1:200 is determined by immunoblotting using HEK-293 human embryonic kidney cells. For immunoprecipitation a

recommended working concentration is 10 µl/mg of protein lysate.
Note: In order to obtain best results in different techniques and preparations we recommend determining optimal working dilutions by titration test.

References

1. Meyerson, M., et al., A family of human CDC2-related protein kinases. EMBO J. **11**, 2909-2917, (1992).
2. Hengstschlagger, M., et al, Cyclin-dependent kinases at the G_1-S transition of the mammalian cell cycle. Mutat. Res., **436**, 1-9 (1999).
3. Keezer, S. M., Gilbert, D.M., Evidence for a pre-restriction point CDK3 activity. J. Cell. Biochem., **85**, 545-552 (2000).
4. Zariwala, M., et al., Cyclin E2, a novel human G1 cyclin and activating partner of CDK2 and CDK3, is induced by viral oncoproteins. Oncogene, **17**, 2787-2798 (1998).
5. Shang, L.M., Cyclin-dependent kinases as cellular targets for antiviral drugs. J. Antimicrob. Chemother., **50**, 779-792 (2002).

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