Revision 1

Store at -20C

#13473

NCAPD3 (D3H6L) Rabbit mAb

Cell Signaling TECHNOLOGY®

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For Research Use Only. Not for Use in Diagnostic Procedures.

Applications:	Reactivity:	Sensitivity:	MW (kDa):	Source/Isotype:	UniProt ID:	Entrez-Gene Id:
W, IP	H	Endogenous	170	Rabbit IgG	#P42695	23310

Product Usage Information

Application	Dilution
Western Blotting	1:1000
Immunoprecipitation	1:100

Storage

Supplied in 10 mM sodium HEPES (pH 7.5), 150 mM NaCl, 100 µg/ml BSA, 50% glycerol and less than 0.02% sodium azide. Store at –20°C. Do not aliquot the antibody.

Specificity/Sensitivity

NCAPD3 (D3H6L) Rabbit mAb recognizes endogenous levels of total NCAPD3 protein.

Source / Purification

Monoclonal antibody is produced by immunizing animals with a synthetic peptide corresponding to residues near the carboxy terminus of human NCAPD3 protein.

Background

The structural maintenance of chromosomes 2 (SMC2) and 4 (SMC4) proteins are condensin complex subunits that enable chromosome condensation and compaction during migration to opposite poles during anaphase (1,2). Condensin is a general regulator of chromosome architecture that may also regulate gene expression and DNA repair. Condensin complex subunits SMC2 and SMC4 form a functional ATPase essential for chromatin condensation, while three auxiliary subunits regulate ATPase activity. Both SMC2 and SMC4 are found within two distinct condensin complexes (condensin I and II) in higher eukaryotes. Condensin I contains auxiliary subunits NCAPD2, NCAPG, and NCAPH, while condensin II contains related auxiliary proteins NCAPD3, NCAPG2, and NCAPH2 (1,2).

Each condensin complex exhibits different localization patterns during the cell cycle and provides for distinct functions during mitosis (3-5). Condensin I is cytoplasmic during interphase and binds chromatin following the breakdown of the nuclear envelope at the end of prophase. Condensin I is required for complete dissociation of cohesin from chromosome arms, for chromosome shortening, and for normal timing of progression through pro-metaphase and metaphase. Mutations in corresponding condensin I genes result in cytokinesis defects due to the persistence of anaphase fibers. Condensin II is nuclear during interphase, but does not bind to chromatin until early prophase where it remains bound until the end of telophase. Condensin II is required for initial chromatin condensation during early prophase. Mutations in corresponding condensin II genes produce high numbers of anaphase bridges resulting from incomplete chromosome segregation. Condensin II complex subunit D3 (NCAPD3) plays a pivotal role in the loading of condensin II onto chromatin and the regulation of chromatin condensation (6,7). NCAPD3 protein contains HEAT repeat clusters that bind to mono-methyl histone H4 Lys20, a histone mark prevalent during mitosis and important for DNA repair and chromatin condensation (6). Increased mono-methyl histone H4 Lys20 levels caused by dissociation of the histone demethylase PHF8 from chromatin and increased expression of the methyltransferase SET8, leads to increased binding of NCAPD3 and condensin II to chromosomes early in mitosis (6). Phosphorylation of NCAPD3 at Thr1415 by CDK1 kinase (cdc2) leads to the recruitment of PLK1 kinase, which hyperphosphorylates condensin II and facilitates mitotic chromosome assembly (7).

Background References

1. Losada, A. and Hirano, T. (2005) *Genes Dev* 19, 1269-87.
2. Hudson, D.F. et al. (2009) *Chromosome Res* 17, 131-44.
3. Hirota, T. et al. (2004) *J Cell Sci* 117, 6435-45.
4. Ono, T. et al. (2004) *Mol Biol Cell* 15, 3296-308.
5. Green, L.C. et al. (2012) *J Cell Sci* 125, 1591-604.
6. Liu, W. et al. (2010) *Nature* 466, 508-12.
7. Abe, S. et al. (2011) *Genes Dev* 25, 863-74.

Species Reactivity

Species reactivity is determined by testing in at least one approved application (e.g., western blot).

Western Blot Buffer

IMPORTANT: For western blots, incubate membrane with diluted primary antibody in 5% w/v BSA, 1X TBS, 0.1% Tween® 20 at 4°C with gentle shaking, overnight.

Applications Key

W: Western Blotting **IP:** Immunoprecipitation

Cross-Reactivity Key

H: Human

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Limited Uses