BACKGROUND

The MLL (Mixed Lineage Leukemia) gene encodes a DNA-binding protein with histone methyltransferase activity that plays an essential role in early development and hematopoiesis. As the catalytic subunit, It forms a multiprotein complex that mediates both methylation of 'Lys-4' of histone H3 (H3K4me) complex and acetylation of 'Lys-16' of histone H4 (H4K16ac). MLL can bind DNA either directly (sequences enriched for AT rich or non-methylated CpG) or indirectly (through sequence specific transcription factors such as E2Fs), provide interfaces for the assembly of multi-protein complexes. It was shown that MLL forms complexes with Menin (a tumor suppressor), cell cycle regulators (E2Fs and HCF-1), Pc-G proteins (BMI-1 and HPC2), HDACs (Histone Deacetylases), Cyp33 (a nuclear cyclophilin), CBP/P300 and MOF (histone acetyltransferase), INI1/SNF5 (chromatin remodeling factors) and core components of the H3K4 histone methyl transferase (WDR5, RbBP5 and Ash2L). In the complex, it specifically mediates H3K4me, a specific tag for epigenetic transcriptional activation. It has weak methyltransferase activity by itself, and requires other component of the MLL1/MLL complex to obtain full methyltransferase activity. It has no activity toward histone H3 phosphorylated on 'Thr-3', less activity toward H3 dimethylated on 'Arg-8' or 'Lys-9', while it has higher activity toward H3 acetylated on 'Lys-9'. It is required for transcriptional activation of HOXA9. It promotes PPP1R15A-induced apoptosis. Moreover, MLL itself is regulated by the cell cycle machinery. MLL undergoes a specialized bimodal degradation resulting in its biphasic expression through the cell cycle.52 this unique expression is conferred by SCF^{Skp2} and APC^{Cdc20}, two cell cycle specific E3 ligases.[1]

In addition to the aforementioned complexity of MLL gene regulation, It has been showed that the full length MLL precursor (MLLFL) undergoes evolutionarily conserved site-specific proteolysis by Taspase1 to generate the mature MLLN320/C180 consisting of processed N-terminal 320 kDa (MLLN320) and C-terminal 180 kDa fragments (MLLC180) that heterodimerize through the FYRN domain of MLLN320 and the FYRC plus SET domains of MLLC180. Taspase1-mediated cleavage of MLL is an evolutionarily conserved regulatory event that enables the spatiotemporal control of MLL downstream targets.[2]

Chromosomal translocations involving the human *MLL* gene are recurrently associated with high-risk acute leukemias. *MLL* translocations correlate with specific disease subtypes (acute myeloid and acute lymphocytic leukemias), a specific gene expression profile, and outcome (favorable or poor), depending on the particular *MLL* fusion. Approximately 50 different *MLL* translocation partner genes have been identified, suggesting that the human *MLL* gene is a hot spot for illegitimate recombination events. During illegitimate recombination events, one *MLL* allele is reciprocally fused with one of the many translocation partner genes. The latter encode nuclear or cytosolic proteins that share only a little sequence homology; however, the fused portion of partner protein sequences is necessary to confer oncogenic potential. Leukemogenic MLL translocations encode MLL fusion proteins that have lost H3K4 methyltransferase activity. A key feature of MLL fusion proteins is their ability to efficiently transform hematopoietic cells into leukemia stem cells.[3]

References:

1. Liu, H. et al: Gene Dev. 21:2385-98, 2007
2. Liu, H. et al:Cancer Biol. Ther. 8:1206-13, 2009
3. Yeoh, E.J. et al: Cancer Cell 1:133-43, 2002

TECHNICAL INFORMATION

Source:
MLL Antibody is a mouse monoclonal antibody raised against purified recombinant human MLL fragments (aa3714-3969) expressed in *E. coli.*

Specificity and Sensitivity:
This antibody detects MLL proteins without cross-reactivity with other related proteins.

Storage Buffer: PBS and 30% glycerol

Storage:
Store at -20°C for at least one year. Store at 4°C for frequent use. Avoid repeated freeze-thaw cycles.

APPLICATIONS

Application:	*Dilution:
WB	1:1000
IP	n/d
IHC	1:200
ICC	n/d
FACS	n/d

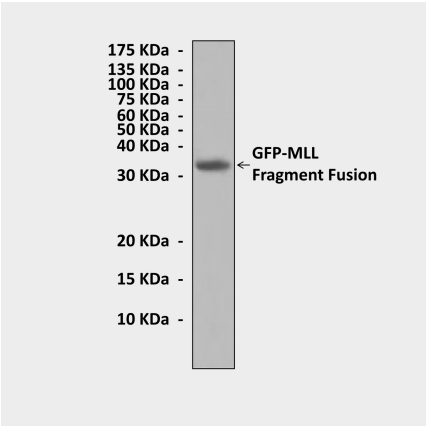
**Optimal dilutions must be determined by end user.*

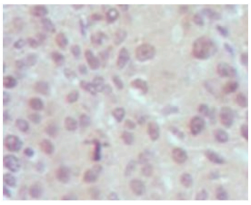
MLL Antibody

Cat. No. CP10171

Applications:	**WB, IHC**
Detected MW:	**180 kDa**
Species & Reactivity:	**Human, Mouse, Rat**
Isotype:	**Mouse IgG1**

QUALITY CONTROL DATA





Top: Western Blot detection of GFP-MLL (aa3714-3969) fusion proteins expressed in CHO cells using MLL Antibody. **Bottom:** This antibody stains paraffin-embedded human lung cancer tissue in IHC analysis.