

# Anti-dimethyl-Histone H3 (Lys4)

Polyclonal Antibody

Cat. # 07-030

Lot # DAM1503382

pack size: 200 µL

Store at -20°C

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NOT FOR USE IN HUMANS



## Certificate of Analysis

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Applications	Species Cross-Reactivity	Antibody Isotype	Epitope/Region	Host Species	Molecular Weight	Accession #
WB, ChIP, IC	H, T	IgG	a.a. 1-8	Rb	17 kDa	NM_003493

### Background

Histone H3 is one of the five main histone proteins involved in the structure of chromatin in eukaryotic cells. Featuring a main globular domain and a long N-terminal tail, H3 is involved with the structure of the nucleosomes of the 'beads on a string' structure. The N-terminal tail of histone H3 protrudes from the globular nucleosome core and can undergo several different types of epigenetic modifications that influence cellular processes. These modifications include the covalent attachment of methyl or acetyl groups to lysine and arginine amino acids and the phosphorylation of serine or threonine.

### Presentation

Rabbit polyclonal antiserum containing 0.05% sodium azide and 30% glycerol.

### Specificity

Recognizes Histone H3 dimethylated on Lysine 4. Specificity demonstrated by ELISA using methylated peptides.

### Species Cross-reactivity

Human and tetrahymena. Broad species cross-reactivity is expected.

### Immunogen

KLH conjugated synthetic peptide (ART<sub>Me2</sub>KQTAR-GC) corresponding to amino acids 1-8 of human Histone H3.

### Molecular Weight

17 kDa

### Storage and Handling

Stable for 1 year at -20°C from date of receipt.

For maximum recovery of product, centrifuge the vial prior to removing the cap.

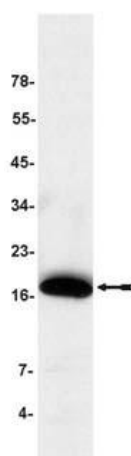
### Control

HeLa whole cell lysate. No-antibody chromatin solution for a control.

### Quality Control Testing

Routinely evaluated by western blot on acid extracted proteins from HeLa cells.

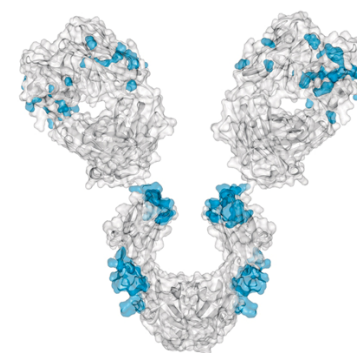
Western Blot Analysis: 1:2000-1:10,000 dilution of this lot detected methylated Histone H3 in acid extracted proteins from HeLa cells. 1:2000-1:5000 dilution of a previous lot detected methylated Histone H3 in acid extracted proteins from HeLa and tetrahymena cells.



#### Western Blot Analysis

HeLa cell acid precipitate was resolved by electrophoresis, transferred to nitrocellulose and probed with a 1:5000 dilution of antidimethyl Histone H3 (Lys4). Proteins were visualized using a goat anti-rabbit secondary antibody conjugated to HRP and a chemiluminescence detection system.

Arrow indicates methylated Histone H3 (17 kDa).



### References

1. Sakamoto, A., *et al* (2004). *Hum Mol Genet* 13: 819-28.
2. Su, R. C., *et al* (2004). *Nat Genet* 36: 502-6.
3. Chakrabarti, S. K., *et al* (2003). *J Biol Chem* 278: 23617-23.
4. Boggs, B. A., *et al* (2002). *Nat Genet* 30: 73-6.
5. Perk, J., *et al* (2002). *Embo J*. 21: 5807-14.
6. Kohlmaier, A., *et al* (2004). *PLoS Biol.* 2: E171. (Epub).

### Additional Research Applications

Chromatin Immunoprecipitation: 5 µL of a previous lot immunoprecipitated methylated Histone H3 from 1 x 10<sup>6</sup> 3T3/A31 cells.

Immunocytochemistry: 1:500 dilution of a previous lot showed positive immunostaining for methylated Histone H3 in L6 cells fixed with 4% paraformaldehyde and permeabilized using 0.1% Triton X-100.

**APPLICATION LEGEND:** WB Western Blotting ChIP Chromatin Immunoprecipitation DB Dot Blot

IC Immunocytochemistry IF Immunofluorescence IH Immunohistochemistry (Tissue)

**SPECIES LEGEND:** H Human M Mouse T *Tetrahymena* R Rat Rb Rabbit WR Most Common Vertebrates

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**PROTOCOL****Western Blot**

1. Perform SDS-polyacrylamide gel electrophoresis (SDS-PAGE) on a cell lysate sample (cell lysis buffer: 50 mM Tris-HCl, pH 7.4; 1% NP-40; 0.25% sodium deoxycholate; 150 mM NaCl; 1 mM EDTA; 1 mM PMSF; 1 µg/mL each aprotinin, leupeptin, pepstatin; 1 mM Na<sub>3</sub>VO<sub>4</sub>; 1 mM NaF) and transfer the proteins to nitrocellulose. Wash the blotted nitrocellulose twice with water.
2. Block the blotted nitrocellulose in freshly prepared PBS containing 3% nonfat dry milk (Catalog # 20-200), (PBS-MLK) for 20-30 minutes at room temperature with constant agitation.
3. Incubate the nitrocellulose with **1:2000-1:10,000 dilution of anti-dimethyl-Histone H3 (Lys4)**, diluted in freshly prepared PBS-MLK overnight with agitation at 4°C.
4. Wash the nitrocellulose twice with water.
5. Incubate the nitrocellulose in the secondary reagent of choice (a goat anti-rabbit HRP conjugated IgG, Catalog # 12-348, 1:5000 dilution was used) in PBS-MLK for 1.5 hours at room temperature with agitation.
6. Wash the nitrocellulose with water twice.
7. Wash the nitrocellulose in PBS-0.05% Tween 20 for 3-5 minutes.
8. Rinse the nitrocellulose in 4-5 changes of water.
9. Use detection method of choice (enhanced chemiluminescence was used).

**Immunocytochemistry**

1. Place a previously autoclaved, 13 mm circular glass coverslip in the well of a 24 well plate.
2. Plate approximately 1 mL of cell suspension into each well. Incubate 24 hours in a 37°C CO<sub>2</sub> incubator.
3. Aspirate media from wells.
4. Add fix 250 µL -400 µL (4% paraformaldehyde) in PBS for 10 minutes at room temperature.
5. Permeabilize cells with 0.1% Triton X-100 for 3 minutes.
6. Wash the cells with PBS, twice, for 15 minutes. Do not shake.
7. Cover cells with 400 µL of 1% BSA in PBS and incubate for 1 hour at room temperature.
8. Wash the cells with PBS for 15 minutes.
9. Incubate the cells with **1:500 anti-dimethyl-Histone H3 (Lys4)** in 1% BSA in PBS and incubate for 2 hours at room temperature.
10. Wash the cells twice with PBS for 5 minutes.
11. Incubate the cells in the dark with a 1:500 dilution of goat anti-rabbit IgG fluorescein conjugated secondary antibody in 1% BSA in PBS for 1 hour at room temperature.
12. Wash the cells three times with PBS.
13. Aspirate well dry.
14. Clean a glass slide with Alconox™ and water, follow with a rinse in 70% ethanol, dry using a Kimwipe™.
15. Place a drop of Aqua Poly-Mount™ mounting media on cleaned slide.
16. Using forceps or a 26-gauge needle with the tip bent, and forceps, retrieve the glass coverslip from the well and place it cell side down on top of the drop of mounting media.
17. Let dry at room temperature, seal edge if desired and examine the cells under a fluorescent microscope.

**Chromatin Immunoprecipitation**

\*Required Solutions:

**Protease Inhibitors:** 1 mM phenylmethylsulfonyl fluoride (PMSF), 1 µg/mL aprotinin and 1 µg/mL pepstatin A. We recommend using a PMSF stock solution less than one month old and add PMSF to the buffer just prior to use since PMSF has a half-life of about 30 minutes in aqueous solutions.

**SDS Lysis Buffer** (Catalog # 20-163): 1% SDS, 10 mM EDTA, 50 mM Tris, pH 8.1.

**ChIP Dilution Buffer** (Catalog # 20-153): 0.01% SDS, 1.1% Triton X-100, 1.2 mM EDTA, 16.7 mM Tris, pH 8.1, 167 mM NaCl.

1. Cross-link histones to DNA by adding formaldehyde directly to culture medium to a final concentration of 1% and incubate for 10 minutes at 37°C. Seal culture vessels if returning the cultures to an incubator containing other cells.
2. Aspirate medium, wash and scrape cells with ice cold PBS containing protease inhibitors\*.
3. Pellet cells for 4 minutes at 700 x g at 4°C.
4. Warm SDS Lysis Buffer\* to room temperature to dissolve precipitated SDS and add protease inhibitors. Resuspend cell pellet in 200 µL SDS Lysis Buffer\* for 10 minutes on ice.
5. Sonicate lysate to reduce DNA length to between 200 and 1000 basepairs. Cool samples on dry ice between pulses but do not freeze the samples. Remove debris by centrifugation for 10 minutes at 13,000 rpm at 4°C in a microcentrifuge.
6. Dilute supernatant fraction 10-fold in ChIP Dilution Buffer\* with protease inhibitors added. Keep a portion of this chromatin solution (1%) to quantitate the amount of DNA present in different samples before immunoprecipitation.
7. To reduce nonspecific background, pre-clear the chromatin solution with 80 µL of Salmon Sperm DNA/Protein A Agarose (Catalog # 16-157) for 30 minutes at 4°C with agitation.
8. Pellet beads by a brief centrifugation and collect supernatant fraction.
9. Add **5 µL of anti-dimethyl Histone H3** to 1 mL of chromatin solution (supernatant fraction of step 7) and incubate overnight at 4°C with rotation. Save the other 1 mL of chromatin solution for a no-antibody control.
10. Collect immune complexes with 60 µL of Salmon Sperm DNA/Protein A Agarose (Catalog # 16-157) for one hour at 4°C with rotation.
11. Prepare elution buffer (1% SDS, 0.1 M NaHCO<sub>3</sub>).
12. Pellet beads by centrifugation and wash five times, for 3-5 minutes per wash, using the sequence of buffers listed below. Use 1 mL of each buffer per wash.
  - a. Low Salt Immune Complex Wash Buffer (Catalog # 20-154): 150 mM NaCl, 0.1% SDS, 1% Triton X-100, 2 mM EDTA, 20 mM Tris-HCl, pH 8.1. **One wash.**
  - b. High Salt Immune Complex Wash Buffer (Catalog # 20-155): 500 mM NaCl, 0.1% SDS, 1% Triton X-100, 2 mM EDTA, 20 mM Tris-HCl, pH 8.1. **One wash.**
  - c. LiCl Immune Complex Wash Buffer (Catalog # 20-156): 0.25 M LiCl, 1% NP40, 1% sodium deoxycholate, 1 mM EDTA, 10 mM Tris-HCl, pH 8.1. **One wash.**
  - d. TE Buffer (Catalog # 20-157): 0, 10 mM Tris-HCl, 1 mM EDTA, pH 8.0. **Two washes.**
13. \*\*Elute immune complexes by adding 250 µL elution buffer (see step 11) to the pelleted beads. Vortex briefly to mix and incubate at room temperature for 15 minutes with rotation. Spin down beads, carefully transfer the supernatant fraction (eluate) to another tube and repeat elution. Combine eluates.
14. Add 20 µL 5 M NaCl to the combined eluates and reverse crosslinks at 65°C for 4 hours.
15. Add 10 µL of 0.5 M EDTA, 20 µL 1 M Tris-HCl, pH 6.5, and 2 µL of 10 mg/mL Proteinase K to the eluate and incubate for one hour at 45°C.
16. Recover DNA by phenol/chloroform extraction and ethanol precipitation. Addition of an inert carrier, such as 20 µg glycogen or yeast RNA is suggested. Wash pellets with 70% ethanol and slow to air dry.
17. Resuspend pellets in an appropriate buffer or water. Detect specific sequences from no-antibody and immunoprecipitated samples by quantitative PCR or slot-blot. Include input and unbound DNA samples as controls. Conditions for PCR amplification must be determined empirically.

**\*\*Following washing of the beads, immunoprecipitated histone can be assessed by Immunoblot analysis after boiling of the samples in Laemmli buffer for 10 minutes.**

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07-354	■ Anti-acetyl-Histone H3 (Lys18)
07-355	■ Anti-acetyl-Histone H3 (Lys23)
07-360	■ Anti-acetyl-Histone H3 (Lys27)
07-750	■ Anti-acetyl-Histone H3 (Lys79)
07-352	■ Anti-acetyl-Histone H3 (Lys9)
07-593	■ Anti-acetyl-Histone H3 (Lys9/18)
07-370	■ Anti-dimethyl (Lys4) dimethyl (Lys9) Histone H3
07-608	■ Anti-dimethyl Histone H3 (Lys23)
07-214	■ Anti-dimethyl-Histone H3 (Arg17)
05-808	■ Anti-dimethyl-Histone H3 (Arg2)
07-215	■ Anti-dimethyl-Histone H3 (Arg26)
07-427	■ Anti-dimethyl-Histone H3 (Lys14)
07-452	■ Anti-dimethyl-Histone H3 (Lys27)
07-369	■ Anti-dimethyl-Histone H3 (Lys36)
07-652	■ Anti-dimethyl-Histone H3 (Lys37)
07-030	■ Anti-dimethyl-Histone H3 (Lys4)
05-835	■ Anti-dimethyl-Histone H3 (Lys79), clone NL59
07-212	■ Anti-dimethyl-Histone H3 (Lys9)
06-755	■ Anti-Histone H3
07-448	■ Anti-monomethyl-Histone H3 (Lys27)
07-548	■ Anti-monomethyl-Histone H3 (Lys36)
07-395	■ Anti-monomethyl-Histone H3 (Lys9)
05-713	■ Anti-monomethyl-Histone H3 (Lys9), clone RR103
05-817	■ Anti-phospho-Histone H3 (Ser10), clone MC463
06-570	■ Anti-phospho-Histone H3 (Ser10), Mitosis Marker
07-145	■ Anti-phospho-Histone H3 (Ser28)
05-789	■ Anti-phospho-Histone H3 (Thr11), clone MC83
05-809	■ Anti-trimethyl (Lys9)-phospho (Ser10)-Histone H3
05-801	■ Anti-trimethyl-Histone H3 (Lys36), clone MC86
07-473	■ Anti-trimethyl-Histone H3 (Lys4)
17-622	■ ChIPAb+ Trimethyl-Histone H3 (Lys27)
17-625	■ ChIPAb+ Trimethyl-Histone H3 (Lys9)
12-568	■ Trimethyl-Histone H3 (Lys9) Peptide, biotin conjugate
17-245	■ Acetyl-Histone H3 Immunoprecipitation (ChIP) Assay Kit
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