

Monoclonal Antibody to Dnmt 3b (DNA methyltransferase 3b)



11175 Flintkote Ave., Suite E, San Diego, CA 92121
Tel: (858) 642-0978 Fax (858) 642-0937
Toll free: 1-888-723-GENE
E-mail: info@imgenex.com
web site: <http://www.imgenex.com>

Monoclonal Antibody to Dnmt 3b (DNA methyltransferase 3b)

Catalog No : IMG-184A
Formulation : 0.1 mg in 0.2 ml PBS containing 0.05% BSA and 0.05% sodium azide. Sodium azide is highly toxic.
Isotype : Mouse IgG1, Kappa
Clone : 52A1018
Purification : Protein G Chromatography
Species React : Human, Mouse
Host : Mouse

Application
Western blot analysis: 2-4 ug/ml
IP: 1-2 ug/ml
IF/ICC: 1-2 ug/ml
ChIP: Please see Product Citation (5)
IHC (paraffin): Please see Let et al (2005) and MacDonald et al (2005) for details.

Storage
Store at 4°C. For long-term storage, store at -20°C.

Recommended Positive Control: NIH 3T3 cell lysate

Background

Methylation of DNA at cytosine residues plays an important role in regulation of gene expression, genomic imprinting and is essential for mammalian development. Hypermethylation of CpG islands in tumor suppressor genes or hypomethylation of bulk genomic DNA may be linked with development of cancer. To date, 3 families of mammalian DNA methyltransferase genes have been identified which include Dnmt1, Dnmt2 and Dnmt3. Dnmt1 is constitutively expressed in proliferating cells and inactivation of this gene causes global demethylation of genomic DNA and embryonic lethality. Dnmt2 is expressed at low levels in adult tissues and its inactivation does not affect DNA methylation or maintenance of methylation. The Dnmt3 family members, Dnmt3a and Dnmt3b, are strongly expressed in ES cells but their expression is down regulated in differentiating ES cells and is low in adult somatic tissue. Recently, it has been shown that naturally occurring mutations of Dnmt3b gene occurs in patients with a rare autosomal recessive disorder, termed ICF (immunodeficiency, centromeric instability, and facial anomalies) syndrome.

Antigen

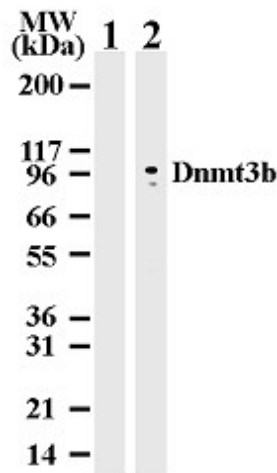
This antibody was raised against bacteria expressed recombinant mouse Dnmt3b. The antibody also recognizes human Dnmt3b.

Application Notes

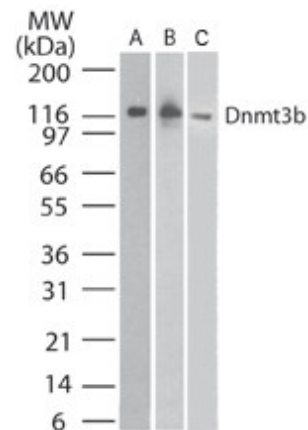
This antibody does not react with Dnmt3a.

Genebank Info (Protein)

NP_787046



Western blot analysis for Dnmt3b using IMG-184A at 2 ug/ml against 10 µg of cell lysates of 293 transfected with mouse Dnmt3a (lane 1) and Dnmt3b (lane 2). A protein band of approximate mol. wt. of 110 kDa is only detected in 293 cells transfected with mouse Dnmt3b cDNA.



Western blot analysis of Dnmt3b in A) NIH 3T3 cell lysate, B) recombinant Dnmt3b1 protein (IMGENEX, 40214), and C) 2102Ep human embryonal carcinoma cell lysate using IMG-184A at 4 ug/ml, 0.5 ug/ml, and 3 ug/ml respectively.

Related Products

- 20101 [Goat Anti-Mouse Ig HRP Conjugate]
- IMG-5019A-1 [Monoclonal Antibody to GAPDH - Loading Control]

Monoclonal Antibody to Dnmt 3b (DNA methyltransferase 3b)

3. IMG-5019A-2 [Monoclonal Antibody to GAPDH - Loading Control]
4. 40214 [Dnmt3b1 recombinant protein]
5. 40176 [NIH 3T3 cell line lysate (Swiss albino mouse embryo derived contact-inhibited fibroblast cells)]

Reference

1. Xie S, Wnag Z, Okano M, Nogami M, Li Y, He WW, Okumura K, and Li E. *Gene* 236: 87-95 (1999).
2. Okano M, Bell DW, Haber DA, and Li E. *Cell* 99: 247-257 (1999).
3. Reik W, Kelsey G, and Walter J. *Nat. Genet* 23: 380-382 (1999).
4. Hsieh CL. *Mol Cell Biol* 19: 8211-8218 (1999).
5. Hansen RS, Wijmenga C, Joo P., Stanek AM, canfield TK, Weemaes CM, and Gartler SM. *Proc. Natl. Acad. Sci USA* 96: 14412-14417 (1999).

Product Citations

1. **The nucleolar remodeling complex NoRC mediates heterochromatin formation and silencing of ribosomal gene transcription.** Raffaella Santoro, Junwei Li, Ingrid Grummt. *Nature Genetics* 32, 393-396 (2002).
2. **Double RNA Interference of DNMT3b and DNMT1 Enhances DNA Demethylation and Gene Reactivation.** Yu-Wei Leu, Farahnaz Rahmatpanah, Huidong Shi, Susan H. Wei, Joseph C. Liu, Pearly S. Yan and Tim Hui-Ming Huang. *Cancer Research* 63, 6110-6115, October 1, 2003.
3. **Role of the DNA Methyltransferase Variant DNMT3b3 in DNA Methylation.** Daniel J. Weisenberger, Mihaela Velicescu, Jonathan C. Cheng, Felicidad A. Gonzales, Gangning Liang, and Peter A. Jones. *Mol. Cancer Res.* 2: 62-72 (2004).
4. **Induction of DNA Methylation and gene silencing by short interfering RNAs in human cells.** Hiroaki Kawasaki, Kazunari Taira. *Nature* 431: 211-217 (2004).
5. **Reduced Genomic Cytosine Methylation and Defective Cellular Differentiation in Embryonic Stem Cells Lacking CpG Binding Protein.** Diana L. Carlone, Jeong-Heon Lee, Suzanne R. L. Young, Erika Dobrota, Jill Sergesketter Butler, Joseph Ruiz, and David G. Skalnik. *Molecular and Cellular Biology*, 25 (12): 4881-4891 (2005).
6. **Loss of Estrogen Receptor Signaling Triggers Epigenetic Silencing of Downstream Targets in Breast Cancer.** Yu-Wei Leu, Pearly S. Yan, Meiyun Fan, Victor X. Jin, Joseph C. Liu, Edward M. Curran, Wade V. Welshons, Susan H. Wei, Ramana V. Davuluri, Christoph Plass, Kenneth P. Nephew, and Tim H-M. Huang. *Cancer Research* 64, 8184-8192 (2004). **(ChIP Assay)**
7. **Dynamic expression of de novo DNA methyltransferases Dnmt3a and Dnmt3b in the central nervous system.** Jian Feng, Hua Chang, En Li, Guoping Fan. *Journal of Neuroscience Research*. 79 (6): 734-746 (2005).
8. **An association of DNMT3b protein expression with P16INK4a promoter hypermethylation in non-smoking female lung cancer with human papillomavirus infection.** Torng-Sen Lin, Huei Lee, Ruel-A Chend, Ming-Lin Ho, Chia-Yu Lin, Ya-Hui Chen, Yi Yu Tsai, Ming-Chih Chou, and Ya-Wen Cheng. *Cancer Letters*, 226 (1): 77-84 (2005). (sold by Gene Therapy System) **(IHC on paraffin section).**
9. **Inhibition of DNA methyltransferase reverses cisplatin induced drug resistance in murine neuroblastoma cells.** Yi-Yong Qiu, Bernard L. Mirkin and Rama S. Dwivedi. *Cancer Detection and Prevention*. doi:10.1016/j.cdp.2005.05.004 online publication. **(immunofluorescence)**
10. **Stage-specific induction of DNA methyltransferases in olfactory receptor neuron development.** Jessica L. MacDonald, Christopher S.Y. Gin and A. Jane Roskams. *Developmental Biology*, In Press, Corrected Proof, Available online 8 November 2005. **(IHC on paraffin)**
11. **Transient down-regulation of DNMT1 methyltransferase leads to activation and stable hypomethylation of MAGE-A1 in melanoma cells.** Axelle Lorient, Etienne De Plaen, Thierry Boon, and Charles De Smet. *J. Biol. Chem.*, Feb 2006; 10.1074/jbc.M510469200.
12. **Roles for Dnmt3b in mammalian development: a mouse model for the ICF syndrome.** Yoshihide Ueda, Masaki Okano, Christine Williams, Taiping Chen, Katia Georgopoulos, and En Li. *Development*, 133: 1183-1192 (2006).
13. **Mutations in DNA methyltransferase DNMT3B in ICF syndrome affect its regulation by DNMT3L** Zheng-Hua Xie, Yan-Nv Huang, Zhao-Xia Chen, Arthur D. Riggs, Jian-Ping Ding, Humaira Gowher, Albert Jeltsch, Hiroyuki Sasaki, Kenichiro Hata, and Guo-Liang Xu *Hum. Mol. Genet.*, 15: 1375-1385 (2006).
14. **Suppression of Intestinal Neoplasia by Deletion of Dnmt3b.** Haijiang Lin, Yasuhiro Yamada, Suzanne Nguyen, Heinz Linhart, Laurie Jackson-Grusby, Alexander Meissner, Konstantinos Meletis, Grace Lo, and Rudolf Jaenisch. *Mol. Cell. Biol.*, 26: 2976-2983 (2006).
15. **Dynamic expression of DNMT3a and DNMT3b isoforms during male germ cell development in the mouse.** La Salle S and JM Trasler. *Developmental Biology* 296:71-82. (2006). Imgenex products cited for **WB (primary male mouse germ cells and testes):**
 1. **DNMT3a (IMG-268A), Fig 5B (middle panel). The antibody detected both the DNMT3a (908 aa) and DNMT3a2 (689 aa) isoforms.**
 2. **DNMT3b (IMG-184A), Fig 5C (top panel). The antibody detected multiple DNMT3b isoforms.**
16. **DNA methyltransferase expression in the human endometrium: down-regulation by progesterone and estrogen.** Yamagata Y, A Asada, I Tamura, L Lee, R Maekawa, K Taniguchi, T Taketani, A Matsuoka, H Tamura, N Sugino. *Human Reproduction* doi:10.1093/humanrep/dep015. **Imgenex antibodies cited:**
 1. **IMG-261A (dnmt1): IHC(paraffin), human endometrium tissue, Fig. 1A.**
 2. **IMG-184A (dnmt3b): IHC(paraffin), human endometrium tissue, Fig. 1B.**
17. **Inhibition of IFN- α transcription by site-specific methylation during T helper cell development.** Brendan Jones, Jianzhu Chen. *The EMBO Journal* 25, 2443-2452 (2006). **(ChIP Assay)**
18. **Maintenance of self-renewal ability of mouse embryonic stem cells in the absence of DNA methyltransferases Dnmt1, Dnmt3a and Dnmt3b.** Akiko Tsumura, Tomohiro Hayakawa, Yuichi Kumaki, Shin-ichiro Takebayashi, Morito Sakae, Chisa Matsuoka, Kunitada Shimotohno, Fuyuki Ishikawa, En Li, et al. *Genes to Cells*, 11 (7): 805-814 (2006).
19. **Dnmt3a2 targets endogenous Dnmt3L to ES cell chromatin and induces regional DNA methylation.** Keisuke Nimura, Chisaki Ishida, Hiroshi Koriyama, Kenichiro Hata, Shinya Yamanaka, En Li, Kiyoe Ura, and Yasufumi Kaneda. *Genes Cells*, 11: 1225-1237 (2006).
20. **Dnmt3b promotes tumorigenesis in vivo by gene-specific de novo methylation and transcriptional silencing.** Linhart H, H Lin, Y Yamada, E Moran, E Steine, S Gokhale, G Lo, E Cantu, M Ehrlich, T He, A Meissner, R Jaenisch. *Genes and Development* 21: 3110-3122 (2007). **Imgenex products cited (mouse tumor cells):**
 1. **IMG-184A (Dnmt3b): IHC (paraffin); Figs. 1C, 2A.**
 2. **Dnmt3b transgene validated in mice in Figs. 1C, 2A.**
 3. **IMG-268A (Dnmt3a): IHC (paraffin), Wb; Figs. 1C, 2A,B.**
 4. **Dnmt3a transgene validated in mice in Figs. 1C, 2A,B.**
21. **Annurca apple polyphenols have potent demethylating activity and can reactivate silenced tumor suppressor genes in colorectal cancer cells.** Fini L, M Selgrad, V Fogliano, G Graziani, M Romano, E Hotchkiss, Y Daoud, E De Vol, C Boland, L Ricciardiello. *J Nutr.* 137: 2622-2628 (2007). **WB (human CRC cells), Fig. 5B.**
22. **Role of the DNA methyltransferase variant DNMT3b3 in DNA methylation.** Weisenberger DJ, M Velicescu, JC Cheng, FA Gonzales, G Liang, and PA Jones. *Molecular Cancer Res* 2:62-72. (2004). Imgenex products cited for **WB [wild-type mouse embryonic stem (ES) cells and ES knockouts of Dnmt3a, Dnmt3b, and 3a/b]:**
 1. **DNMT3a (IMG-268A), Fig 2A, B. The specificity of the antibody is knockout mouse validated as it did not detect Dnmt3a in either the 3a^{-/-} (M1/3B) or 3a/3b^{-/-} (M1) mice. Dnmt3a was detected in the WT, 1^{-/-} (3A/3B) and 3b^{-/-} (M1/3A) mice as expected.**
 2. **DNMT3b (IMG-184A), Fig 2A, B. The antibody detected both the Dnmt3b1 and Dnmt3b6 isoforms. The specificity of the antibody is knockout mouse validated as it did not detect Dnmt3a in either the 3b^{-/-} (M1/3A) or 3a/3b^{-/-} (M1) mice. Dnmt3b was detected in the WT, 1^{-/-} (3A/3B) and 3a^{-/-} (M1/3B) mice as expected.**
 3. **Coordinate regulation of DNA methyltransferase expression during oogenesis.** Lucifero D, S La Salle, D Bourc'his, J Martel, TH Bestor and JM Trasler. *BMC Developmental Biology* doi:10.1186/1471-213X-7-36 (2007).
- Imgenex products cited for **WB (growing mouse oocytes and type B spermatogonia):**
 1. **DNMT3a (IMG-268A), Fig 5a, b (middle panel). The antibody detected both the DNMT3a (908 aa) and DNMT3a2 (689 aa) isoforms.**
 2. **DNMT3b (IMG-184A), Fig 5c (top panel). The antibody detected the DNMT3b2 isoform.**
24. **DNA methyl-transferase 3B promotes epigenetic silencing through histone 3 chromatin modifications in pituitary cells.** Zhu X, X Mao, R Hurren, AD Schimmer, S Ezzat and SL Asa. *J Clin Endocrin Metab* doi:10.1210/jc.2008-0578 (2008). **AtT20 mouse pituitary corticotroph cells:**
 1. **WB, Figs 2A and 3B. The antibody was DNMT3b siRNA validated by western blot in Fig 3B.**
 2. **IHC (P), Fig B (formalin fixed, paraffin embedded cell pellets).**
25. **Helicobacter pylori regulates p21WAF1 by histone H4 acetylation.** Xia G, R Schneider-Stock, A Diestel, C Habold, S Krueger, A Roessner, M Naumann and U Lendeckel. *Biochemical and Biophysical Research Communications* 369: 526-531 (2008). **Imgenex products cited (human NCI N87 gastric carcinoma cells): WB (Fig 1)**
 1. **Dnmt1 (IMG-261)**
 2. **Dnmt3a (IMG-268)**
 3. **Dnmt3b (IMG-184)**
26. **Maternal and zygotic Dnmt1 are necessary and sufficient for the maintenance of DNA methylation imprints during preimplantation development.** Hirasawa R, H Chiba, M Kaneda, S Tajima, E Li, R Jaenisch, H Sasaki. *Genes and Development* 22: 1607-1616 (2008). **Imgenex antibodies cited:**
 1. **Dnmt3a (IMG-268a): IF/ICC (mouse oocytes and embryos), Fig. 1a.**
 2. **Dnmt3b (IMG-184): IF/ICC (mouse oocytes and embryos), Fig. 1c.**
27. **SWI/SNF mediates polycomb eviction and epigenetic reprogramming of the INK4b-ARF-INK4a locus.** *MCB* 28: 3457-3464 (2008). **WB [human MRT (malignant rhabdoid**

Monoclonal Antibody to Dnmt 3b (DNA methyltransferase 3b)

tumor) derived cell lines], Fig. 6C.
28.

Epigenetic silencing of CCAAT/enhancer-binding protein δ activity by YY1/polycomb group/DNA methyltransferase complex. Ko C, H Hsu, M Shen, W Chang, J Wang. *JBC* 283: 30919-30932 (2008). **Imgenex antibodies cited for HeLa cells in Fig. 7A (IF), 7B (WB following a DNA Affinity Precipitation Assay of nuclear extracts), 7C and D (ChIP): .**

- 1. IMG-261A (Dnmt1)**
- 2. IMG-268A (Dnmt3a)**
- 3. IMG-184A (Dnmt3b).**

29.
DNMT3B expression might contribute to CpG island methylator phenotype in colorectal cancer. Noshio K, K Shima, N Irahara, S Kure, Y Baba, G J Kirkner, L Chen, S Gokhale, A Hazra, D Spiegelman, E L Giovannucci, R Jaenisch, C S Fuchs, S Ogino. *Clin Cancer Res* 15: 3663-3671 (2009). **IHC (paraffin): Fig 1 (tissue microarrays consisting of normal human colon and colorectal cancer.**

Copyright © IMGEX Corporation. All Rights Reserved

Toll free: 1-888-723-4363

Fax: 1-858-642-0937

www.imgenex.com

info@imgenex.com

Research purposes only. Not for diagnostic or in vivo use.