SANTA CRUZ BIOTECHNOLOGY, INC.

MTHFD1 (A-1): sc-271444

SANTA CRUZ BIOTECHNOLOGY

The Power to Question

BACKGROUND

Methylenetetrahydrofolate dehydrogenase 1 (MTHFD1) is a 935 amino acid, folate-dependent protein that is responsible for the consecutive interconversion of tetrahydrofolate derivatives which drive the synthesis of purine, methionine and thymidylate. The cytosolic MRHFD1 contains three subunits, 5,10-methylenetetrahydrofolate dehydrogenase, 5,10-methenyltetrahydrofolate cyclohydrolase and 10-formyltetrahydrofolate synthetase, each with distinct activities. MTHFD1 functions as a homodimer consisting of two major domains, an N-terminal containing the dehydrogenase and cyclohydrolase activities and a larger synthetase domain in the C-terminus. Mutations in the MTHFD1 gene in pregnant women are associated with an increased risk of giving birth to a child with a neural tube defect, along with a possible risk of decreased embryo survival. MTHFD1 also plays a role in migraine development, since folate metabolism is involved in migraine pathophysiology, mainly in migraine with aura.

REFERENCES

1. Arakawa, T. 1970. Congenital defects in folate utilization. Am. J. Med. 48: 594-598.
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3. Krajinovic, M., et al. 2004. Role of polymorphisms in MTHFR and MTHFD1 genes in the outcome of childhood acute lymphoblastic leukemia. Pharmacogenomics J. 4: 66-72.
4. Christensen, K.E., et al. 2005. Disruption of the MTHFD1 gene reveals a monofunctional 10-formyltetrahydrofolate synthetase in mammalian mitochondria. J. Biol. Chem. 280: 7597-7602.
5. Parle-McDermott, A., et al. 2005. MTHFD1 R653Q polymorphism is a maternal genetic risk factor for severe abruptio placentae. Am. J. Med. Genet. A 132A: 365-368.
6. Oterino, A., et al. 2005. Thymidylate synthase promoter tandem repeat and MTHFD1 R653Q polymorphisms modulate the risk for migraine conferred by the MTHFR T677 allele. Brain Res. Mol. Brain Res. 139: 163-168.
7. Parle-McDermott, A., et al. 2005. A polymorphism in the MTHFD1 gene increases a mother's risk of having an unexplained second trimester pregnancy loss. Mol. Hum. Reprod. 11: 477-480.
8. Mills, J.L., et al. 2005. Folate-related genes and omphalocele. Am. J. Med. Genet. A 136: 8-11.
9. Parle-McDermott, A., et al. 2006. Confirmation of the R653Q polymorphism of the trifunctional C1-synthase enzyme as a maternal risk for neural tube defects in the Irish population. Eur. J. Hum. Genet. 14: 768-772.

CHROMOSOMAL LOCATION

Genetic locus: MTHFD1 (human) mapping to 14q23.3.

SOURCE

MTHFD1 (A-1) is a mouse monoclonal antibody raised against amino acids 1-120 mapping at the N-terminus of MTHFD1 of human origin.

PRODUCT

Each vial contains 200 µg IgG_{2a} kappa light chain in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

APPLICATIONS

MTHFD1 (A-1) is recommended for detection of MTHFD1 of human origin by Western Blotting (starting dilution 1:100, dilution range 1:100-1:1000), immunoprecipitation [1-2 µg per 100-500 µg of total protein (1 ml of cell lysate)], immunofluorescence (starting dilution 1:50, dilution range 1:50-1:500) and solid phase ELISA (starting dilution 1:30, dilution range 1:30-1:3000).

Suitable for use as control antibody for MTHFD1 siRNA (h): sc-61082, MTHFD1 shRNA Plasmid (h): sc-61082-SH and MTHFD1 shRNA (h) Lentiviral Particles: sc-61082-V.

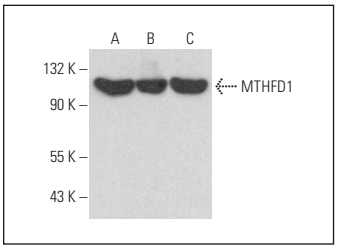
Molecular Weight of MTHFD1: 100 kDa.

Positive Controls: MTHFD1 (h): A-431 whole cell lysate: sc-2201, K-562 whole cell lysate: sc-2203 or Jurkat whole cell lysate: sc-2204.

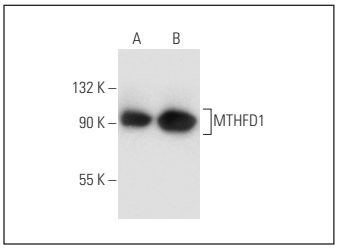
RECOMMENDED SUPPORT REAGENTS

To ensure optimal results, the following support reagents are recommended: 1) Western Blotting: use m-IgGκ BP-HRP: sc-516102 or m-IgGκ BP-HRP (Cruz Marker): sc-516102-CM (dilution range: 1:1000-1:10000), Cruz Marker™ Molecular Weight Standards: sc-2035, UltraCruz® Blocking Reagent: sc-516214 and Western Blotting Luminol Reagent: sc-2048. 2) Immunoprecipitation: use Protein A/G PLUS-Agarose: sc-2003 (0.5 ml agarose/2.0 ml). 3) Immunofluorescence: use m-IgGκ BP-FITC: sc-516140 or m-IgGκ BP-PE: sc-516141 (dilution range: 1:50-1:200) with UltraCruz® Mounting Medium: sc-24941 or UltraCruz® Hard-set Mounting Medium: sc-359850.

DATA



MTHFD1 (A-1): sc-271444. Western blot analysis of MTHFD1 expression in K-562 (**A**), A-431 (**B**) and MCF7 (**C**) whole cell lysates.



MTHFD1 (A-1): sc-271444. Western blot analysis of MTHFD1 expression in K-562 (**A**) and Jurkat (**B**) whole cell lysates.

STORAGE

Store at 4° C, **DO NOT FREEZE**. Stable for one year from the date of shipment. Non-hazardous. No MSDS required.

RESEARCH USE

For research use only, not for use in diagnostic procedures.