SANTA CRUZ BIOTECHNOLOGY, INC.

MTHFD1 (C-3): sc-271413

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 inter-conversion 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.
2. Online Mendelian Inheritance in Man, OMIM™. 2002. Johns Hopkins University, Baltimore, MD. MIM Number: 172460. World Wide Web URL: http://www.ncbi.nlm.nih.gov/omim/
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.

CHROMOSOMAL LOCATION

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

SOURCE

MTHFD1 (C-3) 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_1 kappa light chain in 1.0 ml of PBS with < 0.1% sodium azide and 0.1% gelatin.

STORAGE

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

APPLICATIONS

MTHFD1 (C-3) 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.

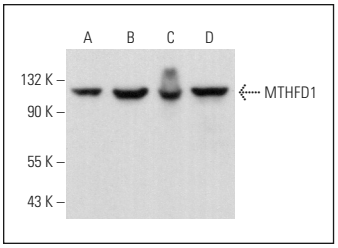
Molecular Weight of MTHFD1: 100 kDa.

Positive Controls: Jurkat whole cell lysate: sc-2204, CCRF-CEM cell lysate: sc-2225 or Hep G2 cell lysate: sc-2227.

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 (C-3): sc-271413. Western blot analysis of MTHFD1 expression in Jurkat (**A**), CCRF-CEM (**B**), HEL 92.1.7 (**C**) and Hep G2 (**D**) whole cell lysates.

SELECT PRODUCT CITATIONS

1. Field, M.S., et al. 2015. Human mutations in methylenetetrahydrofolate dehydrogenase 1 impair nuclear *de novo* thymidylate biosynthesis. Proc. Natl. Acad. Sci. USA 112: 400-405.
2. Sdelci, S., et al. 2019. MTHFD1 interaction with BRD4 links folate metabolism to transcriptional regulation. Nat. Genet. 51: 990-998.
3. Tordonato, C., et al. 2021. miR-146 connects stem cell identity with metabolism and pharmacological resistance in breast cancer. J. Cell Biol. 220: e202009053.

RESEARCH USE

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