

cSHMT (S-W6): sc-100849

BACKGROUND

Mammalian serine hydroxymethyltransferase (SHMT) is a tetrameric, pyridoxal phosphate (PLP)-dependent enzyme that catalyzes the reversible interconversion of serine and tetrahydrofolate to glycine and methylenetetrahydrofolate in the cytoplasm (cSHMT, SHMT1) and mitochondria (mSHMT, SHMT2). cSHMT preferentially supplies one-carbon units for thymidylate biosynthesis, depletes methylenetetrahydrofolate pools for S-adenosylmethionine (SAM) synthesis by synthesizing serine, sequesters 5-methyltetrahydrofolate and inhibits SAM synthesis. Sheep liver cytosolic recombinant SHMT (scSHMT) Lys 71, Arg 80 and Asp 89 residues influence intra-subunit ionic interactions essential for catalytic activity; Tyr 72, Asp 227 and His 356 residues in the active site interact with PLP and maintain the tetrameric structure. Human cSHMT and mSHMT genes map to 17p11.2 and 12q13.3, respectively. The cDNA for the mitochondrial enzyme encodes a mature protein of 474 residues.

REFERENCES

1. Online Mendelian Inheritance in Man, OMIM™. 1998. Johns Hopkins University, Baltimore, MD. MIM Number: 138450. World Wide Web URL: <http://www.ncbi.nlm.nih.gov/omim/>
2. Liu, X., et al. 2001. Lack of catalytic activity of a murine mRNA cytoplasmic serine hydroxymethyltransferase splice variant: evidence against alternative splicing as a regulatory mechanism. *Biochemistry* 40: 4932-4939.
3. Trivedi, V., et al. 2002. Crystal structure of binary and ternary complexes of serine hydroxymethyltransferase from *Bacillus stearothermophilus*: insights into the catalytic mechanism. *J. Biol. Chem.* 277: 17161-17169.
4. Herbig, K., et al. 2002. Cytoplasmic serine hydroxymethyltransferase mediates competition between folate-dependent deoxyribonucleotide and S-adenosylmethionine biosyntheses. *J. Biol. Chem.* 277: 38381-38389.
5. Jala, V.R., et al. 2003. Identification of amino acid residues, essential for maintaining the tetrameric structure of sheep liver cytosolic serine hydroxymethyltransferase, by targeted mutagenesis. *Biochem. J.* 369: 469-476.
6. LocusLink Report (LocusID: 6472). <http://www.ncbi.nlm.nih.gov/LocusLink/>

CHROMOSOMAL LOCATION

Genetic locus: SHMT1 (human) mapping to 17p11.2.

SOURCE

cSHMT (S-W6) is a mouse monoclonal antibody raised against recombinant cSHMT of human origin.

PRODUCT

Each vial contains 100 µg IgG₁ 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

cSHMT (S-W6) is recommended for detection of cSHMT of human origin by Western Blotting (starting dilution 1:200, 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), immunohistochemistry (including paraffin-embedded sections) (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 cSHMT siRNA (h): sc-40940, cSHMT shRNA Plasmid (h): sc-40940-SH and cSHMT shRNA (h) Lentiviral Particles: sc-40940-V.

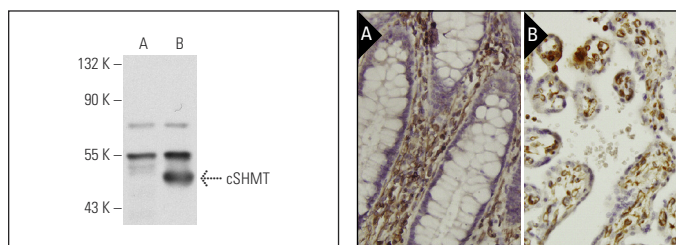
Molecular Weight of cSHMT: 52 kDa.

Positive Controls: cSHMT (h): 293T Lysate: sc-115685, HeLa whole cell lysate: sc-2200 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, TBS Blotto A Blocking Reagent: sc-2333 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



cSHMT (S-W6): sc-100849. Western blot analysis of cSHMT expression in non-transfected: sc-117752 (A) and human cSHMT transfected: sc-115685 (B) 293T whole cell lysates.

cSHMT (S-W6): sc-100849. Immunoperoxidase staining of formalin-fixed, paraffin-embedded human colon tissue showing cytoplasmic localization (A,B).

SELECT PRODUCT CITATIONS

1. Kim, D., et al. 2015. SHMT2 drives glioma cell survival in ischaemia but imposes a dependence on glycine clearance. *Nature* 520: 363-367.

RESEARCH USE

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

PROTOCOLS

See our web site at www.scbt.com for detailed protocols and support products.