

mSHMT siRNA (h): sc-40942

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) Lys71, Arg80 and Asp89 residues influence intra-subunit ionic interactions essential for catalytic activity; Tyr72, Asp227 and His356 residues in the active site interact with PLP and maintain the tetrameric structure. 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.

CHROMOSOMAL LOCATION

Genetic locus: SHMT2 (human) mapping to 12q13.3.

PRODUCT

mSHMT siRNA (h) is a pool of 3 target-specific 19-25 nt siRNAs designed to knock down gene expression. Each vial contains 3.3 nmol of lyophilized siRNA, sufficient for a 10 μ M solution once resuspended using protocol below. Suitable for 50-100 transfections. Also see mSHMT shRNA Plasmid (h): sc-40942-SH and mSHMT shRNA (h) Lentiviral Particles: sc-40942-V as alternate gene silencing products.

For independent verification of mSHMT (h) gene silencing results, we also provide the individual siRNA duplex components. Each is available as 3.3 nmol of lyophilized siRNA. These include: sc-40942A, sc-40942B and sc-40942C.

STORAGE AND RESUSPENSION

Store lyophilized siRNA duplex at -20° C with desiccant. Stable for at least one year from the date of shipment. Once resuspended, store at -20° C, avoid contact with RNases and repeated freeze thaw cycles.

Resuspend lyophilized siRNA duplex in 330 μ l of the RNase-free water provided. Resuspension of the siRNA duplex in 330 μ l of RNase-free water makes a 10 μ M solution in a 10 μ M Tris-HCl, pH 8.0, 20 mM NaCl, 1 mM EDTA buffered solution.

APPLICATIONS

mSHMT siRNA (h) is recommended for the inhibition of mSHMT expression in human cells.

SUPPORT REAGENTS

For optimal siRNA transfection efficiency, Santa Cruz Biotechnology's siRNA Transfection Reagent: sc-29528 (0.3 ml), siRNA Transfection Medium: sc-36868 (20 ml) and siRNA Dilution Buffer: sc-29527 (1.5 ml) are recommended. Control siRNAs or Fluorescein Conjugated Control siRNAs are available as 10 μ M in 66 μ l. Each contain a scrambled sequence that will not lead to the specific degradation of any known cellular mRNA. Fluorescein Conjugated Control siRNAs include: sc-36869, sc-44239, sc-44240 and sc-44241. Control siRNAs include: sc-37007, sc-44230, sc-44231, sc-44232, sc-44233, sc-44234, sc-44235, sc-44236, sc-44237 and sc-44238.

GENE EXPRESSION MONITORING

mSHMT (F-11): sc-390641 is recommended as a control antibody for monitoring of mSHMT gene expression knockdown by Western Blotting (starting dilution 1:200, dilution range 1:100-1:1000) or immunofluorescence (starting dilution 1:50, dilution range 1:50-1:500).

To ensure optimal results, the following support reagents are recommended: 1) Western Blotting: use m-IgG κ BP-HRP: sc-516102 or m-IgG κ 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) Immunofluorescence: use m-IgG κ BP-FITC: sc-516140 or m-IgG κ BP-PE: sc-516141 (dilution range: 1:50-1:200) with UltraCruz[®] Mounting Medium: sc-24941 or UltraCruz[®] Hard-set Mounting Medium: sc-359850.

RT-PCR REAGENTS

Semi-quantitative RT-PCR may be performed to monitor mSHMT gene expression knockdown using RT-PCR Primer: mSHMT (h)-PR: sc-40942-PR (20 μ l). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

SELECT PRODUCT CITATIONS

1. Sim, W.C., et al. 2016. Inhibition of homocysteine-induced endoplasmic reticulum stress and endothelial cell damage by l-serine and glycine. *Toxicol. In Vitro* 34: 138-145.
2. Shi, H., et al. 2019. High expression of serine hydroxymethyltransferase 2 indicates poor prognosis of gastric cancer patients. *Med. Sci. Monit.* 25: 7430-7438.

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.