



Mitochondrial Topo I siRNA (m): sc-149447

BACKGROUND

DNA topoisomerases are nuclear enzymes that regulate the topological structure of DNA in eukaryotic cells by transiently breaking and rejoining DNA strands. Due to their roles in DNA replication, recombination, and transcription, DNA topoisomerases have been identified as targets of numerous anticancer drugs. Mitochondrial Topo I (DNA topoisomerase I, mitochondrial) is a 601 amino acid protein that primarily acts to relieve DNA strain that may occur during duplication of mitochondrial DNA. Although it is expressed ubiquitously, it is logically present at highest levels in tissues that require dense concentrations of mitochondria (ie: heart, skeletal muscle, brain and fetal liver). As a type IB topoisomerase, mitochondrial Topo I requires a divalent metal, either calcium or magnesium, as well as an alkaline pH for optimal activity.

REFERENCES

1. Zhang, H., et al. 2001. Human mitochondrial topoisomerase I. *Proc. Natl. Acad. Sci. USA* 98: 10608-10613.
2. Zhang, H., et al. 2004. Thirteen-exon-motif signature for vertebrate nuclear and mitochondrial type IB topoisomerases. *Nucleic Acids Res.* 32: 2087-2092.
3. Online Mendelian Inheritance in Man, OMIM™. 2005. Johns Hopkins University, Baltimore, MD. MIM Number: 606387. World Wide Web URL: <http://www.ncbi.nlm.nih.gov/omim/>
4. Goto, Y., et al. 2006. Acute loss of transcription factor E2F1 induces mitochondrial biogenesis in HeLa cells. *J. Cell. Physiol.* 209: 923-934.
5. Zhang, H., et al. 2007. Mitochondrial topoisomerases and alternative splicing of the human TOP1mt gene. *Biochimie* 89: 474-481.
6. Zhang, H. and Pommier, Y. 2008. Mitochondrial topoisomerase I sites in the regulatory D-loop region of mitochondrial DNA. *Biochemistry* 47: 11196-11203.
7. Tarasenko, V.I., et al. 2008. Comparative analysis of mitochondrial and nuclear DNA topoisomerase I from maize. *Mol. Biol.* 42: 88-95.
8. Scocca, J.R. and Shapiro, T.A. 2008. A mitochondrial topoisomerase IA essential for late θ structure resolution in African trypanosomes. *Mol. Microbiol.* 67: 820-829.
9. de la Loza, M.C. and Wellinger, R.E. 2009. A novel approach for organelle-specific DNA damage targeting reveals different susceptibility of mitochondrial DNA to the anticancer drugs camptothecin and topotecan. *Nucleic Acids Res.* 37: e26.

CHROMOSOMAL LOCATION

Genetic locus: Top1mt (mouse) mapping to 15 D3.

PRODUCT

Mitochondrial Topo I siRNA (m) is a target-specific 19-25 nt siRNA 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 Mitochondrial Topo I shRNA Plasmid (m): sc-149447-SH and Mitochondrial Topo I shRNA (m) Lentiviral Particles: sc-149447-V as alternate gene silencing products.

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

Mitochondrial Topo I siRNA (m) is recommended for the inhibition of Mitochondrial Topo I expression in mouse 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.

RT-PCR REAGENTS

Semi-quantitative RT-PCR may be performed to monitor Mitochondrial Topo I gene expression knockdown using RT-PCR Primer: Mitochondrial Topo I (m)-PR: sc-149447-PR (20 μ l). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

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.