



Topo II α siRNA (h): sc-36695

BACKGROUND

DNA topoisomerase I and II (Topo I and Topo II) are nuclear enzymes that regulate the topological structure of DNA in eukaryotic cells by transiently breaking and rejoining DNA strands. Eukaryotic topoisomerases are capable of relaxing both positive and negative supercoils, whereas prokaryotic topoisomerases relax only negative supercoils. DNA topoisomerases play a role in DNA replication, recombination, and transcription and have been identified as targets of numerous anticancer drugs. Topo I, a ubiquitously expressed, soluble enzyme, acts by introducing a transient break in one strand of DNA, while Topo II acts by making a transient double-strand break. Topo II is encoded by two different genes to generate two distinct isoforms that are designated Topo II α and Topo II β . Topo II β , and Topo II α are largely homologous at their N-terminal three quarters, however, the C-terminal segments are considerably divergent, suggesting that these regions may mediate different cellular functions and account for the observed differential tissue expression patterns of the two isoforms.

REFERENCES

1. D'Arpa, P., et al. 1988. cDNA cloning of human DNA topoisomerase I: catalytic activity of a 67.7 kDa carboxyl-terminal fragment. *Proc. Natl. Acad. Sci. USA* 85: 2543-2547.
2. Chung, T.D., et al. 1989. Characterization and immunological identification of cDNA clones encoding two human DNA topoisomerase II isozymes. *Proc. Natl. Acad. Sci. USA* 86: 9431-9435.
3. Austin, C.A., et al. 1990. Isolation and characterization of a human cDNA clone encoding a novel DNA topoisomerase II homologue from HeLa cells. *FEBS Lett.* 266: 115-117.

CHROMOSOMAL LOCATION

Genetic locus: TOP2A (human) mapping to 17q21.2.

PRODUCT

Topo II α 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 Topo II α shRNA Plasmid (h): sc-36695-SH and Topo II α shRNA (h) Lentiviral Particles: sc-36695-V as alternate gene silencing products.

For independent verification of Topo II α (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-36695A, sc-36695B and sc-36695C.

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

Topo II α siRNA (h) is recommended for the inhibition of Topo II α 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

Topo II α (G-6): sc-166934 is recommended as a control antibody for monitoring of Topo II α 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).

RT-PCR REAGENTS

Semi-quantitative RT-PCR may be performed to monitor Topo II α gene expression knockdown using RT-PCR Primer: Topo II α (h)-PR: sc-36695-PR (20 μ l, 474 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

SELECT PRODUCT CITATIONS

1. Gardner, L., et al. 2011. Geminin overexpression prevents the completion of topoisomerase II α chromosome decatenation, leading to aneuploidy in human mammary epithelial cells. *Breast Cancer Res.* 13: R53.
2. Broderick, R., et al. 2015. TOPBP1 recruits TOP2A to ultra-fine anaphase bridges to aid in their resolution. *Nat. Commun.* 6: 6572.
3. Li, X., et al. 2015. All-*trans* retinoic acid suppresses topoisomerase II α through the proteasomal pathway. *Anticancer Drugs* 26: 737-746.
4. Pfeifer, C.R., et al. 2018. Constricted migration increases DNA damage and independently represses cell cycle. *Mol. Biol. Cell* 29: 1948-1962.
5. Du, Y., et al. 2021. Propofol modulates the proliferation, invasion and migration of bladder cancer cells through the miR-145-5p/TOP2A axis. *Mol. Med. Rep.* 23: 439.
6. Mackay, R.P., et al. 2022. YM155 induces DNA damage and cell death in anaplastic thyroid cancer cells by inhibiting DNA topoisomerase II α at the ATP-binding site. *Mol. Cancer Ther.* 21: 925-935.
7. Chen, Z., et al. 2024. DNA topoisomerase II inhibition potentiates osimertinib's therapeutic efficacy in EGFR-mutant non-small cell lung cancer models. *J. Clin. Invest.* 134: e127216.

RESEARCH USE

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