SANTA CRUZ BIOTECHNOLOGY, INC.

NQO1 siRNA (h): sc-37139

BACKGROUND

NAD(P)H:quinone oxidoreductase 1 (NQO1) and NRH:quinone oxidoreductase (NQO2) are flavoproteins that catalyze the metabolic detoxification of quinones and their derivatives to hydroquinones, using either NADH or NADPH as the electron donor. This protects cells against quinone-induced oxidative stress, cytotoxicity, and mutagenicity. Many tumors overexpress NQO1, which is an obligate two-electron reductase that deactivates toxins and activates bioreductive anticancer drugs. NQO1, a 274 amino acid protein, is ubiquitously expressed, but the expression level varies among tissues. NQO1 gene expression is coordinately induced in response to xenobiotics, antioxidants, heavy metals and radiation. The antioxidant response element (ARE) in the NQO1 gene promoter is essential for expression and coordinated induction of NQO1. ARE activation by tert-butylhydroquinone is dependent on PI3-kinase, which lies upstream of Nrf2. Nrf2, c-Jun, Nrf1, Jun-B and Jun-D bind to the ARE and regulate expression and induction of NQO1 gene. Maf-Maf homodimers and possibly Maf-Nrf2 heterodimers play a role in negative regulation of ARE-mediated transcription, but Maf-Nrf1 heterodimers fail to bind with the NQO1 gene ARE and do not repress NQO1 transcription.

CHROMOSOMAL LOCATION

Genetic locus: NQO1 (human) mapping to 16q22.1.

PRODUCT

NQO1 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 µM solution once resuspended using protocol below. Suitable for 50-100 transfections. Also see NQO1 shRNA Plasmid (h): sc-37139-SH and NQO1 shRNA (h) Lentiviral Particles: sc-37139-V as alternate gene silencing products.

For independent verification of NQO1 (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-37139A, sc-37139B and sc-37139C.

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 µl of the RNAse-free water provided. Resuspension of the siRNA duplex in 330 µl of RNAse-free water makes a 10 µM solution in a 10 µM Tris-HCl, pH 8.0, 20 mM NaCl, 1 mM EDTA buffered solution.

APPLICATIONS

NQO1 siRNA (h) is recommended for the inhibition of NQO1 expression in human cells.

PROTOCOLS

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

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 µM in 66 µl. 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

NQO1 (A180): sc-32793 is recommended as a control antibody for monitoring of NQO1 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 NQO1 gene expression knockdown using RT-PCR Primer: NQO1 (h)-PR: sc-37139-PR (20 µl, 467 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

SELECT PRODUCT CITATIONS

1. Wu, Y.L., et al. 2013. Epigenetic silencing of NAD(P)H:quinone oxidoreductase 1 by hepatitis B virus X protein increases mitochondrial injury and cellular susceptibility to oxidative stress in hepatoma cells. Free Radic. Biol. Med. 65: 632-644.
2. Park, E.J., et al. 2014. Dicoumarol sensitizes renal cell carcinoma Caki cells to TRAIL-induced apoptosis through down-regulation of Bcl-2, Mcl-1 and c-FLIP in a NQO1-independent manner. Exp. Cell Res. 323: 144-154.
3. Zhang, X., et al. 2017. Overexpression of NAD(P)H: quinone oxidoreductase 1 inhibits hepatocellular carcinoma cell proliferation and induced apoptosis by activating AMPK/PGC-1α pathway. DNA Cell Biol. 36: 256-263.
4. Luo, S., et al. 2018. NQO1 is regulated by PTEN in glioblastoma, mediating cell proliferation and oxidative stress. Oxid. Med. Cell. Longev. 2018: 9146528.
5. Punganuru, S.R., et al. 2018. Cancer-specific biomarker hNQO1-activatable fluorescent probe for imaging cancer cells *in vitro* and *in vivo*. Cancers 10: 470.
6. Punganuru, S.R., et al. 2019. Characterization of a highly specific NQO1-activated near-infrared fluorescent probe and its application for *in vivo* tumor imaging. Sci. Rep. 9: 8577.
7. Park, S.Y., et al. 2020. Petatewalide B alleviates oxygen-glucose deprivation/reoxygenation-induced neuronal injury via activation of the AMPK/Nrf2 signaling pathway. Mol. Med. Rep. 22: 239-246.

RESEARCH USE

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