SANTA CRUZ BIOTECHNOLOGY, INC.

DRP1 siRNA (m): sc-45953

BACKGROUND

Dynamin-related protein 1 (DRP1) mediates outer mitochondrial membrane fission in mammalian cells. DRP1 is also known as Dynamin-like protein 1, (Dlp1), DVLP or Dymple. DRP1 contains the N-terminal tripartite GTP-binding domain characteristic of the Dynamin superfamily of GTPases. DRP1 exists as a T-shaped dimer which contains a head, leg and stalk. The addition of GTP induces a rearrangement of the head and stalk that generates a force that ultimately results in membrane constriction. DRP1 is ubiquitously expressed with abundant expression in skeletal muscle, heart, kidney and brain. In the cell, DRP1 localized to the perinuclear region. In mouse brain, DRP1 is highly expressed in the cerebellum with particularly high levels in cerebellar Purkinje cells. During apoptosis, DRP1 translocates from the cytosol to mitochondria and localizes to potential sites of organelle division. Cell death is averted upon DRP inhibition, suggesting a critical role for mitochondrial fission in apoptosis.

REFERENCES

1. Shin, H.W., et al. 1997. Identification and subcellular localization of a novel mammalian Dynamin-related protein homologous to yeast Vps1p and Dnm1p. J. Biochem. 122: 525-530.
2. Imoto, M., et al. 1998. Identification and functional characterization of a novel human protein highly related to the yeast Dynamin-like GTPase Vps1p. J. Cell Sci. 111: 1341-1349.

CHROMOSOMAL LOCATION

Genetic locus: Dnm1l (mouse) mapping to 16 A2.

PRODUCT

DRP1 siRNA (m) 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 DRP1 shRNA Plasmid (m): sc-45953-SH and DRP1 shRNA (m) Lentiviral Particles: sc-45953-V as alternate gene silencing products.

For independent verification of DRP1 (m) gene silencing results, we also provide the individual siRNA duplex components. Each is available as 3.3 nmol of lyophilized siRNA. These include: sc-45953A, sc-45953B and sc-45953C.

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

DRP1 siRNA (m) is recommended for the inhibition of DRP1 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 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

DRP1 (C-5): sc-271583 is recommended as a control antibody for monitoring of DRP1 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 DRP1 gene expression knockdown using RT-PCR Primer: DRP1 (m)-PR: sc-45953-PR (20 µl, 493 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

SELECT PRODUCT CITATIONS

1. Zhang, C., et al. 2014. Downregualtion of Dynamin-related protein 1 attenuates glutamate-induced excitotoxicity via regulating mitochondrial function in a calcium dependent manner in HT22 cells. Biochem. Biophys. Res. Commun. 443: 138-143.
2. Yuan, Y., et al. 2018. p53/DRP1-dependent mitochondrial fission mediates aldosterone-induced podocyte injury and mitochondrial dysfunction. Am. J. Physiol. Renal Physiol. 314: F798-F808.
3. Park, J.E., et al. 2019. DRP1 phosphorylation is indispensable for steroidogenesis in Leydig cells. Endocrinology 160: 729-743.
4. Rexius-Hall, M.L., et al. 2020. Mitochondrial division inhibitor 1 (mdivi-1) increases oxidative capacity and contractile stress generated by engineered skeletal muscle. FASEB J. 34: 11562-11576.
5. Liu, H., et al. 2021. Aberrant mitochondrial morphology and function associated with impaired mitophagy and DNM1L-MAPK/ERK signaling are found in aged mutant Parkinsonian LRRK2^{R1441G} mice. Autophagy 17: 3196-3220.
6. Lu, Z.Y., et al. 2022. Hydrogen sulfide diminishes activation of adventitial fibroblasts through the inhibition of mitochondrial fission. J. Cardiovasc. Pharmacol. 79: 925-934.
7. Yan, M., et al. 2024. DEAD-box helicase 17 (DDX17) protects cardiac function by promoting mitochondrial homeostasis in heart failure. Signal Transduct. Target. Ther. 9: 127.

RESEARCH USE

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