SANTA CRUZ BIOTECHNOLOGY, INC.

PERK siRNA (m): sc-36214

BACKGROUND

An interferon-inducible, RNA-dependent protein serine/threonine kinase (PKR) has been described. PKR in earlier literature is variously known as DAI, dsJ, PI kinase, p65, p67 or TIK for the mouse kinase; and p68 or p69 for the human kinase. The PKR kinase substrate is the α subunit of protein synthesis initiation factor eIF-2. Phosphorylation of eIF-2α on serine-51 results in inhibition of translation. The serine/threonine kinase catalytic domains map to the carboxy terminal half of the protein while the RNA-binding domains are located in the amino terminal region. PERK is a type I transmembrane protein located in the endoplasmic reticulum (ER) that contains a kinase domain similar to the kinase domain of PKR. PERK is activated in response to ER stress and phosphorylates eIF-2α, thus inhibiting the translation of mRNA.

CHROMOSOMAL LOCATION

Genetic locus: Eif2ak3 (mouse) mapping to 6 C1.

PRODUCT

PERK 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 PERK shRNA Plasmid (m): sc-36214-SH and PERK shRNA (m) Lentiviral Particles: sc-36214-V as alternate gene silencing products.

For independent verification of PERK (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-36214A, sc-36214B and sc-36214C.

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

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

PERK (B-5): sc-377400 is recommended as a control antibody for monitoring of PERK 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 PERK gene expression knockdown using RT-PCR Primer: PERK (m)-PR: sc-36214-PR (20 µl, 560 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

SELECT PRODUCT CITATIONS

1. Hirasawa, H., et al. 2010. Mechanical stimulation suppresses phosphorylation of eIF2α and PERK-mediated responses to stress to the endoplasmic reticulum. FEBS Lett. 584: 745-752.
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3. Tanaka, K., et al. 2013. Advanced glycation end products suppress osteoblastic differentiation of stromal cells by activating endoplasmic reticulum stress. Biochem. Biophys. Res. Commun. 438: 463-467.
4. Tanaka, K., et al. 2014. Involvement of the osteoinductive factors, Tmem119 and BMP-2, and the ER stress response PERK-eIF2α-ATF4 pathway in the commitment of myoblastic into osteoblastic cells. Calcif. Tissue Int. 94: 454-464.
5. Li, H., et al. 2015. Administration of progranulin (PGRN) triggers ER stress and impairs Insulin sensitivity via PERK-eIF2α-dependent manner. Cell Cycle 14: 1893-1907.
6. Li, W., et al. 2017. Phosphorylation of LAMP2A by p38 MAPK couples ER stress to chaperone-mediated autophagy. Nat. Commun. 8: 1763.
7. Guo, Q., et al. 2017. Tunicamycin aggravates endoplasmic reticulum stress and airway inflammation via PERK-ATF4-CHOP signaling in a murine model of neutrophilic asthma. J. Asthma 54: 125-133.
8. Joe, Y., et al. 2018. FGF21 induced by carbon monoxide mediates metabolic homeostasis via the PERK/ATF4 pathway. FASEB J. 32: 2630-2643.
9. Zhang, Y., et al. 2020. STING is an essential regulator of heart inflammation and fibrosis in mice with pathological cardiac hypertrophy via endoplasmic reticulum (ER) stress. Biomed. Pharmacother. 125: 110022.
10. Sen, T., et al. 2020. Aberrant ER-stress induced neuronal-IFNβ elicits white matter injury due to microglial activation and T-cell infiltration after TBI. J. Neurosci. 40: 424-446.
11. Li, W., et al. 2021. Up-regulation of thioredoxin system by puerarin inhibits lipid uptake in macrophages. Free Radic. Biol. Med. 162: 542-554.

RESEARCH USE

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