



# eIF2 $\alpha$ siRNA (h): sc-35272

## BACKGROUND

The initiation of protein synthesis in eukaryotic cells is regulated by interactions between protein initiation factors and RNA molecules. The eukaryotic initiation complex is composed of three subunits, designated eIF2 $\alpha$ , eIF2 $\beta$  and eIF2 $\gamma$  (eukaryotic translation initiation factor 2  $\alpha$ ,  $\beta$  and  $\gamma$ , respectively), all of which work in concert to form a ternary complex with GTP and tRNA in the early stages of protein synthesis. eIF2 $\alpha$ , also known as EIF2S1 or EIF2, is a 315 amino acid subunit of the eukaryotic initiation complex that functions to bind tRNA to the 40S ribosomal subunit (in a GTP-dependent manner), thereby initiating translation. In addition, the phosphorylation state of eIF2 $\alpha$  controls the rate of tRNA translation. When eIF2 $\alpha$  is not phosphorylated, translation occurs at a normal rate. However, upon phosphorylation by one of several kinases, eIF2 $\alpha$  is stabilized, thus preventing the GDP/GTP exchange reaction and slowing translation.

## REFERENCES

1. Trachsel, H., et al. 1978. Binding and release of eukaryotic initiation factor eIF-2 and GTP during protein synthesis initiation. *Proc. Natl. Acad. Sci. USA* 75: 204-208.
2. Benne, R., et al. 1979. The activity of eukaryotic initiation factor eIF-2 in ternary complex formation with GTP and Met-tRNA. *J. Biol. Chem.* 254: 3201-3205.

## CHROMOSOMAL LOCATION

Genetic locus: EIF2S1 (human) mapping to 14q23.3.

## PRODUCT

eIF2 $\alpha$  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  $\mu$ M solution once resuspended using protocol below. Suitable for 50-100 transfections. Also see eIF2 $\alpha$  shRNA Plasmid (h): sc-35272-SH and eIF2 $\alpha$  shRNA (h) Lentiviral Particles: sc-35272-V as alternate gene silencing products.

For independent verification of eIF2 $\alpha$  (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-35272A, sc-35272B and sc-35272C.

## 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  $\mu$ l of the RNase-free water provided. Resuspension of the siRNA duplex in 330  $\mu$ l of RNase-free water makes a 10  $\mu$ M solution in a 10  $\mu$ M Tris-HCl, pH 8.0, 20 mM NaCl, 1 mM EDTA buffered solution.

## APPLICATIONS

eIF2 $\alpha$  siRNA (h) is recommended for the inhibition of eIF2 $\alpha$  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  $\mu$ M in 66  $\mu$ 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

eIF2 $\alpha$  (D-3): sc-133132 is recommended as a control antibody for monitoring of eIF2 $\alpha$  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 eIF2 $\alpha$  gene expression knockdown using RT-PCR Primer: eIF2 $\alpha$  (h)-PR: sc-35272-PR (20  $\mu$ l, 480 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

## SELECT PRODUCT CITATIONS

1. Kim, K.M., et al. 2007. Carbon monoxide induces heme oxygenase-1 via activation of protein kinase R-like endoplasmic reticulum kinase and inhibits endothelial cell apoptosis triggered by endoplasmic reticulum stress. *Circ. Res.* 101: 919-927.
2. Liu, J., et al. 2016. Pterostilbene exerts an anti-inflammatory effect via regulating endoplasmic reticulum stress in endothelial cells. *Cytokine* 77: 88-97.
3. Dong, Z., et al. 2017. Astragaloside-IV alleviates heat-induced inflammation by inhibiting endoplasmic reticulum stress and autophagy. *Cell. Physiol. Biochem.* 42: 824-837.
4. Jayasooriya, R.G.P.T., et al. 2018. Camptothecin enhances c-Myc-mediated endoplasmic reticulum stress and leads to autophagy by activating Ca<sup>2+</sup>-mediated AMPK. *Food Chem. Toxicol.* 121: 648-656.
5. Yu, C.L., et al. 2019. Inhibition of eIF2 $\alpha$  dephosphorylation accelerates pterostilbene-induced cell death in human hepatocellular carcinoma cells in an ER stress and autophagy-dependent manner. *Cell Death Dis.* 10: 418.
6. Yoon, C.J., et al. 2020. Epstein-Barr virus-encoded miR-BART5-5p upregulates PD-L1 through PIAS3/pSTAT3 modulation, worsening clinical outcomes of PD-L1-positive gastric carcinomas. *Gastric Cancer* 23: 780-795.
7. Chang, C.Y., et al. 2022. Endoplasmic reticulum stress contributed to dipyrindamole-induced impaired autophagic flux and glioma apoptosis. *Int. J. Mol. Sci.* 23: 579.

## RESEARCH USE

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