SANTA CRUZ BIOTECHNOLOGY, INC.

AMPKα1 siRNA (m): sc-29674

BACKGROUND

AMPK (for 5'-AMP-activated protein kinase) is a heterotrimeric complex comprising a catalytic α subunit and regulatory β and γ subunits. It protects cells from stresses that cause ATP depletion by switching off ATP-consuming biosynthetic pathways. AMPK is activated by high AMP and low ATP through a mechanism involving allosteric regulation, promotion of phosphorylation by an upstream protein kinase known as AMPK kinase, and inhibition of dephosphorylation. Activated AMPK can phosphorylate and regulate *in vivo* hydroxy-methylglutaryl-CoA reductase and acetyl-CoA carboxylase, which are key regulatory enzymes of sterol synthesis and fatty acid synthesis, respectively. The human AMPKα1 and AMPKα2 genes encode 548 amino acid and 552 amino acid proteins, respectively. Human AMPKβ1 encodes a 271 amino acid protein and human AMPKβ2 encodes a 272 amino acid protein. The human AMPKγ1 gene encodes a 331 amino acid protein. Human AMPKγ2 and AMPKγ3, which are 569 and 492 amino acid proteins, respectively, contain unique N-terminal domains and may participate directly in the binding of AMP within the AMPK complex.

REFERENCES

1. Stapleton, D., et al. 1996. Mammalian AMP-activated protein kinase subfamily. J. Biol. Chem. 271: 611-614.
2. Stapleton, D., et al. 1997. AMP-activated protein kinase isoenzyme family: subunit structure and chromosomal location. FEBS Lett. 409: 452-456.

CHROMOSOMAL LOCATION

Genetic locus: Prkaa1 (mouse) mapping to 15 A1.

PRODUCT

AMPKα1 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 AMPKα1 shRNA Plasmid (m): sc-29674-SH and AMPKα1 shRNA (m) Lentiviral Particles: sc-29674-V as alternate gene silencing products.

For independent verification of AMPKα1 (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-29674A, sc-29674B and sc-29674C.

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

AMPKα1 siRNA (m) is recommended for the inhibition of AMPKα1 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

AMPKα1 (H-4): sc-398861 is recommended as a control antibody for monitoring of AMPKα1 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 AMPKα1 gene expression knockdown using RT-PCR Primer: AMPKα1 (m)-PR: sc-29674-PR (20 µl, 481 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

SELECT PRODUCT CITATIONS

1. Hattori, Y., et al. 2006. Metformin inhibits cytokine-induced nuclear factor κB activation via AMP-activated protein kinase activation in vascular endothelial cells. Hypertension 47: 1183-1188.
2. Finocchietto, P.V., et al. 2011. Defective leptin-AMP-dependent kinase pathway induces nitric oxide release and contributes to mitochondrial dysfunction and obesity in ob/ob mice. Antioxid. Redox Signal. 15: 2395-2406.
3. Kalderon, B., et al. 2012. Suppression of adipose lipolysis by long-chain fatty acid analogs. J. Lipid Res. 53: 868-878.
4. Siddique, M.M., et al. 2013. Ablation of dihydroceramide desaturase 1, a therapeutic target for the treatment of metabolic diseases, simultaneously stimulates anabolic and catabolic signaling. Mol. Cell. Biol. 33: 2353-2369.
5. Xie, Z., et al. 2014. Silibinin activates AMP-activated protein kinase to protect neuronal cells from oxygen and glucose deprivation-re-oxygenation. Biochem. Biophys. Res. Commun. 454: 313-319.
6. Velagapudi, R., et al. 2017. AMPK and SIRT1 activation contribute to inhibition of neuroinflammation by thymoquinone in BV2 microglia. Mol. Cell. Biochem. 435: 149-162.
7. Zhang, Y., et al. 2018. TFEB-dependent induction of thermogenesis by the hepatocyte SLC2A inhibitor trehalose. Autophagy 14: 1959-1975.
8. Liang, C., et al. 2019. MiR-451 antagonist protects against cardiac fibrosis in streptozotocin-induced diabetic mouse heart. Life Sci. 224: 12-22.

RESEARCH USE

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