SANTA CRUZ BIOTECHNOLOGY, INC.

AMPKα1/2 siRNA (h): sc-45312

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* hydroxymethylglutaryl-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.

CHROMOSOMAL LOCATION

Genetic locus: PRKAA1 (human) mapping to 5p13.1, PRKAA2 (human) mapping to 1p32.2.

PRODUCT

AMPKα1/2 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 AMPKα1/2 shRNA Plasmid (h): sc-45312-SH and AMPKα1/2 shRNA (h) Lentiviral Particles: sc-45312-V as alternate gene silencing products.

For independent verification of AMPKα1/2 (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-45312A, sc-45312B and sc-45312C.

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

AMPKα1/2 siRNA (h) is recommended for the inhibition of AMPKα1/2 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

AMPKα1/2 (D-6): sc-74461 is recommended as a control antibody for monitoring of AMPKα1/2 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).

SELECT PRODUCT CITATIONS

1. Cao, C., et al. 2008. AMP-activated protein kinase contributes to UV- and H_2O_2-induced apoptosis in human skin keratinocytes. J. Biol. Chem. 283: 28897-28908.
2. Lee, S.O., et al. 2012. The nuclear receptor TR3 regulates mTORC1 signaling in lung cancer cells expressing wild-type p53. Oncogene 31: 3265-3276.
3. He, X.Y., et al. 2013. Gambogic acid induces EGFR degradation and Akt/mTORC1 inhibition through AMPK dependent-LRIG1 upregulation in cultured U87 glioma cells. Biochem. Biophys. Res. Commun. 435: 397-402.
4. Zhou, X., et al. 2014. Resveratrol regulates mitochondrial reactive oxygen species homeostasis through Sirt3 signaling pathway in human vascular endothelial cells. Cell Death Dis. 5: e1576.
5. Wong, T.Y., et al. 2015. The flavone luteolin suppresses SREBP-2 expression and post-translational activation in hepatic cells. PLoS ONE 10: e0135637.
6. Galdieri, L., et al. 2016. Activation of AMP-activated protein kinase by metformin induces protein acetylation in prostate and ovarian cancer cells. J. Biol. Chem. 291: 25154-25166.
7. Lee, S., et al. 2017. Rebamipide induces the gastric mucosal protective factor, cyclooxygenase-2, via activation of 5'-AMP-activated protein kinase. Biochem. Biophys. Res. Commun. 483: 449-455.
8. Choi, Y.K., et al. 2018. Heme oxygenase metabolites improve astrocytic mitochondrial function via a Ca^{2+}-dependent HIF-1α/ERRα circuit. PLoS ONE 13: e0202039.
9. He, L., et al. 2019. PINK1/Parkin-mediated mitophagy promotes apelin-13-induced vascular smooth muscle cell proliferation by AMPKα and exacerbates atherosclerotic lesions. J. Cell. Physiol. 234: 8668-8682.

RESEARCH USE

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