SANTA CRUZ BIOTECHNOLOGY, INC.

UCP4 siRNA *(I. tridecemlineatus)*: sc-270662

BACKGROUND

A significant portion of the metabolic rate of endotherm is attributable to counteracting uncoupling, wherein a flux of protons down the electrochemical gradient generates heat independently of ATP production. Uncoupling is apparent in thermogenic brown adipose tissue, which expresses tissue-specific uncoupling protein (UCP), suggesting that innate uncoupling and metabolic rate are regulated by UCPs. UCPs are a family of mitochondrial transporter proteins that are implicated in thermoregulatory heat production and maintenance of the basal metabolic rate. A brain-specific novel member of UCP family, UCP4, is most related to UCP3 and possesses features characteristic of mitochondrial transporter proteins. Unlike other known UCPs, UCP4 mRNAs are expressed in both fetal and adult brain tissues. Human UCP4, a 323 amino acid protein, has been speculated on its participation in apoptosis because of its early phylogenetic occurrence. Brain UCP4 mRNA rose by 1.5 fold in response to acute cold exposure, suggesting UCP4 is involved in tissue-specific thermoregulation and metabolic changes. The UCP-specific sequences are found in the first, second and fourth α-helices and are involved in fatty acid anion binding and translocation.

REFERENCES

1. Mao, W., et al. 1999. UCP4, a novel brain-specific mitochondrial protein that reduces membrane potential in mammalian cells. FEBS Lett. 443: 326-330.
2. Adams, S.H. 2000. Uncoupling protein homologs: emerging views of physiological function. J. Nutr. 130: 711-714.
3. Yu, X.X., et al. 2000. Characterization of novel UCP5/BMCP1 isoforms and differential regulation of UCP4 and UCP5 expression through dietary or temperature manipulation. FASEB J. 14: 1611-1618.
4. Jezek, P. and Urbankova, E. 2000. Specific sequence of motifs of mitochondrial uncoupling proteins. IUBMB Life 49: 63-70.
5. Hanak, P. and Jezek, P. 2001. Mitochondrial uncoupling proteins and phylogenesis—UCP4 as the ancestral uncoupling protein. FEBS Lett. 495: 137-141.
6. Argiles, J.M., et al. 2002. The role of uncoupling proteins in pathophysiological states. Biochem. Biophys. Res. Commun. 293: 1145-1152.
7. Mattson, M.P., et al. 2003. Mitochondrial potassium channels and uncoupling proteins in synaptic plasticity and neuronal cell death. Biochem. Biophys. Res. Commun. 304: 539-549.
8. Sokolova, I.M., et al. 2005. Evolution of mitochondrial uncoupling proteins: novel invertebrate UCP homologues suggest early evolutionary divergence of the UCP family. FEBS Lett. 579: 313-317.

RESEARCH USE

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

PROTOCOLS

See our web site at www.scbt.com for detailed protocols and support products.

PRODUCT

UCP4 siRNA *(I. tridecemlineatus)* is a pool of 2 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 UCP4 shRNA Plasmid *(I. tridecemlineatus):* sc-270662-SH and UCP4 shRNA *(I. tridecemlineatus)* Lentiviral Particles: sc-270662-V as alternate gene silencing products.

For independent verification of UCP4 (I. tridecemlineatus) gene silencing results, we also provide the individual siRNA duplex components. Each is available as 3.3 nmol of lyophilized siRNA. These include: sc-270662A and sc-270662B.

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

UCP4 siRNA *(I. tridecemlineatus)* is recommended for the inhibition of UCP4 expression in *I. tridecemlineatus* 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.

RT-PCR REAGENTS

Semi-quantitative RT-PCR may be performed to monitor UCP4 gene expression knockdown using RT-PCR Primer: UCP4 *(I. tridecemlineatus)*-PR: sc-270662-PR (20 µl). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.