

UPC4 (191-290): sc-4523 WB

BACKGROUND

A significant portion of the metabolic rate of endotherm is attributable to counteracting uncoupling, wherein a flux of protons down the electro-chemical 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, UPC4, is most related to UCP3 and possesses features characteristic of mitochondrial transporter proteins. Unlike other known UCPs, UPC4 mRNAs are expressed in both fetal and adult brain tissues. Human UPC4, a 323 amino acid protein, has been speculated on its participation in apoptosis because of its early phylogenetic occurrence. Brain UPC4 mRNA rose by 1.5 fold in response to acute cold exposure, suggesting UPC4 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., Yu, X.X., Zhong, A., Li, W., Brush, J., Sherwood, S.W., Adams, S.H., and Pan, G. 1999. UPC4, 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., Mao, W., Zhong, A., Schow, P., Brush, J., Sherwood, S.W., Adams, S.H., and Pan, G. 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., Busquets, S., Lopez-Soriano, F.J. 2002. The role of uncoupling proteins in pathophysiological states. *Biochem. Biophys. Res. Commun.* 293: 1145-1152.
7. Mattson, M.P., and Liu, D. 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., and Sokolov, E.P. 2005. Evolution of mitochondrial uncoupling proteins: novel invertebrate UCP homologues suggest early evolutionary divergence of the UCP family. *FEBS Lett.* 579: 313-317.

SOURCE

UPC4 (191-290) is expressed in *E. coli* as a 38 kDa tagged fusion protein corresponding to amino acids 191-290 of UPC4 of human origin.

PRODUCT

UPC4 (191-290) is purified from bacterial lysates (>98%) by glutathione agarose affinity chromatography; supplied as 10 μ g in 0.1 ml SDS-PAGE loading buffer.

APPLICATIONS

UPC4 (191-290) is suitable as a Western blotting control for sc-20815.

STORAGE

Store at -20° C; stable for one year from the date of shipment.

RESEARCH USE

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