SANTA CRUZ BIOTECHNOLOGY, INC.

CTR1 siRNA (h): sc-105249

BACKGROUND

The activity of a diverse subset of enzymes relies on the essential nutrient copper. Copper uptake requires tight regulation to ensure that sufficient copper is present in the cell to drive vital cellular processes, while avoiding the accumulation of copper to toxic levels. In *Saccharomyces cerevisiae,* copper regulation involves several proteins. Fre1, a surface reductase, reduces and mobilizes copper outside the cell, while the CTR1 and CTR3 proteins function as copper transport proteins within the plasma membrane. Regulation of these proteins occurs at the transcriptional level. Under copper-deficient conditions, Mac1 binds to copper response elements (CuREs) within promoters, which contain the consensus sequence GCTC, to activate the transcription of CTR1, CTR3 and Fre1. Mac1 also mediates CTR1 degradation. In human, CTR1 also mediates the uptake of cisplatin, a chemotherapeutic drug, and may modulate the sensitivity and toxicity of this drug.

REFERENCES

1. Yamaguchi-Iwai, Y., et al. 1997. Homeostatic regulation of copper uptake in yeast via direct binding of Mac1 protein to upstream regulatory sequences of FRE1 and CTR1. J. Biol. Chem. 272: 17711-17718.
2. Pena, M.M., et al. 1998. Dynamic regulation of copper uptake and detoxification genes in *Saccharomyces cerevisiae*. Mol. Cell. Biol. 18: 2514-2523.
3. Jamison McDaniels, C.P., et al. 1999. The yeast transcription factor Mac1 binds to DNA in a modular fashion. J. Biol. Chem. 274: 26962-26967.
4. Serpe, M., et al. 1999. Structure-function analysis of the protein-binding domains of Mac1p, a copper-dependent transcriptional activator of copper uptake in *Saccharomyces cerevisiae*. J. Biol. Chem. 274: 29211-29219.
5. Pena, M.M., et al. 2000. Characterization of the *Saccharomyces cerevisiae* high affinity copper transporter CTR3. J. Biol. Chem. 275: 33244-33251.
6. Yonkovich, J., et al. 2002. Copper ion-sensing transcription factor Mac1p post-translationally controls the degradation of its target gene product CTR1p. J. Biol. Chem. 277: 23981-23984.
7. Ishida, S., et al. 2002. Uptake of the anticancer drug cisplatin mediated by the copper transporter CTR1 in yeast and mammals. Proc. Natl. Acad. Sci. USA 99: 14298-14302.

CHROMOSOMAL LOCATION

Genetic locus: SLC31A1 (human) mapping to 9q32.

PRODUCT

CTR1 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 CTR1 shRNA Plasmid (h): sc-105249-SH and CTR1 shRNA (h) Lentiviral Particles: sc-105249-V as alternate gene silencing products.

For independent verification of CTR1 (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-105249A, sc-105249B and sc-105249C.

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

CTR1 siRNA (h) is recommended for the inhibition of CTR1 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 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 CTR1 gene expression knockdown using RT-PCR Primer: CTR1 (h)-PR: sc-105249-PR (20 µl, 479 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

SELECT PRODUCT CITATIONS

1. Pan, H., et al. 2018. Theaflavin-3,3'-digallate enhances the inhibitory effect of cisplatin by regulating the copper transporter 1 and glutathione in human ovarian cancer cells. Int. J. Mol. Sci. 19: 117.
2. Wang, X., et al. 2023. Copper transporter CTR1 contributes to enhancement of the sensitivity of cisplatin in esophageal squamous cell carcinoma. Transl. Oncol. 29: 101626.

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.