SANTA CRUZ BIOTECHNOLOGY, INC.

# $Na^+/K^+$ ATPase β4 siRNA (m): sc-149790

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## BACKGROUND

The ubiquitously expressed sodium/potassium-ATPase ($Na^+/K^+$-ATPase) is an oligomeric plasma membrane complex that couples the hydrolysis of one molecule of ATP to the import of three $Na^+$ ions and two $K^+$ ions against their respective electrochemical gradients. As a member of the P-type family of ion motives, $Na^+/K^+$-ATPase plays a critical role in maintaining cellular volume, resting membrane potential and $Na^+$-coupled solute transport. Multiple isoforms of three subunits, designated α, β and γ, comprise the $Na^+/K^+$-ATPase oligomer. The α subunit contains the binding sites for ATP and the cations, while the glycosylated β subunit ensures correct folding and membrane insertion of the α subunits. The small γ subunit co-localizes with the α subunit in nephron segments, where it increases the affinity of $Na^+/K^+$-ATPase for ATP. The β subunit, but not the γ subunit, is essential for normal activity of $Na^+/K^+$-ATPase. $Na^+/K^+$ ATPase β4, also known as ATP1B4 or X,K-ATPase subunit β-m, is a 357 amino acid protein that is highly expressed in skeletal muscle and exists as two alternatively spliced isoforms.

## REFERENCES


1. Pedemonte, C.H. and Kaplan, J.H. 1990. Chemical modification as an approach to elucidation of sodium pump structure-function relations. Am. J. Physiol. 258: C1-C23.
2. Ackermann, U. and Geering, K. 1990. Mutual dependence of Na,K-ATPase α- and β-subunits for correct posttranslational processing and intracellular transport. FEBS Lett. 269: 105-108.
3. Pressley, T.A. 1996. Structure and function of the Na,K pump: ten years of molecular biology. Miner. Electrolyte Metab. 22: 264-271.
4. Stengelin, M.K. and Hoffman, J.F. 1997. Na,K-ATPase subunit isoforms in human reticulocytes: evidence from reverse transcription-PCR for the presence of α1, α3, β2, β3, and γ. Proc. Natl. Acad. Sci. USA 94: 5943-5948.
5. Avila, J., Alvarez de la Rosa, D., González-Martínez, L.M., Lecuona, E. and Martín-Vasallo, P. 1998. Structure and expression of the human Na,K-ATPase β2-subunit gene. Gene 208: 221-227.
6. Pestov, N.B., Adams, G., Shakhparonov, M.I. and Modyanov, N.N. 1999. Identification of a novel gene of the X,K-ATPase β-subunit family that is predominantly expressed in skeletal and heart muscles. FEBS Lett. 456: 243-248.
7. Zhao, H., Pestov, N.B., Korneenko, T.V., Shakhparonov, M.I. and Modyanov, N.N. 2004. Accumulation of β (m), a structural member of X,K-ATPase β-subunit family, in nuclear envelopes of perinatal myocytes. Am. J. Physiol., Cell Physiol. 286: C757-C767.
8. Kung, A.W., Lau, K.S., Cheung, W.M. and Chan, V. 2006. Thyrotoxic periodic paralysis and polymorphisms of sodium-potassium ATPase genes. Clin. Endocrinol. 64: 158-161.


## CHROMOSOMAL LOCATION

Genetic locus: Atp1b4 (mouse) mapping to X A3.3.

## RESEARCH USE

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

## PRODUCT

$Na^+/K^+$ ATPase β4 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 $Na^+/K^+$ ATPase β4 shRNA Plasmid (m): sc-149790-SH and $Na^+/K^+$ ATPase β4 shRNA (m) Lentiviral Particles: sc-149790-V as alternate gene silencing products.

For independent verification of $Na^+/K^+$ ATPase β4 (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-149790A, sc-149790B and sc-149790C.

## 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

$Na^+/K^+$ ATPase β4 siRNA (m) is recommended for the inhibition of $Na^+/K^+$ ATPase β4 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.

## RT-PCR REAGENTS

Semi-quantitative RT-PCR may be performed to monitor $Na^+/K^+$ ATPase β4 gene expression knockdown using RT-PCR Primer: $Na^+/K^+$ ATPase β4 (m)-PR: sc-149790-PR (20 µl). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

## SELECT PRODUCT CITATIONS


1. Xiao, Y., et al. 2017. Ouabain targets the $Na^+/K^+$-ATPase α3 isoform to inhibit cancer cell proliferation and induce apoptosis. Oncol. Lett. 14: 6678-6684.


## PROTOCOLS

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