SANTA CRUZ BIOTECHNOLOGY, INC.

DMP-1 siRNA (m): sc-72288

BACKGROUND

DMP-1 (dentin matrix protein-1), also known as dentin matrix acidic phosphoprotein-1, is a member of the small Integrin ligand N-linked glycoprotein family. It is important for the mineralization of bone and dentin. DMP-1 is expressed in bone, tooth and hypertrophic cartilage. It is synthesized by pre-osteoblasts and contains a large number of acidic domains. DMP-1 localizes to the nucleus of undifferentiated osteoblasts where it functions as a transcriptional regulator for osteoblast-specific gene activation and induces osteoblast differentiation. During osteoblast maturation, DMP-1 undergoes a conformational change and becomes phosphorylated by casein kinase II in response to an influx of calcium ions to the nucleus. DMP-1 is then exported to the extracellular matrix (ECM) where it regulates the nucleation of hydroxyapatite and the formation of calcified tissue. DMP-1 is proteolytically processed into N- and C-terminal fragments in the ECM of bone and dentin. The protein has also been identified in bone as a high molecular weight proteoglycan comprised of the N-terminal DMP-1 fragment and chondroitin sulfate. The loss of DMP-1 can result in hypomineralized bone.

REFERENCES

1. Srinivasan, R., Chen, B., Gorski, J.P. and George, A. 1999. Recombinant expression and characterization of dentin matrix protein 1. Connect. Tissue Res. 40: 251-258.
2. Narayanan, K., Ramachandran, A., Hao, J., He, G., Park, K.W., Cho, M. and George, A. 2003. Dual functional roles of dentin matrix protein 1. Implications in biomineralization and gene transcription by activation of intracellular Ca^{2+} store. J. Biol. Chem. 278: 17500-17508.
3. Chen, S., Inozentseva-Clayton, N., Dong, J., Gu, T.T. and MacDougall, M. 2004. Binding of two nuclear factors to a novel silencer element in human dentin matrix protein 1 (DMP-1) promoter regulates the cell type-specific DMP-1 gene expression. J. Cell. Biochem. 92: 332-349.
4. Karadag, A., Fedarko, N.S. and Fisher, L.W. 2005. Dentin matrix protein 1 enhances invasion potential of colon cancer cells by bridging matrix metalloproteinase-9 to integrins and CD44. Cancer Res. 65: 11545-11552.
5. Foster, B.L., Swanson, E.C., Matsa-Dunn, D., Berry, J.E., Cupp, C.J., Zhang, P. and Somerman, M.J. 2006. Regulation of cementoblast gene expression by inorganic phosphate *in vitro*. Calcif. Tissue Int. 78: 103-112.
6. Kim, J.W., Yamakoshi, Y., Iwata, T., Hu, Y.Y., Zhang, H., Hu, J.C. and Simmer, J.P. 2006. Porcine dentin matrix protein 1: gene structure, cDNA sequence, and expression in teeth. Eur. J. Oral Sci. 114: 33-41.

PRODUCT

DMP-1 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 DMP-1 shRNA Plasmid (m): sc-72288-SH and DMP-1 shRNA (m) Lentiviral Particles: sc-72288-V as alternate gene silencing products.

For independent verification of DMP-1 (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-72288A, sc-72288B and sc-72288C.

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

DMP-1 siRNA (m) is recommended for the inhibition of DMP-1 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 DMP-1 gene expression knockdown using RT-PCR Primer: DMP-1 (m)-PR: sc-72288-PR (20 µl, 599 bp). Annealing temperature for the primers should be 55-60° C and the extension temperature should be 68-72° C.

SELECT PRODUCT CITATIONS

1. Ozeki, N., Hase, N., Yamaguchi, H., Hiyama, T., Kawai, R., Kondo, A., Nakata, K and Mogi, M. 2015. Polyphosphate induces matrix metalloproteinase-3-mediated proliferation of odontoblast-like cells derived from induced pluripotent stem cells. Exp. Cell Res. 333: 303-315.
2. Saito, K., Nakatomi, M. and Ohshima, H. 2020. Dentin matrix protein 1 compensates for lack of osteopontin in regulating odontoblastlike cell differentiation after tooth injury in mice. J. Endod. 46: 89-96.

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.