TGF-β1 mRNA
(mRNA encoding human Transforming Growth Factor Beta 1)

Description

Ready-to-use stabilized TGF-β1 mRNA
Cap Modification: Cap 1 | **Poly (A) Tail:** Yes
Concentration: 1.0 mg/mL
Buffer: 1 mM Sodium Citrate, pH 6.4
Full length mRNA: 1391 nt
Molecular weights: #**MRNA89:** 449600 g/mol; #**MRNA90:** 455450 g/mol; #**MRNA91**: 452525 g/mol

TGF-β1 mRNAs have been designed to produce high expression level of TGFβ1 protein. OZB mRNAs are produced by *in vitro* transcription. mRNAs are stabilized at the 5' end by modified nucleotides capping (Cap1) and contain a poly(A) tail at the 3' end. Sequences have been optimized to yield improved stability and performance. TGF-β1 mRNA #**MRNA89** does not bear any additional nucleotide modifications while #**MRNA90** is modified with 5-methoxyuridine (5moU), #**MRNA91** is modified with N1-methyl-pseudouridine to reduce innate immune response.

Applications

This gene encodes a secreted ligand of the TGF-beta superfamily of proteins. TGFβ1, TGFβ2 and TGFβ3 have been identified in mammals and are each synthesized as precursor proteins that are very similar in that each is cleaved to yield a secreted 112 amino acid polypeptide that remains associated with the latent portion of the molecule. This mRNA encodes the full length protein (NCBI Ref Seq: NP_000651.3), a 390-amino-acid-long precursor polypeptide[1]. Signal transduction occurs upon interaction of the ligand with TGF-beta receptors (TGFBR1 and TGFBR2), leading to recruitment and activation of SMAD family of transcription factors that regulate gene expression. Apart from the SMAD-dependent pathway, TGF-β can also signal through SMAD-independent pathways (i.e. MAPK, JNK, NF-κB, PI3K..). These non-canonical TGF-β signaling pathways are involved in an extensive range of cellular events, greatly expanding the participation of TGF-β signaling in health and disease. Overall, TGFB1 regulates cell proliferation, differentiation and growth, and can modulate expression and activation of other growth factors including interferon gamma and tumor necrosis factor alpha. Dysfunctional TGF-β signaling can play key roles in numerous pathological processes, contributing to the disorders of developmental defects, aberrant healing, fibrotic diseases, inflammatory diseases, infectious diseases, as well as tumors[2]. Mutations in this gene result in Camurati-Engelmann disease[3].

1. Derynck R, *et al.*, Nature., 1985, Aug;316(6030):701-5.
2. Deng, Z *et al.*, Signal Transduct Target Ther., 2024, Mar 22;9(1):61.
3. Kinoshita A, *et al.*, Nat Genet., 2000, Sep;26(1):19-20.

General considerations on OZB's mRNA

TGF mRNAs resemble fully matured mRNAs with 5'cap1 structure and 3' polyA tail, therefore ready to be translated by the ribosome. mRNA transfection provides several advantages over plasmid DNA (pDNA) delivery. It does not require nuclear uptake for being expressed since translation of mRNA occurs directly into cytoplasm. Indeed, nuclear delivery (transport through nuclear membrane) is one the principal barriers for transfecting slow or non-dividing cells and consequently, mRNA transfection is particularly attractive for such purpose. This approach presents also the advantage of being non-integrative which is particularly appealing for stem cells, regenerative medicine or vaccine fields. Contrary to pDNA, mRNA cannot lead to genetic insertion causing mutations. Moreover, the protein expression from the mRNA is promoter-independent and faster than with DNA. For transfection we recommend RmesFect™ (#RM21000) and RmesFect™ Stem (#RS31000).

Quality Controls

Items	Specification	Standard QC	Superior Grade QC*
Integrity	Agarose gel mobility and HPLC	✓	✓
Concentration	1mg/ml +/- 5%	✓	✓
A260/280	>1.8 for Unmod, >1.7 for modified	✓	✓
Sterility	Absence of growth after 14 days	✓	✓
Endotoxin	<0.5 EU/mL		✓
dsRNA	<0.5%		✓

* our catalogue mRNA undergo the standard QC, Superior Grade QC can be performed as an additional prestation.

Certificate of analysis on demand.

Use, Handling and storage

For Research Use Only. Not for use in humans. Not for use in diagnostic or therapeutic purposes.

Long term storage (months): -80°C.

Short term storage (few days): -20°C.

We recommend to aliquot the mRNA solution for a better storage and to work on ice. Follow good laboratory practices for mRNA handling (avoid freeze/thaw cycles, do not vortex, use RNAse free water and barrier tips, …).

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mRNA Stability

RNA can suffer degradation when not handled, stored, or use properly. In order to assess how stable are OZ Biosciences mRNA, we have tested a randomly chosen RNA from our catalog, and submitted it to several freeze/thaw cycles as well as a 15 days storage at room temperature (RT). mRNA did not show any sign of degradation in both experiments (*cf* Stability note available on our website).

Kit contents

TGF-β1 mRNAs-20: 20 µg of mRNA.
TGF-β1 mRNAs-100: 100 µg mRNA.
TGF-β1 mRNAs-1000: 1 mg of mRNA.

Related Products

Ref	Description
#**RM20500/21000**	RmesFect™ transfection reagent (mRNA)
#**RS30500/31000**	RmesFect™ Stem transfection reagent (mRNA)
#**MRNA11/15/22**	mRNA GFP unmodified or 5moU or N1-mpU
#**MRNA12/16/24**	mRNA LUC unmodified or 5moU or N1-mpU
#**MRNA40/41/42**	mRNA OVA unmodified or 5moU or N1-mpU
#**MRNA95/96/97**	mRNA INF-α unmodified or 5moU or N1-mpU
#**MRNA98/99/100**	mRNA INF-γ unmodified or 5moU or N1-mpU
#**MRNA92/93/94**	mRNA TGF-α unmodified or 5moU or N1-mpU
#**MRNA101/102/103**	mRNA TNF-α unmodified or 5moU or N1-mpU

Custom mRNAs are also available now!