

Description

Ready-to-use stabilized TNF α 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: nt

Molecular weights: #MRNA101: 367440 g/mol; #MRNA102: 371670 g/mol; #MRNA103: 69555 g/mol

TNF mRNAs have been designed to produce high expression level of TNF 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. TNF mRNA #MRNA101 does not bear any additional nucleotide modifications while #MRNA102 is modified with 5-methoxyuridine (5moU), #MRNA103 is modified with N1-methyl-pseudouridine to reduce innate immune response.

Applications

This mRNA encodes a multifunctional proinflammatory cytokine that belongs to the tumor necrosis factor (TNF) superfamily. **TNF α is mainly secreted by macrophages** and can induce cell death of certain tumor cell lines. It can bind to, and thus functions through its receptors TNFRSF1A/TNFR1 and TNFRSF1B/TNFR2. This cytokine is involved in the regulation of a wide spectrum of biological processes including cell proliferation, differentiation, neuroprotection apoptosis, lipid metabolism, and coagulation¹. It is potent pyrogen causing fever by direct action or by stimulation of interleukin-1 secretion and is implicated in the induction of cachexia². Plays a role in angiogenesis by inducing VEGF production synergistically with IL1B and IL6. TNF α has been implicated in a variety of diseases, including autoimmune diseases, insulin resistance, psoriasis, rheumatoid arthritis ankylosing spondylitis, tuberculosis, autosomal dominant polycystic kidney disease, and cancer. Mutations in this gene affect susceptibility to cerebral malaria, septic shock, and Alzheimer disease³.

1. Chadwick W, *et al.*, Trends Neurosci., 2008, Oct;31(10):504-11.
2. Stefferl A, *et al.*, Br J Pharmacol., 1996, Aug;118(8):1919-24.
3. Di J, *et al.*, Int J Mol Sci., 2021, Mar 8;22(5):2719.

General considerations on OZB's mRNA

TNF 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 of 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 fragment analyzer	✓	✓
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, ...).

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

TNF- α mRNAs-20: 20 μ g of mRNA.

TNF- α mRNAs-100: 100 μ g mRNA.

TNF- α 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
#MRNA89/90/91	mRNA TGF- β unmodified or 5moU or N1-mpU

Custom mRNAs are also available now!