IFN-γ mRNA
(mRNA encoding human Interferon gamma (IFNG))

Description

Ready-to-use stabilized IFNγ 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: 719 nt
Molecular weights: #**MRNA98:** 233500 g/mol; #**MRNA99:** 236410 g/mol; #**MRNA100**: 234955 g/mol

IFN-γ mRNAs have been designed to produce high expression level of IFN 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. IFN-γ mRNA #**MRNA98** does not bear any additional nucleotide modifications while #**MRNA99** is modified with 5-methoxyuridine (5moU), #**MRNA100** is modified with N1-methyl-pseudouridine to reduce innate immune response.

Applications

The encoded cytokine is a is a dimerized soluble cytokine, only member of the type II interferon family. IFN-γ is produced by immune cells such as T-cells and NK cells that plays crucial roles in antimicrobial, antiviral, and antitumor responses by activating effector immune cells and enhancing antigen presentation[1]. IFNG signals through binding to its heterodimeric receptor consisting of Interferon gamma receptor 1 (IFNGR1) and Interferon gamma receptor 2 (IFNGR2).
IFN-γ binding to the receptor activates the JAK-STAT pathway and leads to the upregulation of interferon-stimulated genes (ISGs)[2].
IFN-γ plays a role in class I antigen presentation pathway and up-regulates the MHC II complexes on the cell surface by promoting expression of several key molecules such as cathepsins B/CTSB, H/CTSH, and L/CTSL[3]. This cytokine also participates in the regulation of hematopoietic stem cells during development and under homeostatic conditions by affecting their development, quiescence, and differentiation. In clinic, while IFN-γ is approved by the U.S FDA in treatment of chronic granulomatous disease and severe malignant osteopetrosis, its potential use in cancer remains debated[5].

1. Han J *et al.*, Front Immunol., 2023, May 18:14:1190333.
2. Greenlund AC, *et al.*, J Biol Chem. 1993, Aug 25;268(24):18103-10.
3. Lah TT, *et al.*, FEBS Lett. 1995, Apr 17;363(1-2):85-9.
4. Hadjadj J *et al.*, Science., 2020 Aug 7;369(6504):718-724.
5. Singh S, *et al.*, Cancer Res., 2023, Jul 5;83(13):2093-2095.

General considerations on OZB's mRNA

IFN 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 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, …).

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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

IFN-γ mRNAs-20: 20 µg of mRNA.
IFN-γ mRNAs-100: 100 µg mRNA.
IFN-γ 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
#MRNA92/93/94	mRNA TGF-α unmodified or 5moU or N1-mpU
#MRNA89/90/91	mRNA TGF-β unmodified or 5moU or N1-mpU
#MRNA101/102/103	mRNA TNF-α unmodified or 5moU or N1-mpU

Custom mRNAs are also available now!