Stock Name: Novoprotein
Stock Code: 688137

Facilitate the Development and Industrialization of RNA Vaccines/Drugs

Total Solution for RNA Vaccines/Drugs Research and Development

Novoprotein Scientific Inc.

Distributed by:
CliniSciences Group

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GMP Grade animal-free, ampicillin-free

Dedicated & Professional

Novoprotein Scientific Inc. (Novoprotein) is a high-tech enterprise with more than 10 years of extensive experience in the recombinant protein industry, focusing on protein technology, and advanced in R&D, production, sales, and application solutions to raw materials and techniques for biopharmaceuticals, in vitro diagnosis, mRNA vaccines, and basic life science research. Our principal products include target proteins and cytokines, recombinant antibodies, molecular enzymes and reagents, as well as providing related technical services. Novoprotein possesses R&D and manufacturing bases in Shanghai, Suzhou, and Heze.

novoprotein
近岸蛋白

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Animal-Free Statement

STATEMENT

We hereby certify that our GMP series products are expressed in medium with clear chemical composition, no animal-derived and human-derived ingredients, and purified by multi-step chromatography. In the process of expression, purification and preparation of the product, no reagents containing animal-derived and human-derived ingredients. The final product is free of ampicillin, GMO, residual solvents, metal catalysts, melamine, and elemental impurities. The packing materials used in the product do not involve rubber plugs.

We do not use animal materials from or in contact with affected or quarantined animals spreading spongiform encephalopathy/bovine spongiform disease. No animals or animal products are used in our production facilities, and there is no contact with any animal pathogens.

Novoprotein Scientific (Heze) Inc.

May 22, 2023

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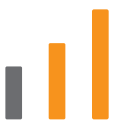
GMP Grade animal-free, ampicillin-free

Total Solution for RNA Vaccines/Drugs Research and Development

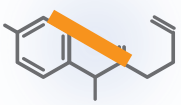
GMP Grade
Raw Material Production



5 Billion Doses
Production Capacity

Total Solution for
Raw Materials/Services

Animal-free

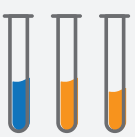


Ampicillin-free

Core Supplier of Raw Materials for mRNA Vaccines and Drugs in China

Nearly 10,000 m² Clean Workshop

Compliant with Pharmacopoeia



Comprehensive QC Testing

ISO

FDA DMF Filed

Halal Certification

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Products List

mRNA Preparation

Application	Cat. No.	Product Name
Plasmid Linearization	GMP-RE057	BspQI, GMP Grade
	GMP-EB057	10×BspQI Reaction Buffer, GMP Grade
	GMP-RE026	BsaI, GMP Grade
	GMP-RE036	BsaI (*E. coli*), GMP Grade
	GMP-EB026	10×BsaI Reaction Buffer , GMP Grade
	GMP-RE015	XbaI, GMP Grade
	GMP-EB015	10×XbaI Reaction Reaction Buffer, GMP Grade
In Vtro Transcription	GMP-E121-H200	T7 RNA Polymerase, GMP Grade
	GMP-E122-H200	T7 RNA Polymerase 2.0, GMP Grade
	GMP-E125	RNase Inhibitor, GMP Grade
	GMP-M036	Pyrophosphatase, Inorganic（yeast）, GMP Grade
	GMP-E131	T7 RNA Transcription Enzyme Mix, GMP Grade
	GMP-S023A-S026A	NTP, GMP Grade（100mM）
	GMP-S033D-S036D	NTPs (200mM Tris Solution), GMP Grade
dsDNA Template Digestion	GMP-E127	DNase I, GMP Grade
mRNA Capping	GMP-M062	Vaccinia Capping Enzyme, GMP Grade
	GMP-M072	mRNA Cap 2´-O-Methyltransferase, GMP Grade
	GMP-EB62	10×Capping Reaction Buffer, GMP Grade
	GMP-S062	SAM (32mM), GMP Grade
	GMP-S024N	GTP, GMP Grade（10mM）
mRNA Tailing	GMP-M012	*E. coli* Poly(A) Polymerase, GMP Grade
	GMP-EB12	10×Poly(A) Polymerase Buffer, GMP Grade
	GMP-S023N	ATP, GMP Grade（10mM）

circRNA Preparation

Application	Cat. No.	Product Name
circRNA Preparation and Purification	M048	T4 RNA Ligase 1
	GMP-M050	T4 RNA Ligase 2, GMP Grade
	GMP-E224	RNase R, GMP Grade
	GMP-EB224	10×RNase R Buffer, GMP Grade

RNA Purification

Application	Cat. No.	Product Name
RNA Purification	N243	RNA Clean Beads
	S125	Lithium Chloride Precipitation Solution

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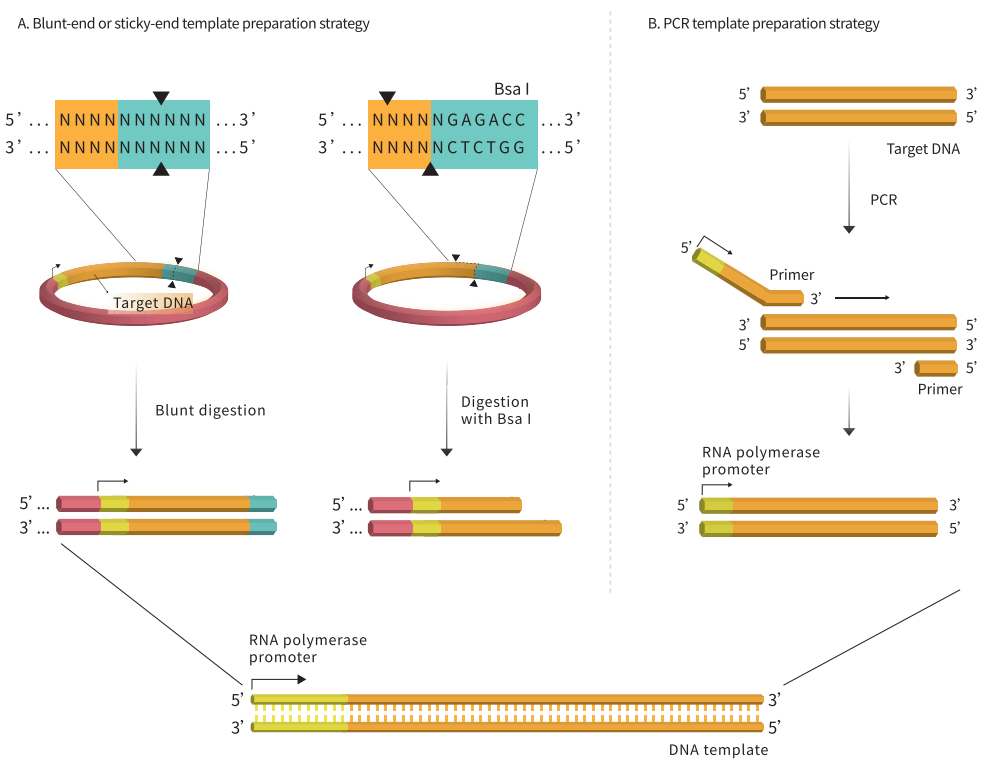
Preparation of Linear Template DNA

Linearized plasmids with double-stranded promoters, PCR products or synthetic DNA fragments can be used as templates for *in vitro* transcription. The quality of the template not only affects the efficiency of *in vitro* transcription, but also determines the integrity of the synthesized RNA. The yield of the synthesis depends largely on the purity of the template. The template can be dissolved in TE buffer or RNase-free water after purification.



A. Plasmids with T7 promoter can be used as transcription templates. The linearization and purity of plasmids will affect the yield of transcription and the integrity of RNA. Since circular plasmids do not have effective termination, RNA products of different lengths will be transcribed. In order to obtain RNA of a specific length, the plasmid must be completely linearized. For linearized plasmids, please ensure that the double-strand is blunt-ended or the 5'-end of the coding strand is overhanging structure. Using a type IIS restriction endonuclease (eg. BsaI), the synthesized RNA does not contain restriction site sequences.

B. PCR products with T7 promoter can be used as templates for *in vitro* transcription. The T7 promoter was added to the 5'-end of the upstream primer of the sense strand when PCR amplifying the template. The PCR product was purified and used as a template. High-fidelity polymerase amplification is required to ensure the correctness of the template sequence.

Recommended Products

GMP Grade animal-free, ampicillin-free

BsaI

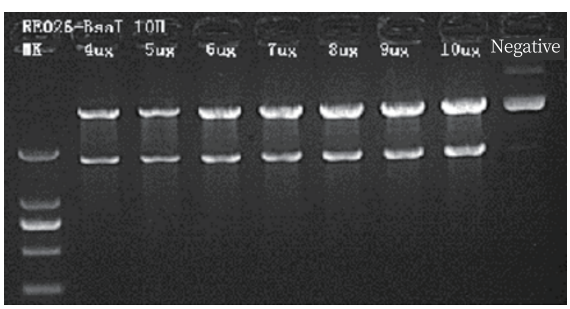
Recognition site

5'...GGTCTC(N)$_1$ ↓ ...3'
3'...CCAGAG(N)$_5$ ↑ ...5'

Quality control standards

- Purity: ⩾95%
- Heavy Metals: ⩽ 10 ppm
- Bacterial Endotoxins: < 1EU/ml
- Microbial Limit⩽ 1cfu/10ml
- No RNase residue

Product features



MK: DNA Marker;
Lane 2-8: In the double enzyme digestion system, increase the amount of plasmid to 10μg under the same amount of BsaI enzyme.
The results showed that complete enzyme digestion could be achieved, which proved that the enzyme activity was high, and the reaction substrate could be flexibly adjusted according to the type of plasmid.

Product information

Cat. No.	Product Name
GMP-RE026	BsaI, GMP Grade
GMP-RE036	BsaI (*E.Coli*), GMP Grade
GMP-RE057	BspQI, GMP Grade
GMP-RE015	XbaI, GMP Grade

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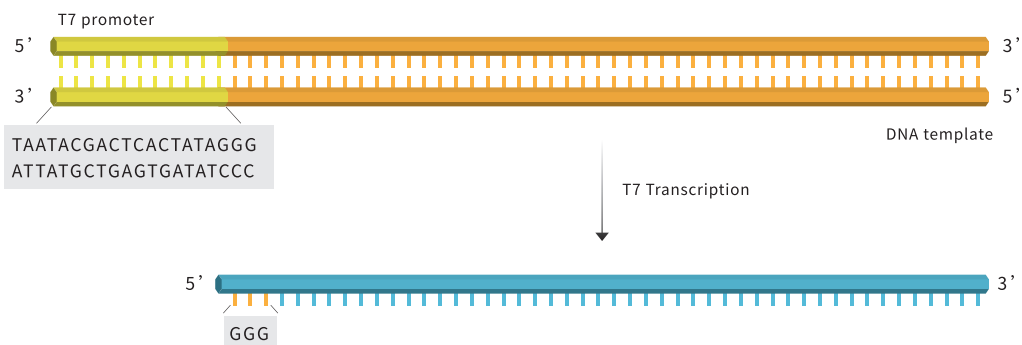
In vitro Transcription (IVT)

As a biological macromolecule, mRNA can be synthesized on a large scale by *in vitro* transcription (IVT). T7 promoter is one of the promoters with the highest transcription efficiency. *In vitro* transcription (IVT) yields more synthetic products.

Novoprotein provides GMP grade T7 RNA Polymerase and a complete kit with careful formulation and optimization. The kit contains T7 RNA Polymerase, RNase Inhibitor, Pyrophosphatase, Inorganic and DNase I. The first three components are optimized and formulated into an enzyme mix, it has the advantages of high yield, convenient operation, and reduced pollution caused by sample addition, and can be used to stably synthesize high-quality RNA.



In the template, the T7 promoter is linked to the target sequence, transcription starts from the first G after the promoter, and the sequence of the transcription product is the same as a chain in the template.

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Recommended Products

Chinese invention grant: ZL 2021 1 0044261.3

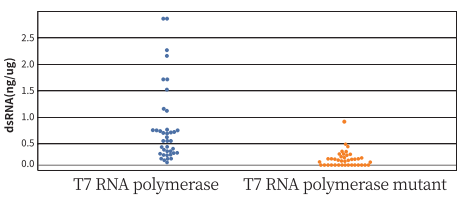
T7 RNA Polymerase 2.0

Quality control standards

- Purity: ⩾ 95%
- Heavy Metals: ⩽ 10 ppm
- Bacterial Endotoxins: < 5EU/ml
- Host-cell Protein Residues: ⩽ 50 ppm
- Exogenous DNA residue: ⩽ 100 pg/mg
- No RNase and endonuclease/ exonuclease residues

Product features

T7 RNA polymerase mutant reduces dsRNA content significantly

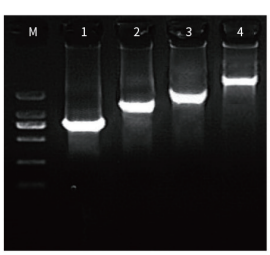


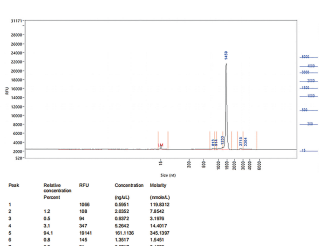
Novoprotein's patented product "T7 polymerase mutant" has been verified by hundreds of templates, and the dsRNA content is lower than 0.1ng/ul on most templates, and can be lower than 0.01ng/ul for RNA synthesized with modified nucleotides.

	Yield (μg)	Capping efficiency	Integrity	dsRNA content (ng/μg)
eGFP	220	98.56%	94.1%	0.015
Luciferase	183	99.97%	92.1%	0.060

Large fragments have high yield and integrity

	Fragment	Yield (μg)	Integrity	dsRNA content (ng/μg)
1	1000nt	214	94.1%	0.015
2	2000nt	222	92.1%	0.060
3	8000nt	237	85.5%	0.202
4	9000nt	204	84.3%	0.365





Product information

Cat. No.	Product Name
GMP-E122-H200	T7 RNA Polymerase 2.0, GMP Grade
GMP-E121-H200	T7 RNA Polymerase, GMP Grade
GMP-E131	T7 RNA Transcription Enzyme Mix, GMP Grade

Recommended Products

GMP Grade animal-free, ampicillin-free

RNase Inhibitor

The murine RNase Inhibitor can specifically inhibit the activity of RNase A, B and C, and can form a 1:1 complex with RNase, thereby inhibiting its activity. In the large-scale production of mRNA, RNase Inhibitors play a very important protective role.

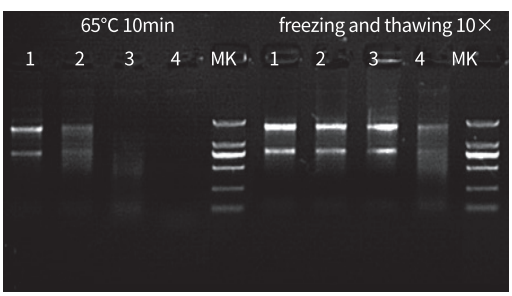
This product is a recombinant murine RNase Inhibitor with a molecular weight of about 50kD. It is expressed in *Escherichia coli* on a large scale and conforms to GMP production and quality management standards. All raw and auxiliary materials can be traced.

Quality control standards

- Purity: ⩾ 95%
- Heavy Metals: ⩽ 10 ppm
- Bacterial Endotoxins: < 5EU/ml
- Host-cell Protein Residues: ⩽ 50 ppm
- Exogenous DNA residue: ⩽ 100 pg/mg
- No RNase and endonuclease/exonuclease residues

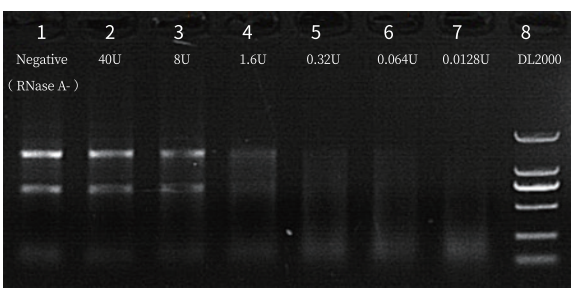
Product features

Freeze-thaw stability: after repeated freezing and thawing for 10 times, the enzyme activity wasn't affected



At 65 ℃ for 10min, more than half of the enzyme activity can be retained at 40U, and the enzyme activity is basically unaffected by freeze-thaw for 10 times.
Lane 1: 40U enzyme activity was not treated Lane 2: 40U
Lane 3: 8U Lane 4: 1.6U

High enzyme activity: after high dilution, it still has high enzyme activity



1μl of RNase Inhibitor was added to each system after 1/5 gradient dilution of RNase Inhibitor from 40U/μl. Finally, 1μl of 5pg RNase A was added to each system.

Product information

Cat. No.	Product Name
GMP-E125	RNase Inhibitor, GMP Grade

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Recommended Products

GMP Grade animal-free, ampicillin-free

Pyrophosphatase, Inorganic (yeast)

In the process of *in vitro* transcription of mRNA in large systems, inorganic pyrophosphates will inevitably be produced. These substances have a great inhibitory effect on transcription. Inorganic pyrophosphatase (PPase) can hydrolyze the inorganic pyrophosphates generated in *In Vitro* Transcription (IVT), promotes the reaction equilibrium to shift to the product forming end and increases the amount of products.

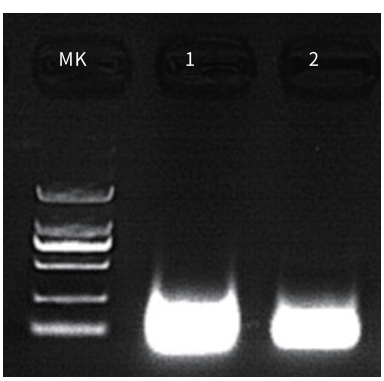
This product is a large-scale recombinant inorganic pyrophosphatase expressed in *Escherichia coli*, with a molecular weight of about 63kD. It conforms to GMP production and quality management standards, and all raw and auxiliary materials can be traced.

Quality control standards

- Purity: ⩾95%
- Heavy Metals: ⩽ 10 ppm
- Bacterial Endotoxins: < 5EU/ml
- Host-cell Protein Residues: ⩽ 50 ppm
- Exogenous DNA residue: ⩽ 100 pg/mg
- No RNase and endonuclease/exonuclease residues

Product features

Strong versatility: suitable for DNA, RNA and protein synthesis systems



1	Pyrophosphatase, Inorganic was added
2	RNase-free water was added

Inorganic pyrophosphatase significantly increases RNA transcript yield.

Product information

Cat. No.	Product Name
GMP-M036	Pyrophosphatase, Inorganic (yeast), GMP Grade

Recommended Products

GMP Grade animal-free, ampicillin-free

NTPs

Nucleoside triphosphates (NTPs) can be used in a variety of related applications in molecular biology. The products have no endonuclease, exonuclease and ribonuclease contamination.

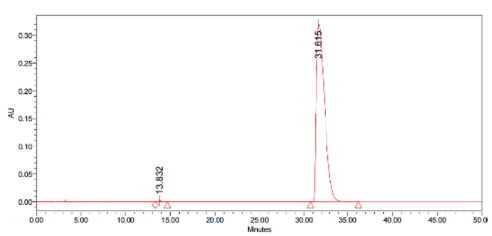
This product is produced with raw and auxiliary materials of pharmaceutical specifications, and all kinds of pollution in the production process are strictly controlled. Product production and quality management procedures in line with GMP standards ensure the traceability of the production process and all raw and auxiliary materials.

Quality control standards

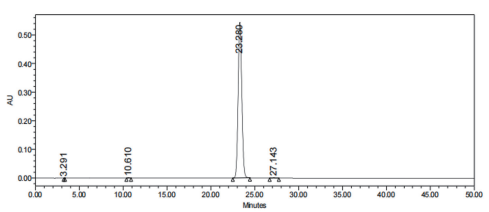
- Concentration: 100mM±5mM
- No RNase and endonuclease/exonuclease residues

Product features

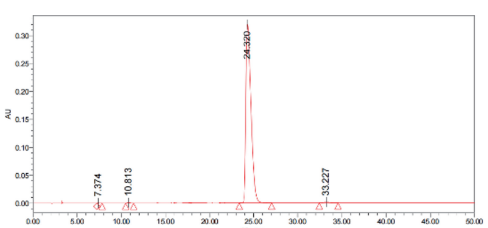
ATP purity: 99.8%



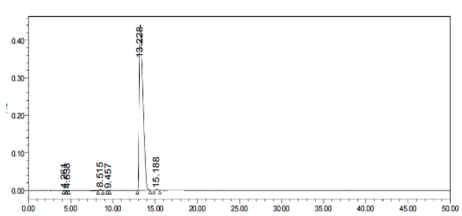
GTP purity: 99.7%



UTP purity: 99.4%



CTP purity: 99.5%



Product information

Cat. No.	Product Name
GMP-S023A	ATP, GMP Grade （100mM）
GMP-S024A	GTP, GMP Grade （100mM）
GMP-S025A	CTP, GMP Grade （100mM）
GMP-S026A	UTP, GMP Grade （100mM）

Cat. No.	Product Name
GMP-S033D	ATP (200mM Tris Solution), GMP Grade
GMP-S034D	GTP (200mM Tris Solution), GMP Grade
GMP-S035D	CTP (200mM Tris Solution), GMP Grade
GMP-S036D	UTP (200mM Tris Solution), GMP Grade

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Recommended Products

GMP Grade animal-free, ampicillin-free

DNase I

In the process of large-scale mRNA production, the transcription template needs to be removed after transcription. DNase I can randomly decompose single-stranded or double-stranded DNA to the same degree to generate oligonucleotides with 5'-P terminal. Under the condition of Mg^{2+}, DNase I can cut the double-stranded DNA at will.

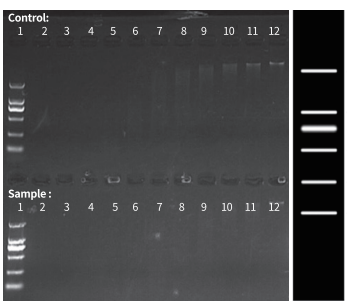
This product is a recombinant DNase I expressed by *Pichia pastoris* on a large scale, with a molecular weight of about 39kD, in line with GMP production and quality management standards, and all raw and auxiliary materials can be traced.

Quality control standards

- Purity: ⩾95%
- Heavy Metals: ⩽ 10 ppm
- Bacterial Endotoxins: <5EU/ml
- Host-cell Protein Residues: ⩽ 50 ppm
- Exogenous DNA residue: ⩽ 100 pg/mg
- No RNase residue

Product features

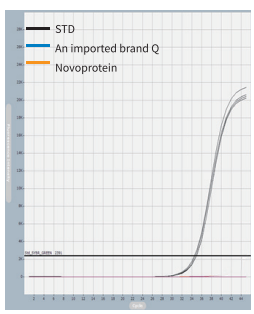
High enzyme activity: the human genome can be digested by trace amounts



1	DNA Ladder 2000
2	0.02U
3	0.01U
4	0.005U
5	0.0025U
6	0.00125U
7	0.000625U
8	0.0003125U
9	0.00015625U
10	0.000078125U
11	0.0000390625U
12	0U

Data conclusion: The sample is consistent with the control

Excellent performance: efficient removal of DNA residue in samples



Well	Sample	Ct
1	STD	34.51
2	STD	34.65
3	STD	34.92
4	STD	34.94
5	An imported brand Q	UD
6	An imported brand Q	UD
7	An imported brand Q	UD
8	An imported brand Q	UD
9	Novoprotein	UD
10	Novoprotein	UD
11	Novoprotein	UD
12	Novoprotein	UD

Sample: Mouse kidney (~20 mg) compared with an imported brand Q, both can remove DNA residue in RNA samples very well.

Product information

Cat. No.	Product Name
GMP-E127	DNase I, GMP Grade

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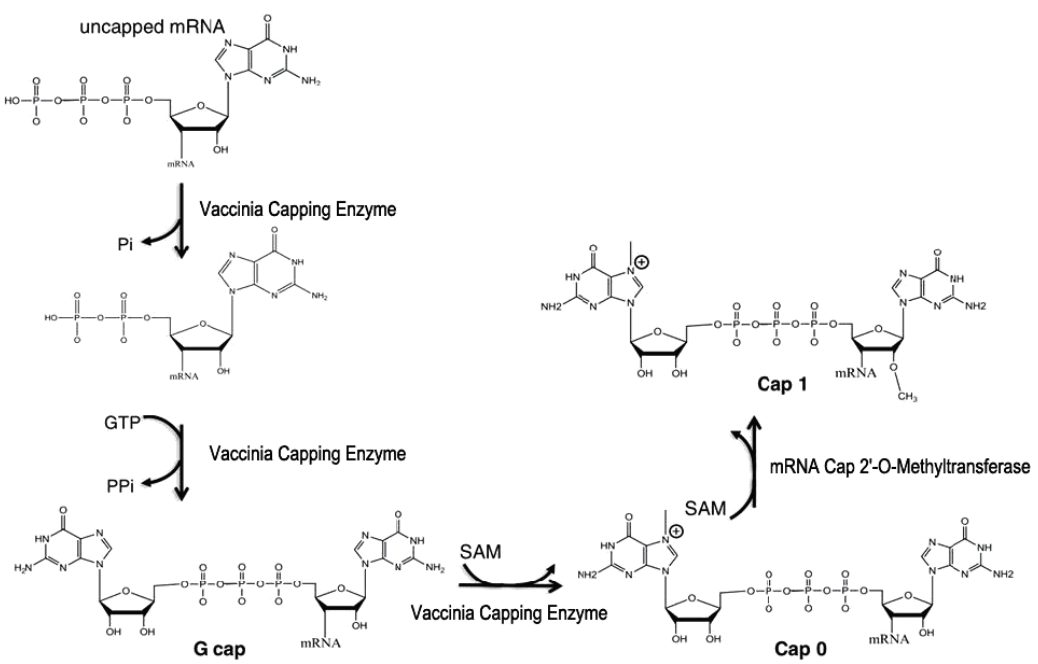
mRNA Capping

The RNA obtained by *in vitro* transcription has not been modified in cells, does not have the Cap structure and the PolyA tail, is easily degraded, easily activates the immune response, cannot bind to the ribosomal initiation protein, and cannot initiate protein translation. Therefore, in industrial mRNA production, Vaccinia Capping Enzyme needs to be used to cap the IVT RNA, so that the 5'-end of the RNA can obtain the Cap0 structure, and further use 2'-O-methyltransferase to convert Cap0 to Cap1. The Cap1 structure is known to be the least recognized structure by the body's RNA recognizer RIG-I, and is less naturally immunogenic. The cap structure introduced by enzymatic capping is completely consistent with the natural cap structure in eukaryotes, which fundamentally reduces the immunogenicity of exogenous mRNA, protects it from degradation, improves translation efficiency, and increases intracellular protein production. Capping efficiencies of up to 100% can be achieved by enzymatic capping, while capping by chemically synthesized cap analog structures is relatively inefficient, and the cap analog structures differ from natural cap structures.



Enzymatic pathways of mRNA capping. The production of Cap0 structural RNA requires the vaccinia capping enzyme: this enzyme combines the functions of a triphosphatase, a guanosine transferase, and a guanine methyltransferase. S-adenosylmethionine (SAM) is the methyl donor. Once the Cap0 structure is generated, it can be further modified by 2'-O-ribose methyltransferase to generate the Cap1 structure. This figure is quoted from Michael Beverly, Amy Dell, Parul Parmar, Leslie Houghton et al (2016). Label-free analysis of mRNA capping efficiency using RNase H probes and LC-MS. Anal Bioanal Chem.

Recommended Products

GMP Grade animal-free, ampicillin-free

Vaccinia Capping Enzyme

Quality control standards

- Purity: ⩾95%
- Heavy Metals: ⩽ 10 ppm
- Bacterial Endotoxins: ＜5EU/ml
- Host-cell Protein Residues: ⩽ 50 ppm
- Exogenous DNA residue: ⩽ 100 pg/mg
- No RNase and endonuclease/ exonuclease residues

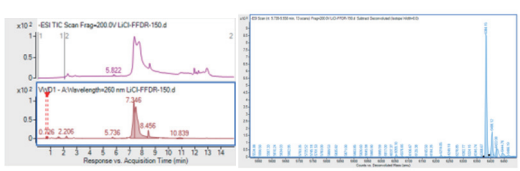
mRNA Cap 2'-O-Methyltransferase

Quality control standards

- Purity: ⩾95%
- Heavy Metals: ⩽ 10 ppm
- Bacterial Endotoxins: ＜5EU/ml
- Host-cell Protein Residues: ⩽ 50 ppm
- Exogenous DNA residue: ⩽ 100 pg/mg
- No RNase and endonuclease/ exonuclease residues

Product features

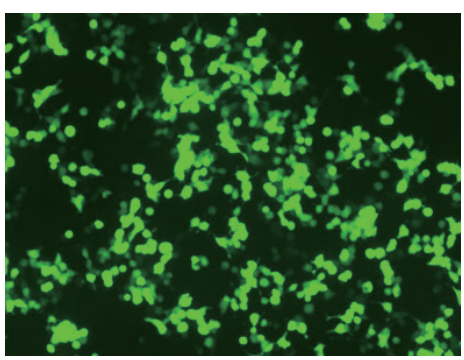
Capping efficiency ⩾95%



5' end cleavage product	AVr Mass	%Quant(Area)
5'-monophosphate RNA	5601.37	0.02
5'-diphosphate RNA	5681.35	0.00
5'-triphosphate RNA	5761.33	0.27
5'-Cap 1 RNA	6383.81	99.71

The capping efficiency is 99.71%.

Capped mRNA expressed successfully



The capped eGFP mRNA was successfully expressed in cells.

Product information

Cat. No.	Product Name
GMP-M062	Vaccinia Capping Enzyme, GMP Grade
GMP-M072	mRNA Cap 2'-O-Methyltransferase, GMP Grade
GMP-EB62	10×Capping Reaction Buffer, GMP Grade
GMP-S062	SAM, GMP Grade
GMP-S024N	GTP, GMP Grade (10mM)

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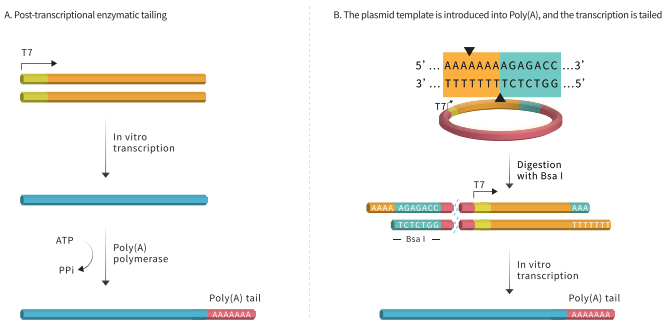
mRNA Tailing

In the complete structure of mRNA, the Poly(A) tail is an important part, which has the effect of improving the stability and translation efficiency of mRNA. There are two main ways of adding tails to synthesize mRNA *in vitro*:

Enzymatic tailing;

A sequence encoding PolyA was introduced on the template.



The tailing is completed by the above methods: (A) post-transcriptional enzymatic tailing; (B) the template is linearized with BsaI and then transcribed.

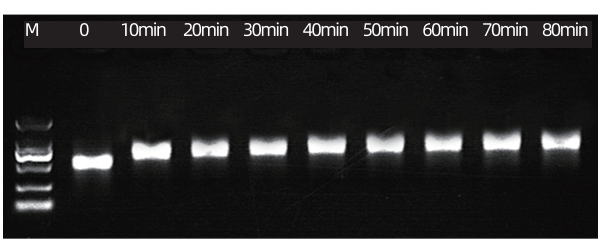
E. coli Poly(A) Polymerase

Quality control standards

- Purity: ⩾95%
- Heavy Metals: ⩽ 10 ppm
- Bacterial Endotoxins: < 5EU/ml
- Host-cell Protein Residues: ⩽ 50 ppm
- No RNase and endonuclease/ exonuclease residues

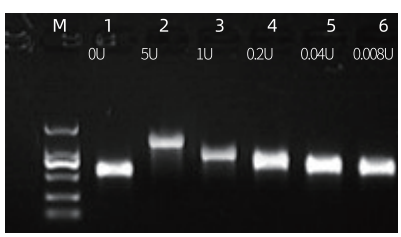
Product features

Fast and efficient: the Poly (A) tail was added in 10min



Taking RNA as the template, adding 5U enzyme amount and completing the addition of 200 A bases in 10min.

High enzyme activity



A small amount of Poly(A) Polymerase was added to the reaction system to efficiently add the Poly (A) tail.

Product information

Cat. No.	Product Name
GMP-M012	*E. coli* Poly(A) Polymerase, GMP Grade
GMP-EB12	10×Poly(A) Polymerase Buffer
GMP-S023N	ATP, GMP Grade (10mM)

Circular RNA Product Solutions

Application	Cat. No.	Product Name
Plasmid Linearization	GMP-RE057	BspQI, GMP Grade
	GMP-EB057	10×BspQI Reaction Buffer, GMP Grade
	GMP-RE026	BsaI, GMP Grade
	GMP-RE036	BsaI (*E. coli*), GMP Grade
	GMP-EB026	10×BsaI Reaction Buffer , GMP Grade
	GMP-RE015	XbaI, GMP Grade
	GMP-EB015	10×XbaI Reaction Reaction Buffer, GMP Grade
In Vtro Transcription	GMP-E121-H200	T7 RNA Polymerase, GMP Grade
	GMP-E122-H200	T7 RNA Polymerase 2.0, GMP Grade
	GMP-E125	RNase Inhibitor, GMP Grade
	GMP-M036	Pyrophosphatase, Inorganic（yeast）, GMP Grade
	GMP-E131	T7 RNA Transcription Enzyme Mix, GMP Grade
	GMP-S023A-S026A	NTP, GMP Grade（100mM）
	GMP-S033D-S036D	NTPs (200mM Tris Solution), GMP Grade
dsDNA Template Digestion	GMP-E127	DNase I, GMP Grade

Application	Cat. No.	Product Name
circRNA Preparation and Purification	M048	T4 RNA Ligase 1
	GMP-M050	T4 RNA Ligase 2, GMP Grade
	GMP-E224	RNase R, GMP Grade
	GMP-EB224	10×RNase R Buffer, GMP Grade

Application	Cat. No.	Product Name
RNA Purification	N243	RNA Clean Beads
	S125	Lithium Chloride Precipitation Solution

Recommended Products

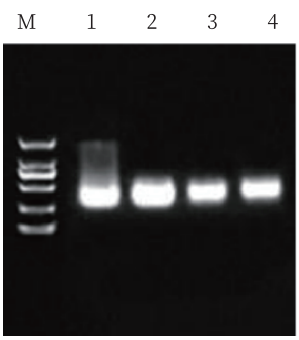
GMP Grade animal-free, ampicillin-free

RNase R

Ribonuclease R (RNase R), from the RNR superfamily of E.coli, is a Mg^{2+}-dependent 3'-5' exonuclease. RNA can be cleaved into dinucleotide and trinucleotide gradually from the 3'-5' direction by RNase R. RNase R can digest most of the linear RNA. However, it is difficult to digest circular RNA, lariat RNA and short double-stranded RNA molecules with less than 7 nucleotides of 3' end protrusion.

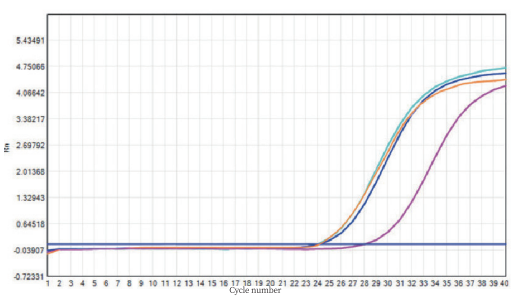
Application Example

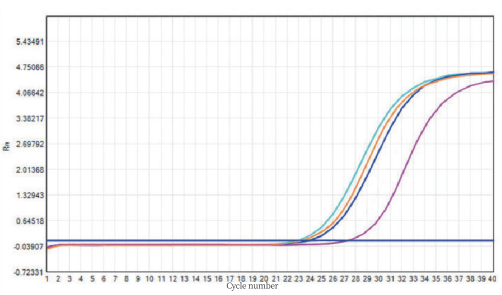
circRNA Purification



M: DNA Ladder
Lane 1: Negative control
Lane 2: 0.5U RNase R was incubated with 1μg circRNA
Lane 3: 1U RNase R was incubated with 1μg circRNA
Lane 4: 2U RNase R was incubated with 1μg circRNA

Purification of circRNA using RNase R shows that linear RNA is digested and the increase of enzyme amount has no effect on circRNA.





qRT-PCR was used to detect the changes in gene abundance of has_circVapa and has_circKIF12a in the total RNA digested by RNase R. The results showed that, consistent with the negative group (orange), there was no change in the abundance of the two genes, while in the samples digested by RNase A (pink), the gene abundance decreased significantly, indicating that circRNA tolerated the digestion of RNase R.

Product information

Cat. No.	Product Name
GMP-E224	RNase R, GMP Grade
GMP-EB224	10×RNase R Buffer, GMP Grade

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mRNA Enzymes DIBA Kit

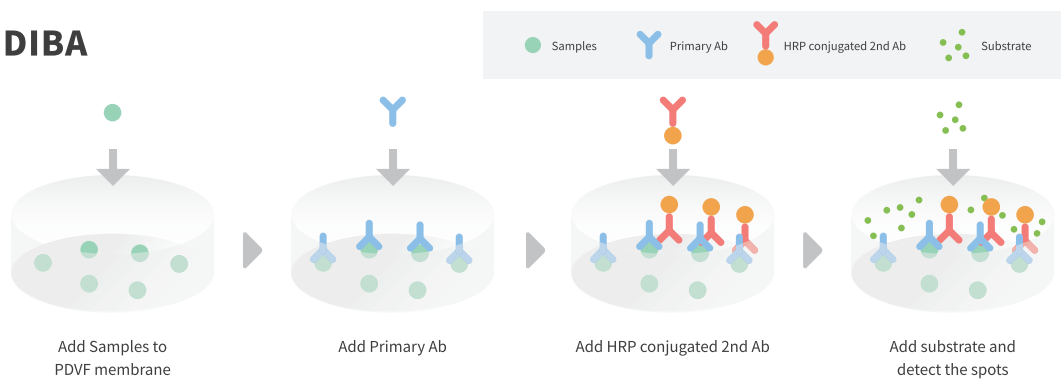
According to the Technical Guidelines for Pharmaceutical Research of mRNA Vaccines for SARS-CoV-2 Prevention (Trial) in 2020 , the raw materials for mRNA vaccine production should comply with the relevant provisions of the current version of the Pharmacopoeia of the People's Republic of China and/or be consistent with international requirements. For production raw materials (such as T7 RNA Polymerase, pyrophosphatase, RNase inhibitors, etc.) prepared by recombinant technology or biological/chemical synthesis technology, corresponding production process and quality research data should be provided. Therefore, identification testing of raw materials is required to confirm whether the raw materials stored in the labelled containers are the raw materials as indicated. Various enzymes (such as T7 RNA Polymerase, inorganic pyrophosphatase, RNase inhibitors, vaccinia capping enzymes, mRNA Cap 2'-O-methyltransferases) are used in the *in vitro* transcription and modification of mRNA, as a protein substance, the enzymes can be identified by the Dot Immunobinding Assay (DIBA, 2020 edition of the Chinese Pharmacopoeia, Part IV, General Principles 3402).

The mRNases DIBA Kit uses polyvinylidene fluoride (PVDF) as the solid phase, and carries out antigen-antibody reaction by immunospot method to carry out the identification test of various raw materials.

Product features

- Strong specificity
- Good robustness

Reaction principle



Product information

Cat. No.	Product Name
PA007	mRNA Enzymes DIBA Kit

Quality Control Solution of mRNA Substance

According to the 2020 Technical Guidelines for Pharmaceutical Research of mRNA Vaccine for Coronavirus Prevention (Trial) and the Analytical Procedures for mRNA Vaccine Quality-Draft Guidelines-2nd Edition of US Pharmacopoeia, mRNA vaccines need to be detected for process control, such as capping efficiency, length of Poly(A) tailing product, mRNA sequence integrity, sequence accuracy, purity, mRNA concentration, concentration of by-products (incomplete mRNA, double-stranded RNA, truncated RNA, long-stranded RNA, etc.), residual protein, residual DNA, sterility, Bacterial Endotoxin, etc.

mRNA Substance Quality Control

Application	Cat. No.	Product Name
mRNA Capping Detection	CD001	mRNA Capping Detection Sample Preparation Kit (Beads)
	CD002	mRNA Capping Detection FlashPrep Kit
	E124	RNase H
	E134	Thermostable RNase H
mRNA Tailing Detection	E151	RNase T1
	E242	NovoNGS® mRNA Magnetic Isolation Kit
mRNA Enzyme Residue Detection	PA101	Pyrophosphatase, Inorganic ELISA Kit
	PA102	T7 RNA Polymerase ELISA Kit
	PA105	RNase Inhibitor ELISA Kit
dsRNA Detection	RD017	NovoFast dsRNA ELISA Kit
RNase Residue Detection	DT007	RNase Detection Kit
DNase Residue Detection	DT009	DNase Detection Kit
DNA Template Residue Detection	E106-01A	NovoStart® Probe qPCR SuperMix (UDG)
	E406-01A	NovoStart® High-Specificity Probe qPCR SuperMix (UDG)
E. coli HCD Detection	DR001	NovoStart® *E. coli* DNA Residue Detection Kit
mRNA Enzymes Identification	PA007	mRNA Enzymes DIBA Kit

Recommended Products

GMP Grade animal-free, ampicillin-free

NovoFast dsRNA ELISA Kit

1 High experimental efficiency: one-step detection

Add 100μl standard/sample per well

Add 100μl dsRNA Detection Antibody

37°C , 1h

Wash the plate with 1×Wash Buffer at 300μl/ well

Add 100μl substrate per well

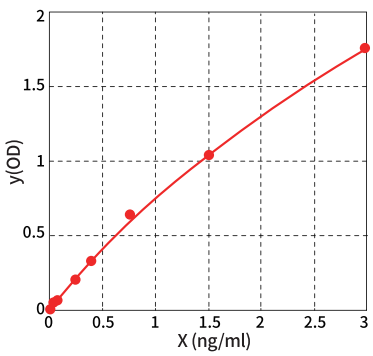
Incubate at 37°C for 15min in the dark

Add 50μl Stop Reagent per well, and Detect the OD

2 Sensitivity: 0.047ng/ml

ng/ml	OD
3.000	1.770
1.500	1.032
0.750	0.625
0.375	0.325
0.188	0.180
0.094	0.102
0.047	0.086
0.000	0.044
R2	0.990

3 Detection range: 0.047-3ng/ml



Product information

Cat. No.	Product Name
RD017	NovoFast dsRNA ELISA Kit

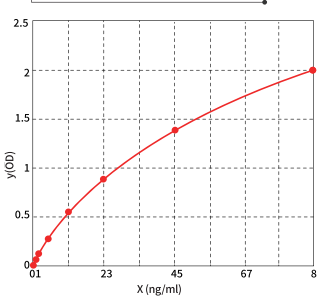
Series of enzyme residues detection kit

Pyrophosphatase, Inorganic ELISA Kit

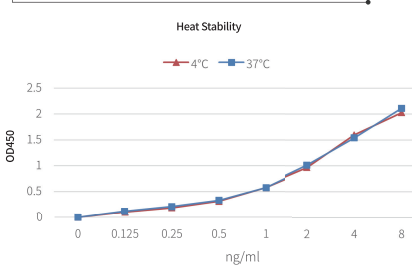
1 one-step detection takes only 1.5 hours

ng/ml	OD
8	2.0245
4	1.3855
2	0.8690
1	0.5440
0.5	0.3105
0.25	0.1715
0.125	0.1060
0	0.0585

2 Sensitivity: 0.125ng/ml



3 Strong stability: Placed at 37°C for 7 days, no difference in detection



Product information

Cat. No.	Product Name
PA101	Pyrophosphatase, Inorganic ELISA Kit
PA105	RNase Inhibitor ELISA Kit
PA102	T7 RNA Polymerase ELISA Kit
PA107	RNase R ELISA kit

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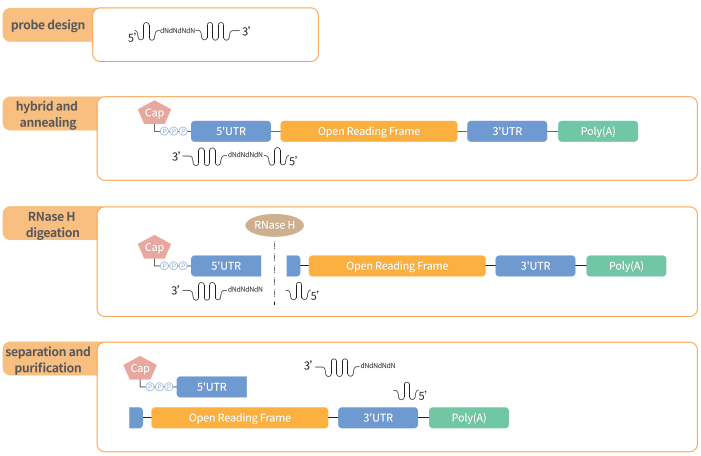
Recommended Products

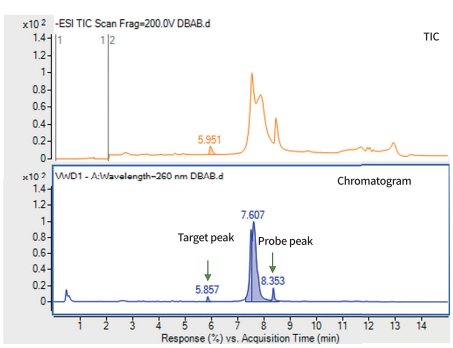
Chinese invention grant: ZL 2023 1 1212061.X

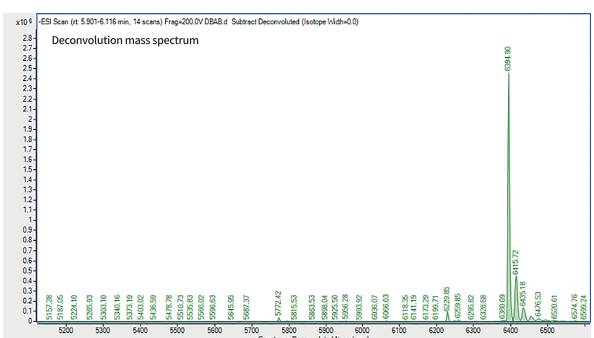
Innovative mRNA capping detection FlashPrep kit



Product features

- The probe binding and enzyme digestion are completed in one step. The whole process takes only 1.5 hours.
- No need for Biotin probes and magnetic beads, lower costeffect has no significant difference.
- Recovery⩾80%.
- Strong stability, 37°C for 21 days, repeated freezing and thawing 150 times, no significant change in enzyme activity.





Product information

Cat. No.	Product Name
CD002	mRNA Capping Detection FlashPrep Kit
CD001	mRNA Capping Detection Sample Preparation Kit (Beads)

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Catalog mRNA

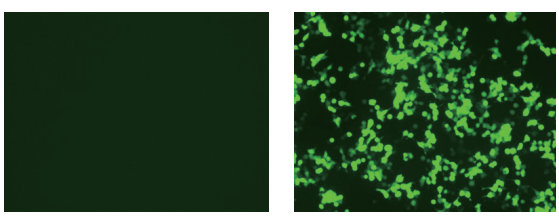
GFP mRNA encodes a green fluorescent protein that can be expressed in mammalian cells. The eGFP mRNA of novoprotein has 5' Cap1 and 3'poly (A) tail, and is an ideal target for studying transfection and expression using various assays. Luciferase is a general term of enzymes that can produce bioluminescence in nature, and the most representative one is the luciferase from *Photinus pyralis*. luciferase from *Photinus pyralis* can show luciferase activity without post-translational modification. The mRNA sequence of Luciferase of novoprotein was derived from *Photinus pyralis*, and point mutation was performed on the wild-type sequence, which significantly improved the thermal stability and pH range of the protein.

Application	Cat. No.	Product Name
Reportor Gene/ Functional Gene mRNA	MR008 / MR010	eGFP mRNA / eGFP mRNA (N1-Me-Pseudo UTP)
	MR009 / MR011	Luciferase mRNA / Firefly Luciferase mRNA (N1-Me-Pseudo UTP)
	MR201	eGFP circRNA
	MR202	Luciferase circRNA
	MR105	mCherry mRNA (N1-Me-Pseudo UTP)
	MR015	OVA mRNA (N1-Me-Pseudo UTP)
	MR016	hEPO mRNA (N1-Me-Pseudo UTP)
	MR107 / MR019	Cas9 mRNA / Cas9 mRNA (N1-Me-Pseudo UTP)
	GMP-MR005	piggyBac mRNA, GMP Grade

Product features

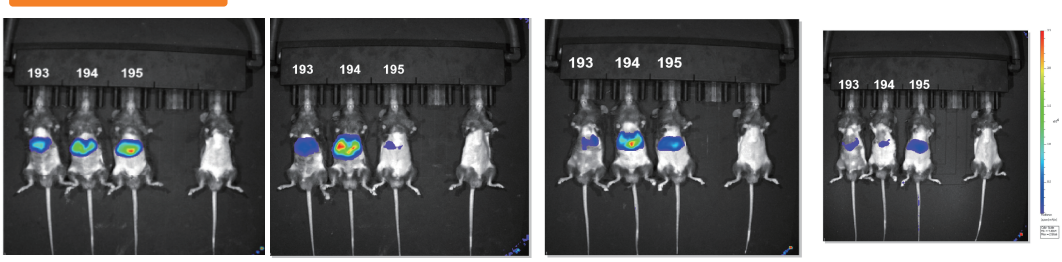
- Large supply of mRNA
- Customized mRNA

eGFP mRNA



eGFP mRNA was translated and expressed successfully after transfecting into cells.

Luciferase mRNA



Luciferase mRNA was encapsulated and injected into mice and translated successfully.

CliniSciences Group

Austria
Company: CliniSciences GmbH
Address: Sternwartestrasse 76, A-1180 Wien - Austria
Telephone: +43 720 115 580
Fax: +43 720 115 577
Email: oesterreich@clinisciences.com
Web: https://www.clinisciences.com

Belgium
Company: CliniSciences S.R.L
Address: Avenue Stalingrad 52, 1000 Brussels - Belgium
Telephone: +32 2 31 50 800
Fax: +32 2 31 50 801
Email: belgium@clinisciences.com
Web: https://www.clinisciences.com

Denmark
Company: CliniSciences ApS
Address: Oesterbrogade 226, st. 1, Copenhagen, 2100 - Denmark
Telephone: +45 89 888 349
Fax: +45 89 884 064
Email: danmark@clinisciences.com
Web: https://www.clinisciences.com

Finland
Company: CliniSciences ApS
Address: Oesterbrogade 226, st. 1, Copenhagen, 2100 - Denmark
Telephone: +45 89 888 349
Fax: +45 89 884 064
Email: suomi@clinisciences.com
Web: https://www.clinisciences.com

France
Company: CliniSciences S.A.S
Address: 74 Rue des Suisses, 92000 Nanterre- France
Telephone: +33 9 77 40 09 09
Fax: +33 9 77 40 10 11
Email: info@clinisciences.com
Web: https://www.clinisciences.com

Germany
Company: Biotrend Chemikalien GmbH
Address: Wilhelm-Mauser-Str. 41-43, 50827 Köln - Germany
Telephone: +49 221 9498 320
Fax: +49 221 9498 325
Email: info@biotrend.com
Web: https://www.biotrend.com

Iceland
Company: CliniSciences ApS
Address: Oesterbrogade 226, st. 1, Copenhagen, 2100 - Denmark
Telephone: +45 89 888 349
Fax: +45 89 884 064
Email: island@clinisciences.com
Web: https://www.clinisciences.com

Ireland
Company: CliniSciences Limited
Address: Ground Floor, 71 lower Baggot street Dublin D02 P593 - Ireland
Telephone: +353 1 6971 146
Fax: +353 1 6971 147
Email: ireland@clinisciences.com
Web: https://www.clinisciences.com

Italy
Company: CliniSciences S.r.l
Address: Via Maremmana inferiore 378 Roma 00012 Guidonia Montecelio - Italy
Telephone: +39 06 94 80 56 71
Fax: +39 06 94 80 00 21
Email: italia@clinisciences.com
Web: https://www.clinisciences.com

Netherlands
Company: CliniSciences B.V.
Address: Kraijenhoffstraat 137A, 1018RG Amsterdam, - Netherlands
Telephone: +31 85 2082 351
Fax: +31 85 2082 353
Email: nederland@clinisciences.com
Web: https://www.clinisciences.com

Norway
Company: CliniSciences AS
Address: c/o MerVerdi Munkerudtunet 10 1164 Oslo - Norway
Telephone: +47 21 988 882
Email: norge@clinisciences.com
Web: https://www.clinisciences.com

Poland
Company: CliniSciences sp.Z.o.o.
Address: ul. Rotmistrza Witolda Pileckiego 67 lok. 200 - 02-781 Warszawa -Poland
Telephone: +48 22 307 0535
Fax: +48 22 307 0532
Email: polska@clinisciences.com
Web: https://www.clinisciences.com

Portugal
Company: Quimigen Unipessoal LDA
Address: Rua Almada Negreiros, Lote 5, Loja 14, 2615-275 Alverca Do Ribatejo - Portugal
Telephone: +351 30 8808 050
Fax: +351 30 8808 052
Email: info@quimigen.com
Web: https://www.quimigen.pt

Spain
Company: CliniSciences Lab Solutions
Address: C/ Hermanos del Moral 13 (Bajo E), 28019, Madrid - Spain
Telephone: +34 916 750 700
Fax: +34 91 269 40 74
Email: espana@clinisciences.com
Web: https://www.clinisciences.com

Sweden
Company: CliniSciences ApS
Address: Oesterbrogade 226, st. 1, Copenhagen, 2100 - Denmark
Telephone: +45 89 888 349
Fax: +45 89 884 064
Email: sverige@clinisciences.com
Web: https://www.clinisciences.com

Switzerland
Company: CliniSciences AG
Address: Fracht Ost Flughafen Kloten CH-8058 Zürich - Switzerland
Telephone: +41 (044) 805 76 81
Fax: +41 (044) 805 76 75
Email: switzerland@clinisciences.com
Web: https://www.clinisciences.com

UK
Company: CliniSciences Limited
Address: 11 Progress Business center, Whittle Parkway, SL1 6DQ Slough- United Kingdom
Telephone: +44 (0)1753 866 511
or +44 (0) 330 684 0982
Fax: +44 (0)1753 208 899
Email: uk@clinisciences.com
IWeb: https://www.clinisciences.com

USA
Company: Biotrend Chemicals LLC
Address: c/o Carr Riggs Ingram, 500 Grand Boulevard, Suite 210 Miramar Beach, FL 32550- USA
Telephone: +1 850 650 7790
Fax: +1 850 650 4383
Email: info@biotrend-usa.com
Web: https://www.biotrend-usa.com

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