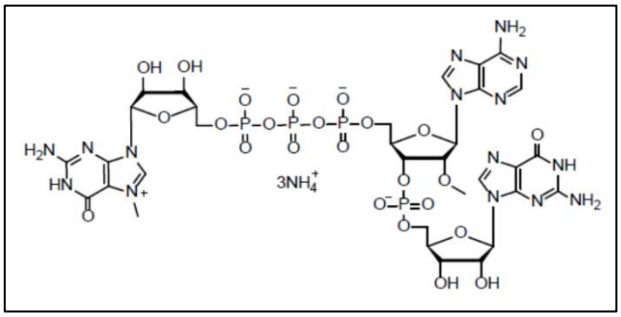
1. Product Information

Product name	**Cas9 mRNA (Cap1, 145A)**
Internal product code	BM1r
Catalog numbers (aliquot sizes)	562-xxx-GMP (variable sizes)
Quality grade	**current Good Manufacturing Practice (cGMP)**
Description	mRNA coding for wild type Cas9 nuclease from *Streptococcus pyogenes* with nuclear localization sequence (NLS-spCas9-NLS), human codon optimization, human UTRs
Length	4520 nt
5'-Cap	Cap1 (m7G(5')ppp(5')(2'OMeA)pG)
3' Poly(A) tail	145 nt
Base modification	N1-methylpseudouridine (m1Ψ)
Concentration	1 mg/ml solution in buffer (frozen)
Storage buffer	1 mM sodium citrate pH 6.4
Storage temperature	-75 ± 15 °C
Lot Nr.	Specified on product label
Use by date	Specified on product label
Manufacturer	Biomay AG, Ada-Lovelace-Straße 2; 1220 Vienna, Austria; www.biomay.com; info@biomay.com

2. Description

Human codon-optimized Cas9 mRNA is translated to a CRISPR nuclease Cas9 (spCas9 from *Streptococcus pyogenes*, uniprot Q99ZW2 / CAS9_STRP1) with nuclear localization sequences (NLS) on the N- and C-termini. The mRNA is capped with m7G(5')ppp(5')(2'OMeA)pG, providing Cap0 (N7-methyl guanosine analog connected to the 5′ nucleotide through a 5′ to 5′ triphosphate linkage analog) and Cap1 (2′-O-methylation at the first position following the Cap0 analog) structures. The product has been manufactured by in vitro transcription using a linear DNA template, purified by chromatography, filtered (0.2 µm) and filled as a low-bioburden product.



Cap1 structure of Cas9 mRNA

3. Intended Use / Application

Product is mRNA that has been manufactured and quality-controlled under the conditions of current Good Manufacturing Practice (GMP). It has been certified and released by a Qualified Person (QP) under EMA law (EMA directive 2001/83/EC). It was designed and is intended to be used for gene-editing of eukaryotic cells with a specific guide RNA (gRNA).

Note: Biomay places no restrictions on the use of its Cas9 mRNA products. Depending on the application, end users may need to secure appropriate third-party licenses related to CRISPR/Cas-mediated gene editing or the use of modified nucleosides from the relevant intellectual property holders.

4. Quality Control and Specifications

	Method	Specification	Results
Appearance	Visual inspection	Clear and colorless solution	Clear and colorless solution
pH-value	pH potentiometric Ph. Eur. 2.2.3	6.4 ± 0.3	6.4
mRNA identity	Denaturing RNA agarose gel electrophoresis	Conforms to reference	Conforms to reference
		Single distinct band visible	Single distinct band visible
	Capillary electrophoresis	Size ± 10% of theoretical size	Conforms
Sequence identity	Sanger sequencing after reverse transcription	Conforms to theoretical sequence	Conforms
mRNA concentration	UV spectrophotometry (UV absorbance A_{260nm} / Ph. Eur. 2.2.25)	0.8 – 1.2 mg/ml	1.04 mg/ml
mRNA integrity	Capillary electrophoresis	≥ 85%	94 %
mRNA purity	UV spectrophotometric (UV absorbance A_{260nm}/A_{280nm})	1.8 – 2.1	1.9
5'- Capping efficiency	LC/MS	≥ 90 %	Conforms
3'- Poly(A)-tail length	LC/MS	≥ 95 % (of theoretical poly(A) tail length)	Conforms
Residual protein	Nano Orange assay	< 0.50 % w/w	< 0.3 % w/w
Residual template DNA	qPCR	< 0.1 ng/mg RNA	0.016 ng/mg RNA
dsRNA	ELISA	≤ 0.0050 %	0.0005 %
Endotoxin	LAL test Ph. Eur. 2.6.14 method D	≤ 0.2 EU/mg RNA	< 0.1 EU/mg RNA
Bioburden	Membrane filtration Ph. Eur. 2.6.12	< 1 cfu/ml	< 1 cfu/ml

5. Safety information

Material is considered non-infectious, non-toxic and non-pathogenic under the conditions of the intended applications. General safety procedures should still be followed to maintain a safe working environment. Always wear appropriate personal protective equipment (PPE), including lab coats, gloves, and safety glasses, to avoid contamination and accidental exposure. Work in a clean, organized space, and handle reagents with care, avoiding direct contact. Dispose of all waste materials, including gloves and pipette tips, in designated biohazard containers, even though the commodity is non-hazardous, to prevent cross-contamination. Always wash hands after handling any biological material and before leaving the lab.