

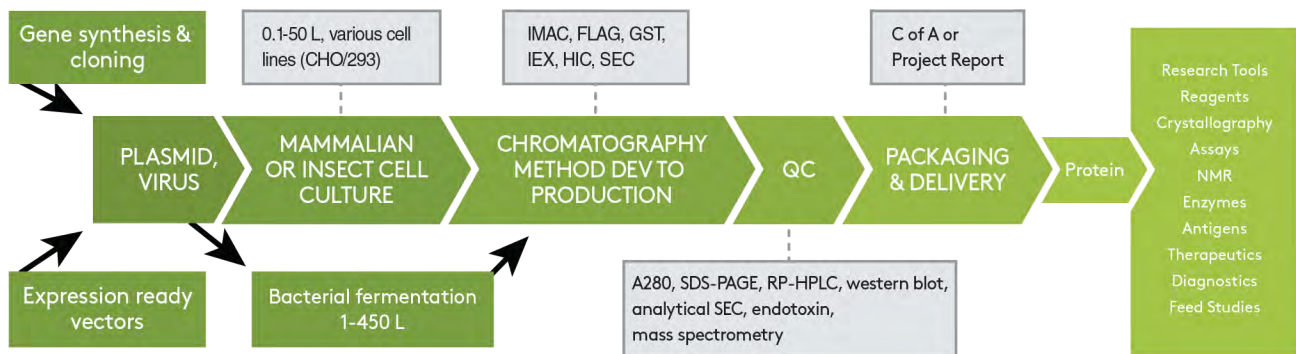


Protein design and manufacture

Gene-to-protein custom manufacturing

Our recombinant protein production capabilities range from construct design and small-scale screening to scaleup and manufacturing. With experience producing thousands of proteins, we identify potential risks and engineer custom solutions to satisfy the most demanding requirements. We build trust and confidence with open communication and focused teams passionate about achieving results. It's our goal to become your long-term partner in success.

Recombinant Protein Production



RECOMBINANT PROTEIN SERVICES, DESIGNED FOR YOU

Aldevron specializes in custom development and manufacture of CRISPR nucleases and IVT enzymes. We provide the broadest range of QA/QC levels to meet your exact specifications:

- **Research Grade**
- **Research Grade +**, TSE certificate available
- **GMP-Source™**, a faster, cost-effective alternative to GMP
- **GMP**, customized to your requirements

Additionally, we provide the most comprehensive inventory offering of CRISPR nucleases and IVT enzymes for research and clinical use.



Sample Certificate of Analysis

Certificate of Analysis

Product Information

Name: His-sNLS-Myc-spCas9
 Lot Number: MRC00X-X1
 Date of Manufacture: 23-Aug-2016
 Concentration (A280): 1.01 mg/mL (E₂₈₀^{1%} = 0.760)
 Total Protein per Container: 1.01 mg
 Total Volume per Container: 1.0 mL
 Formulation Buffer: 25 mM Tris-Cl, 300 mM NaCl, 0.1 mM EDTA, 1.0 mM DTT, 50% (v/v) Glycerol, pH 7.4
 Molecular Weight: 164 kDa
 Storage: -20 °C
 Use: Research use only

Specifications and Quality Test Results

Test	Specification	Result
Activity in vitro (Figure 1)	>80%	85%
Purity RP-HPLC (Figure 2)	>90%	100%
Purity SDS-PAGE (Figure 3)	>90%	>95%
Endotoxin Level	<10 EU/mg	<5 EU/mg
Residual DNase (Ambion DNaseMax™)	<LOD	<LOD
Residual RNase (Ambion RNaseRefr™)	<LOD	<LOD

Figure 1. Activity assay of His-sNLS-Myc-spCas9. Agarose gel comparing His-sNLS-Myc-spCas9 (MRD006-11) activity assay and NEB Cas9 activity assay with three small guide RNAs (17 bp). The 5.5 kb band represents uncut DNA and all smaller bands are Cas9 cleavage products.

Certificate of Analysis

Peak	Ret. Time	Area	Height	Area%	Conc.
1	17.602	7885244	788635	100.000	9.000
Total		7885244	788635	100.000	

Figure 2. Reverse-phase HPLC analysis of His-sNLS-Myc-spCas9. 10 µg of His-sNLS-Myc-spCas9 was analyzed using reverse-phase HPLC. Agilent Zorbax® 300SB-C3 column, mobile phase A=0.1% TFA in water, mobile phase B=0.1% TFA in acetonitrile, gradient=5-100% B over 30 min at 1.0 mL/min, 40 °C, 214 nm detection.

Figure 3. Reducing SDS PAGE of His-sNLS-Myc-spCas9. His-sNLS-Myc-spCas9 was analyzed using reducing SDS PAGE. 4-15% Bio-Rad® TGX™ gel, Bio-Rad® Precision Plus Protein™ markers, Thermo Fisher Scientific SYPRO® Orange Protein Gel Stain.

Reviewed
 Tony Goossens
 Quality Control Manager

Date: 31-Aug-2016

—end of document—

ALDEVRON
 4570 15th Street
 Madison, WI 53719
 1-800-297-5000
 1-608-441-8400
 www.aldevron.com

EMD Biosciences
 1000 Research Park Drive
 Madison, WI 53711
 1-800-368-0000
 1-608-441-7400
 www.emdbiosciences.com

EMD Millipore
 100 Federal Street
 Boston, MA 02110
 1-800-343-7300
 1-617-338-3400
 www.millipore.com

v1.031AUG2016 Page 2 of 2

Protein Services FAQ

Q: What can I send for starting material?

A: Electronic sequences, expression-ready vectors, hybridoma cells

Q: What are your culturing throughput and scale capabilities?

A: 48 clones x 1 L in parallel to 2 x 25 L WAVE Bioreactor

Q: What is your turnaround time?

A: 7 weeks starting with gene synthesis, 3-4 weeks starting with expression ready vector

Q: What documents can you expect at the end of the project?

A: Certificate of Analysis or a Project Summary Report

Q: What are some other services that might be helpful to my biotherapeutics program?

- Aldevron has developed efficient workflows for high-throughput expression, purification and multi-gram scale-up production.
- High quality plasmid preparations for transient transfections
- Expression-ready vector construction including class switching
- Hybridoma development directly from cDNA using Aldevron's Genovac Antibody Technology

