

Supporting Rapid Response in Delivery of Vaccines and Therapeutics

Ability to supply raw materials to support 1.2 billion mRNA vaccines per year

Construct Design

Plasmid DNA

mRNA Drug
Product
Formulation

Fill / Finish*
Cold Chain
Distribution

| Key Products | Key Services | |
|--|-------------------------|--------------------------------|
| mRNA Cap Analogs (Co Cap™) | Microbial Cell Banking | Plasmid DNA Production |
| Linear Plasmid DNA (Research, GMP Start™, GMP Grade) | mRNA Production | Gene Synthesis |
| mRNA (Research, GMP Start™, GMP Grade) | Formulation Development | Custom Chemical Manufacturing |
| Lipids | GMP Storage Services | Analytical & Stability Testing |

^{*}Small-scale fill / finish services for early-stage clinical trials, personalized medicines and rare diseases



End-to-End Nucleic Acid Production Services

Supporting clients by providing scalable manufacturing to bring products from benchtop to bedside

R&D

Chemical Manufacturing

Biomanufacturing

Quality Control / Assurance

Storage & Logistics

- Construct design and synthesis
- Cell bank preparation and strain optimization
- Vaccine design
- Specialized biologics services
- Design support for right-firsttime delivery of products
- Custom synthetic and purification route development for
 - Cap analogs
 - Phosphoramidites
 - Custom oligonucleotides
 - Lipids

- Single-product explosionproof synthesis with kg-scale cap analog capacity
- Proprietary purification methods
- Kg scale quantities
- Custom Manufacturing of:
 - Cap analogs
 - Lipids
 - Phosphoramidites
 - Oligonucleotides containing complex amidites

- Platform proprietary processes for
 - RNase-free production of Linear Plasmid DNA as starting material for mRNA production with full endotoxin clearance
 - Ultrapure mRNA and saRNA production with dsRNA clearance
 - Cell Banking
- Mg to g scale quantities
- Grades available:
 - Research-grade
 - GMP Start™
 - GMP Grade

- Analytical testing (incl. stability testing), review and release of critical raw materials and finished products with detailed certificate of analysis supplied
- GLP and GDP practices implemented with established CAPA and handling procedures
- Validated or Qualified methods for QC for MCB, plasmid DNA, mRNA drug substance release
- Stability testing
- Assay and method development, qualification, validation and verification

- Controlled environment with cGMP management
 - Chilled storage
 - Low temperature
 - Ultra-low temperature
 - Cryogenic storage

End-to-end solutions to support customers from R&D through commercial scale manufacturing



Tim Morgan

Director of Business Development Northern RNA

801-856-2142

tmorgan@northernrna.com





Jared Davis

President and Chief Technical Officer

Northern RNA

403-926-4154

jdavis@northernrna.com







86NorthRNA/ 8666784762

info@northernrna.com

www.northernrna.com

