



All-ScaleFlow™ Manufacturing Solution for mRNA

Christophe Bonneville, CEO & Co-Founder

Flora Binder, CDO & Co-Founder

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Dillico: Unleash the full potential of mRNA

Cofounded in 2022 by senior professionals



Christophe Bonneville, PhD
Co-Founder & CEO

MILLIPORE SIGMA **resolution**
spectra systems



Flora Binder
Co-Founder & CDO

moderna **Biogen**

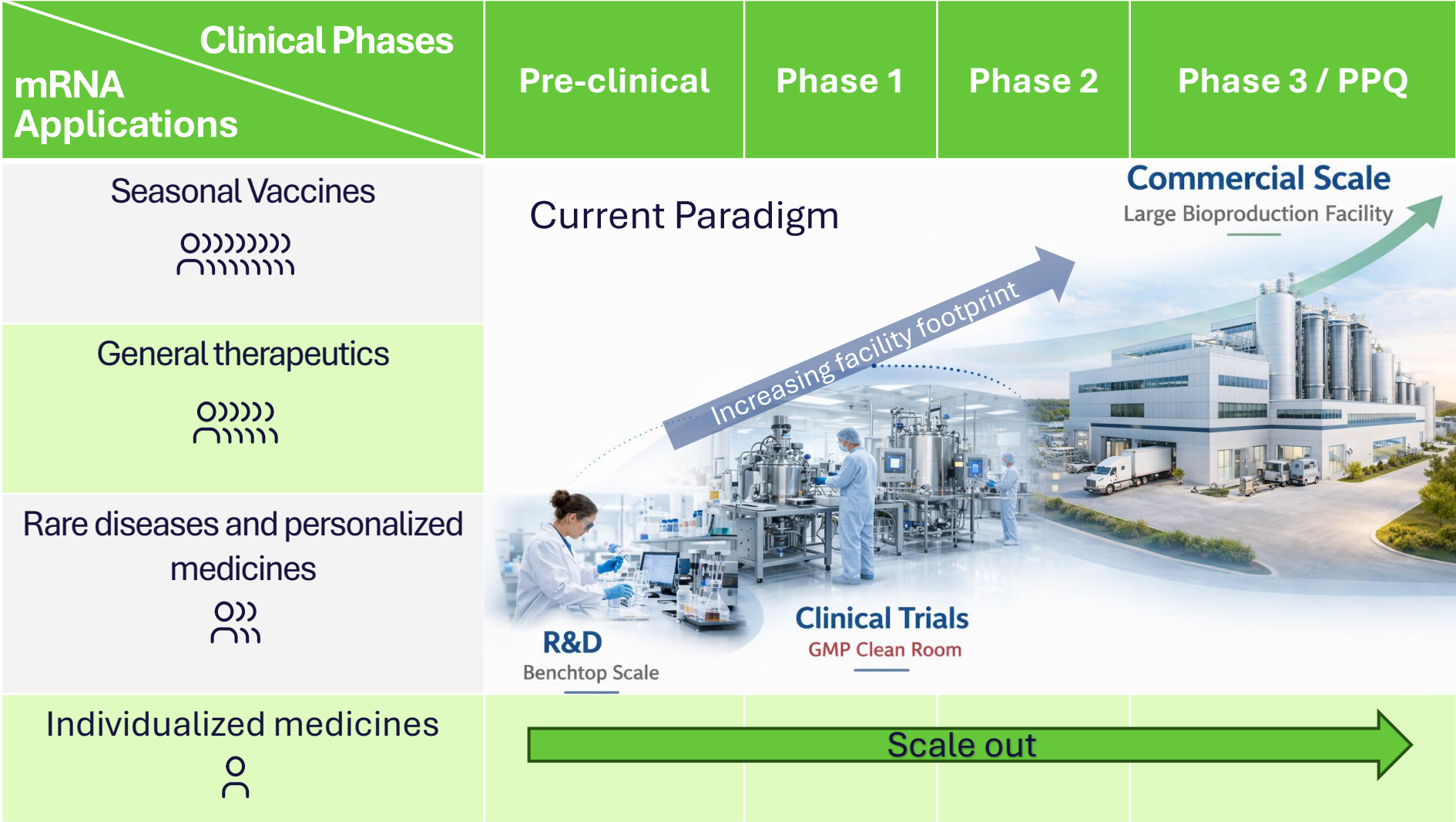


Emmanuel Gaud
Co-Founder & COO

ERAS **BILFINGER** **boccard**
Alliance for success

- ✓ Based in Grenoble area, France
- ✓ Partnerships with Pharma and Leading Suppliers
- ✓ A Team with wide range of expertise:
 - mRNA Process development, Modeling and Analytical
 - Process Equipment design, construction and installation
 - Bioprocess digitalization and PAT

The Dream for Bio-manufacturing – One-size Fits All



All-ScaleFlow™ Manufacturing System Features

Continuous Automated cGMP end-to-end Process

Closed Process

CIP, D&RNAse inactivation, SIP onboard

Flexible

m/sa/gRNA-(t)LNP
Raw Material Agnostic

Robust Process

Process Simulator for PD
Sensors and Full Automation
Structured Data Management
Real-time Maintenance

High Quality Product at best cost

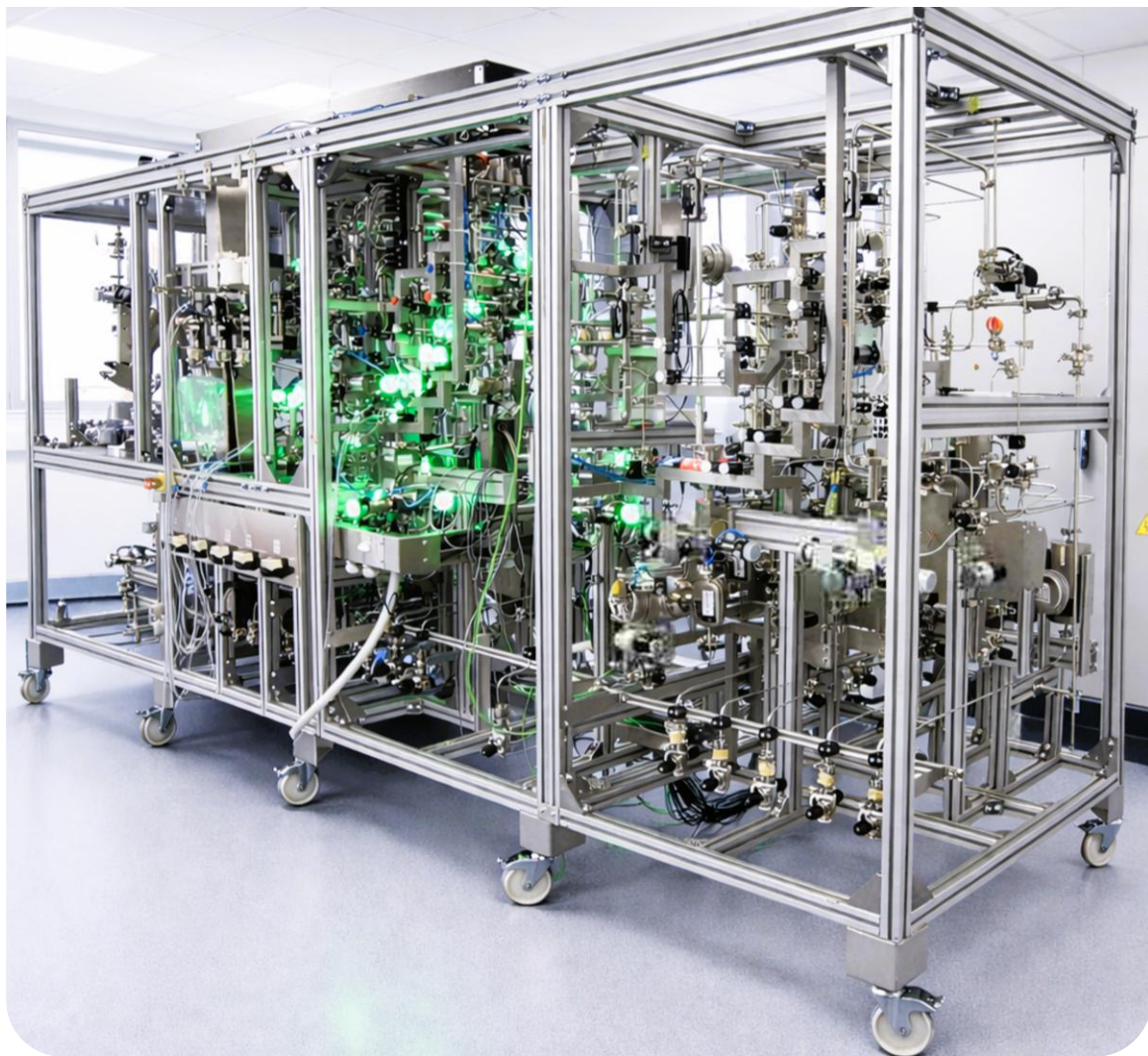
No process hold times
Most proven purification technologies

Scale up free & flexible capacity



Reduction in cost

All-ScaleFlow™ Pilot & Analytical Lab



d Example of All-ScaleFlow™ platform installation

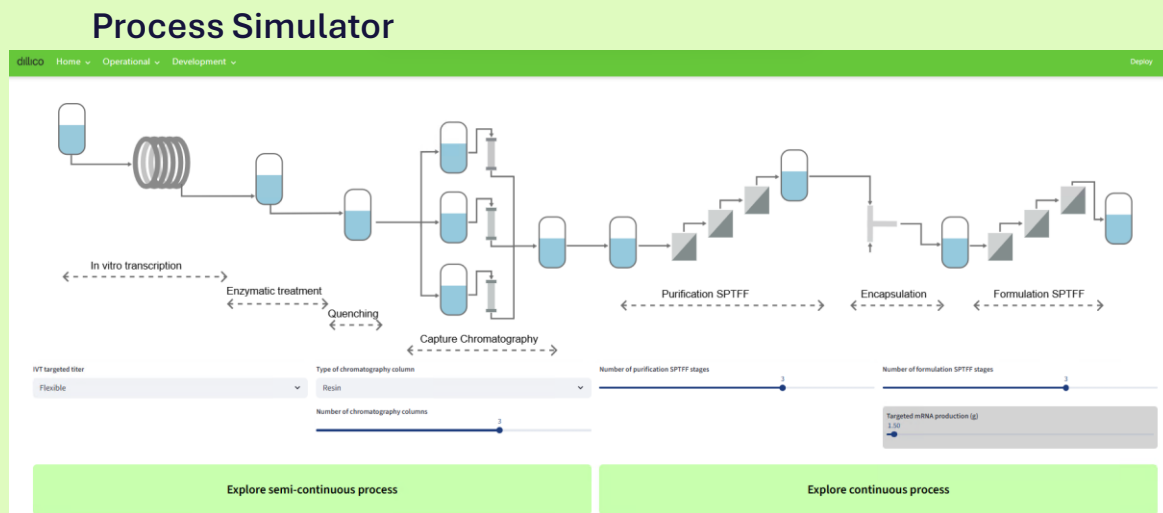


Order of magnitude of capacity for 1 system

- Epidemic mode :
 - mRNA: 40M doses/y
 - saRNA: 300 M doses/y
- Small runs : 5 hours between 2 runs for cleaning & raw material bags installation

A Process Simulator Leveraging a Performance Modeling Platform

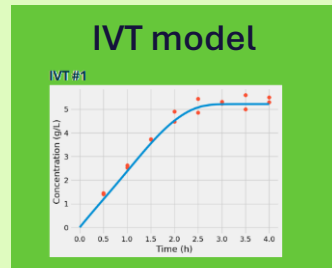
Process requirements & constraints



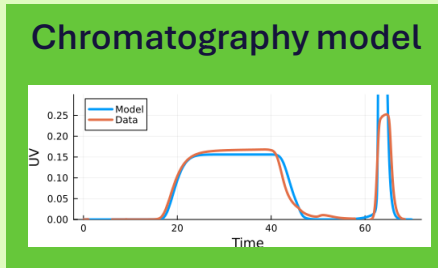
Ready to prepare your run:

- Master Recipe
- Bill of materials
- Schedule of the run

Performance Modeling Platform



IVT experiments



Chromatography experiments

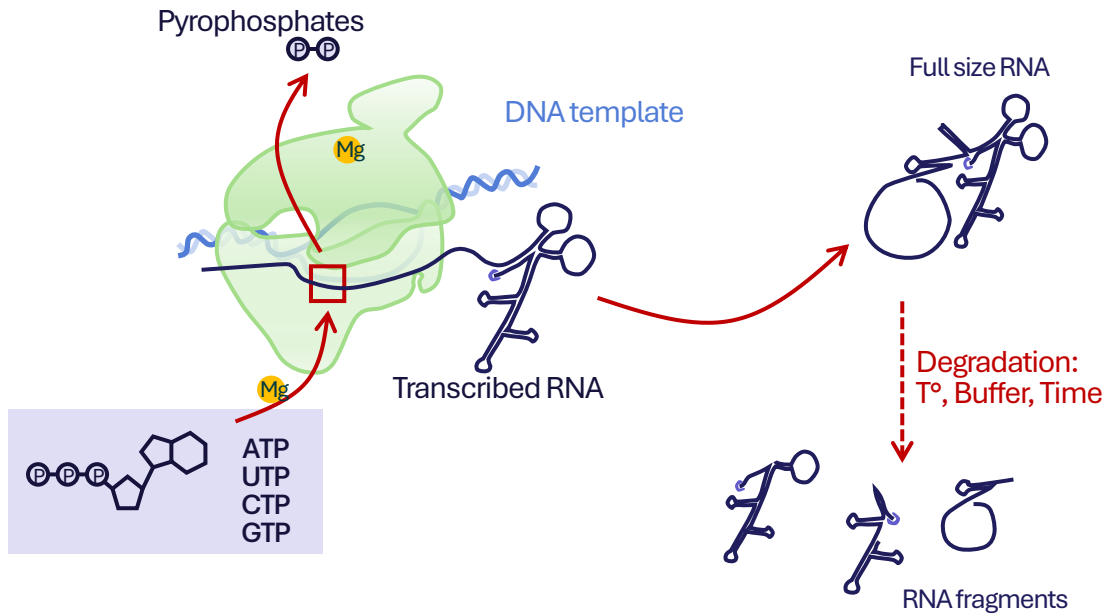
SPTFF model

SPTFF experiments

Encapsulation model

Encapsulation experiments

In Vitro Transcription (IVT) Performance Model



Mechanistic Modeling of the IVT Reaction

Reaction Kinetics

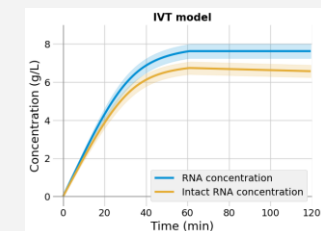
- T7-DNA binding
- Initiation kinetics
- Elongation dynamics
- Polymerase unbinding
- NTP consumption

Physicochemical Effects

- Ion speciation
- Mg-NTP complexation
- Pyrophosphate dynamics
- DNA sequestration
- RNA degradation

Outputs

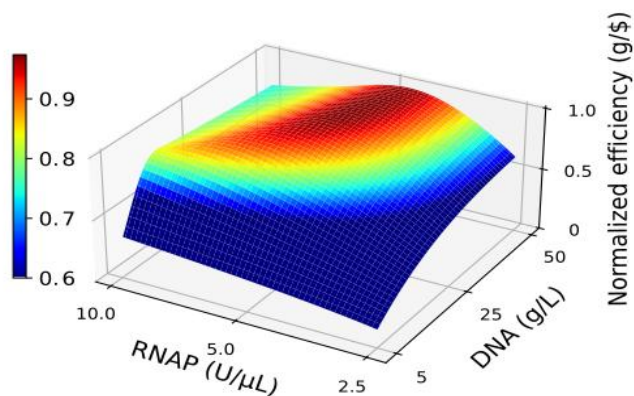
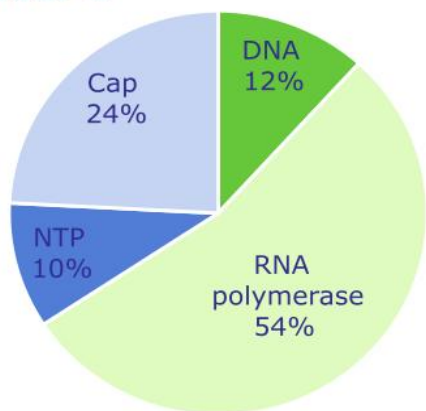
RNA production kinetics and Key IVT process attributes



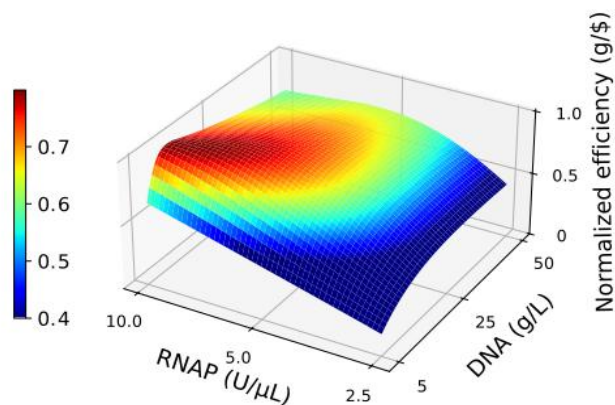
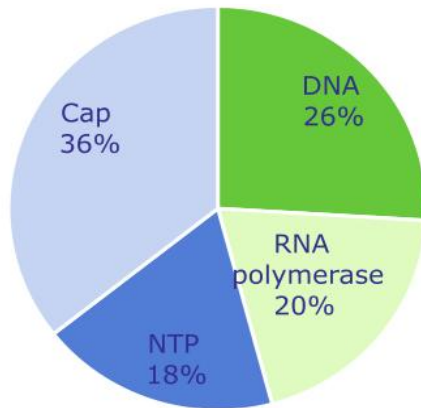
Stover NM et al. Biotechnol Bioeng. 2024 May 2. doi:10.1002/bit.28699.
Stover NM et al. arXiv:2504.07212, 2025 April 9

Optimize Any IVT Recipe for Better Cost of Goods Sold (COGS)

User 1 Cost Structure



User 2 Cost Structure



- IVT optimization needs to be contextualized rather than purely yield-centric
- Different cost structures can result in very different IVT cost profiles

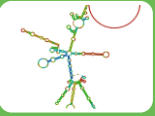
The IVT Performance Model suggests very different IVT recipes to achieve the same COGS with different raw material cost structure

High-quality Drug Substance for Various mRNA Production



ZsGreen mRNA

- 1001 bases



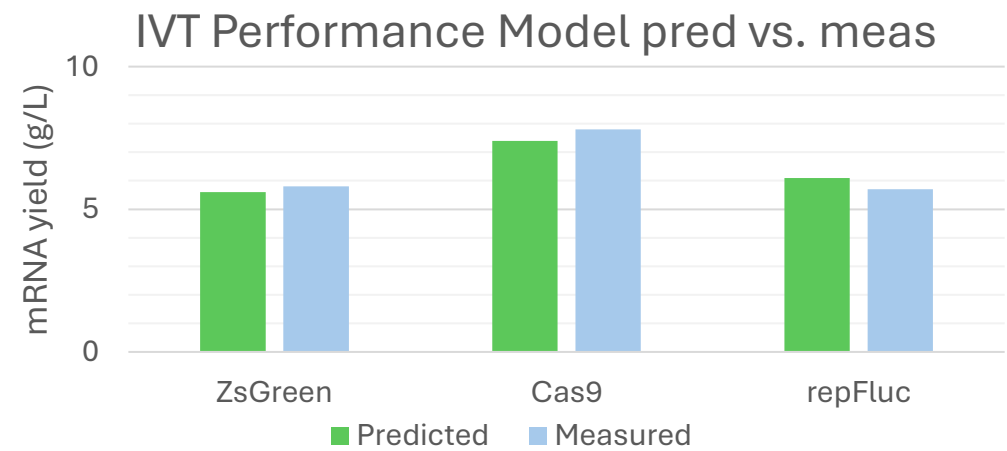
Cas 9 mRNA

- 4472 bases



repFluc mRNA (saRNA)

- 9501 bases



Process Step	RNA Quality Attributes	~1001b (ZsGreen)	~4500b (Cas 9)	~9500b (saFluc)
Post - oligodT Chromatography	3' PolyA-tailed mRNA (%)	95	97	95
	mRNA intactness (%)	92	93	86
	5' Capping Efficiency (%)	96	95	99
	dsRNA	< 0,004% (w/w)		
	Residual pDNA	< LOQ% (w/w)		
	Residual protein	< LOQ% (w/w)		

Flexibility for various Use Cases

	R&D – MSAT	Pre-clinical Vaccine	Immuno-Oncology Personnalized Medecine	mRNA Vaccine	saRNA vaccine
	Screening run Scale-down run	Run for a toxicity batch	100 patients with 9 doses of 1mg	High-end scale Epidemic vaccine	High-end scale Epidemic vaccine
Run Duration	6 hours No bag change	24 hours No bag change	12 hours No bag change	5 days Bag change every 24h	5 days Bag change every 24h
Qty of mRNA per run/batch	~ 216 mg (IVT 5 g/L)	3 g (IVT 5.4 g/L)	1g (IVT 5 g/L)	19g (IVT 5.1g/L)	30g (IVT 8g/L)
Max. Annual production capacity	250 runs (1 per day)	96 runs (2 per week) 9 Mdoses (30µg)	250 runs (1 per day) 25 000 patients	950g (50 runs) 30 Mdoses (30µg)	1490g (50 runs) 298Mdoses (5µg)

mRNAufacturing™ Solution



ENABLING SERVICES

Evidence package

Pre-clinical manufacturing services

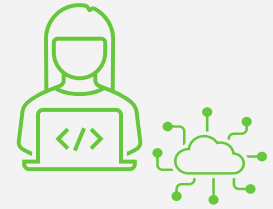


CORE PLATFORM

All-ScaleFlow™ manufacturing platform
(Capital investment)

Resilience Package (maintenance)

Single-use spiral



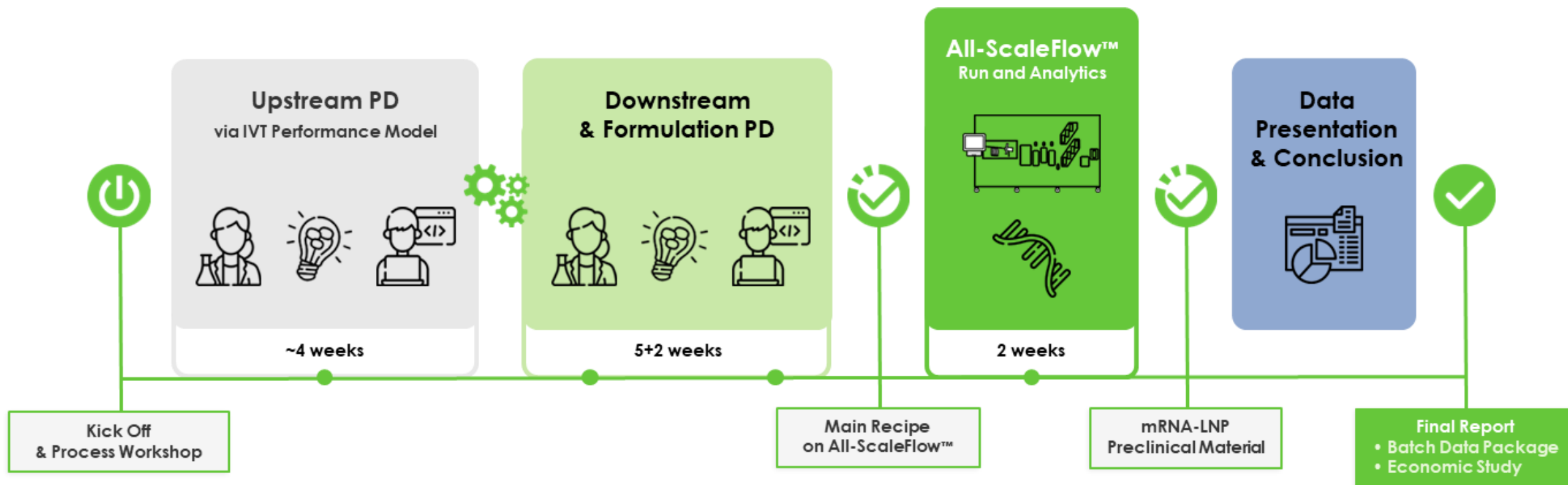
CUSTOMIZED EXPERT SUPPORT

Digital tool & services of process development

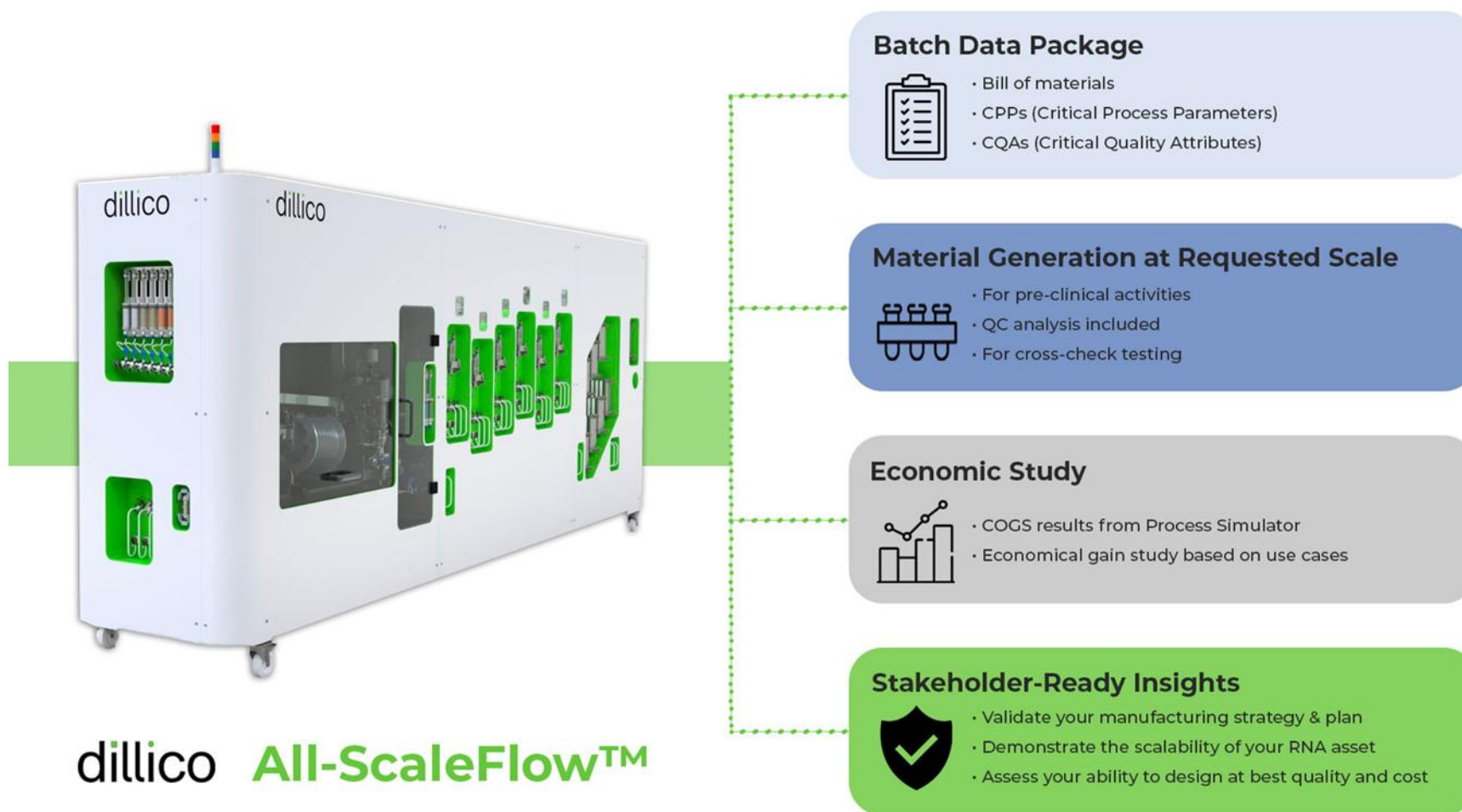
Digital tool & Manufacturing Science services

Work with us & Get ready: the Evidence Package

Demonstrating All-ScaleFlow™ performances by manufacturing mRNA-LNP with your own sequence



What You Gain from the Evidence Package



Takeaway message

All-ScaleFlow™



Suitable for existing mRNA platform



Direct scale-up and flexible capacity



High-quality product & process robustness



Straight forward Process Development & Tech Transfer



Ready for Evaluation with customer mRNA construct





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Unleash the full
potential of mRNA

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