JP Morgan Presentation
January 11, 2023

Next Generation
RNA Medicines

Forward Looking Statements

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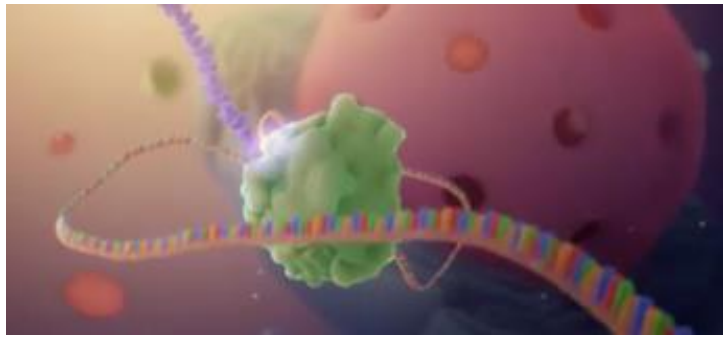
Arcturus Therapeutics



Global Late-Stage Clinical mRNA Medicines Company

Nasdaq: ARCT

Headquarters: San Diego, CA

Employees: 172

Founded: 2013

mRNA Medicine Candidates

LUNAR-OTC *Ornithine Transcarbamylase Deficiency*

LUNAR-CF *Cystic Fibrosis*

Additional Earlier Stage Programs

Multiple Strategic Partners

CSL™

ultragenyx pharmaceutical

CYSTIC FIBROSIS FOUNDATION®

BARDA — Biomedical Advanced Research and Development Authority

Proprietary mRNA Technologies Driving Therapeutic Programs

Broad Intellectual Property Portfolio

mRNA Technology

mRNA for protein replacement

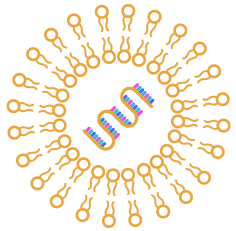
Self-amplifying mRNA (STARR™) low-dose vaccine technology

LUNAR® Delivery

Hepatocytes – *intravenous*

Myocytes – *intramuscular*

Bronchial Cells – *inhaled*



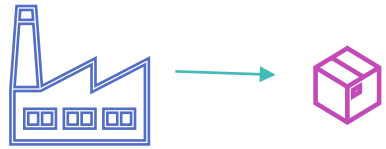
Manufacturing Know-How

mRNA Drug Substance Production

mRNA Purification

LNP Drug Product Production

Fill Finish / Lyophilization



280+ Patents & Patent Applications

Pipeline of Arcturus-Owned mRNA Therapeutic Candidates

Franchise	Candidate	Funded By	Indication	Prevalence	Upcoming Milestone
Hepatic	LUNAR-OTC (ARCT-810)	ARCTURUS therapeutics	Ornithine Transcarbamylase Deficiency	> 10,000	Phase 2 Interim Data 2023
Respiratory	LUNAR-CF (ARCT-032)	CYSTIC FIBROSIS FOUNDATION	Cystic Fibrosis	85,000-100,000	Phase 1 Initiation Q1 2023

Each Arcturus-Owned Program Represents a Significant Commercial Opportunity

Pipeline of Partnered mRNA Therapeutics and Vaccines

Franchise	Candidate	Partner	Indication	Stage
Hepatic	LUNAR-GSD3 (UX053)	ultragenyx pharmaceutical	Glycogen Storage Disease Type III	Phase 1/2*
Vaccine	LUNAR-COV19 (ARCT-154)	CSL	COVID-19	Phase 3
	LUNAR-FLU (Seasonal)	CSL	Seasonal Influenza	Pre-clinical
	LUNAR-FLU (Pandemic)	BARDA	Pandemic Influenza	Pre-clinical

* https://www.sec.gov/Archives/edgar/data/1515673/000095017022021366/rare-20220930.htm

Greater than $5 Billion in Potential Milestones and Profit Sharing / Royalties

CSL Vaccine Partnership

Deal Value: Up to $4.5 billion

- Collaboration combines CSL's global vaccine commercial and manufacturing infrastructure with Arcturus' expertise in mRNA design and modification, LUNAR® lipid nanoparticle (LNP) technology and manufacturing know-how.
- Deal terms encompass the development, manufacture, and commercialization of mRNA-based vaccines targeting COVID-19, Influenza, and three other respiratory infectious disease vaccines.

Terms of the Partnership

CSL™ | ARCTURUS® therapeutics

$200 million	Upfront Payment
$1.3 billion	Development Milestones
$3.0 billion	Commercial Milestones

40% profit sharing for COVID-19 vaccines

Up to **double digit royalties** for influenza and three additional respiratory infectious disease vaccines

Meiji Pharma, Japan Phase 3 Trial of ARCT-154

Trial to test self-amplifying mRNA vaccine ARCT-154 as a booster compared to Comirnaty®

Background

- Japan has high rate of covid vaccinations and boosters: > 2.9 doses / person (source: NY Times Jan 2023)
- Meiji Pharma received rights to conduct ARCT-154 clinical study in Japan
- Meiji Group received significant subsidy from Japanese government in Q4 2022

Study Design Summary

- Phase 3 Non-inferiority immunogenicity trial
- Conducted in Japan, fully funded by Meiji
- Trial expected to support PMDA approval
- Test ARCT-154 as a booster compared to Comirnaty®
- 780 total adult participants
  - 390 to receive ARCT-154 (5 mcg)
  - 390 to receive Comirnaty® (30 mcg)

Study Update

- Study Initiated December 13, 2022
- First two sites vaccinated 65 subjects; No SAEs or cardiac-related events reported
- Study now expanded to 11 sites
- 734 additional subjects scheduled for vaccination

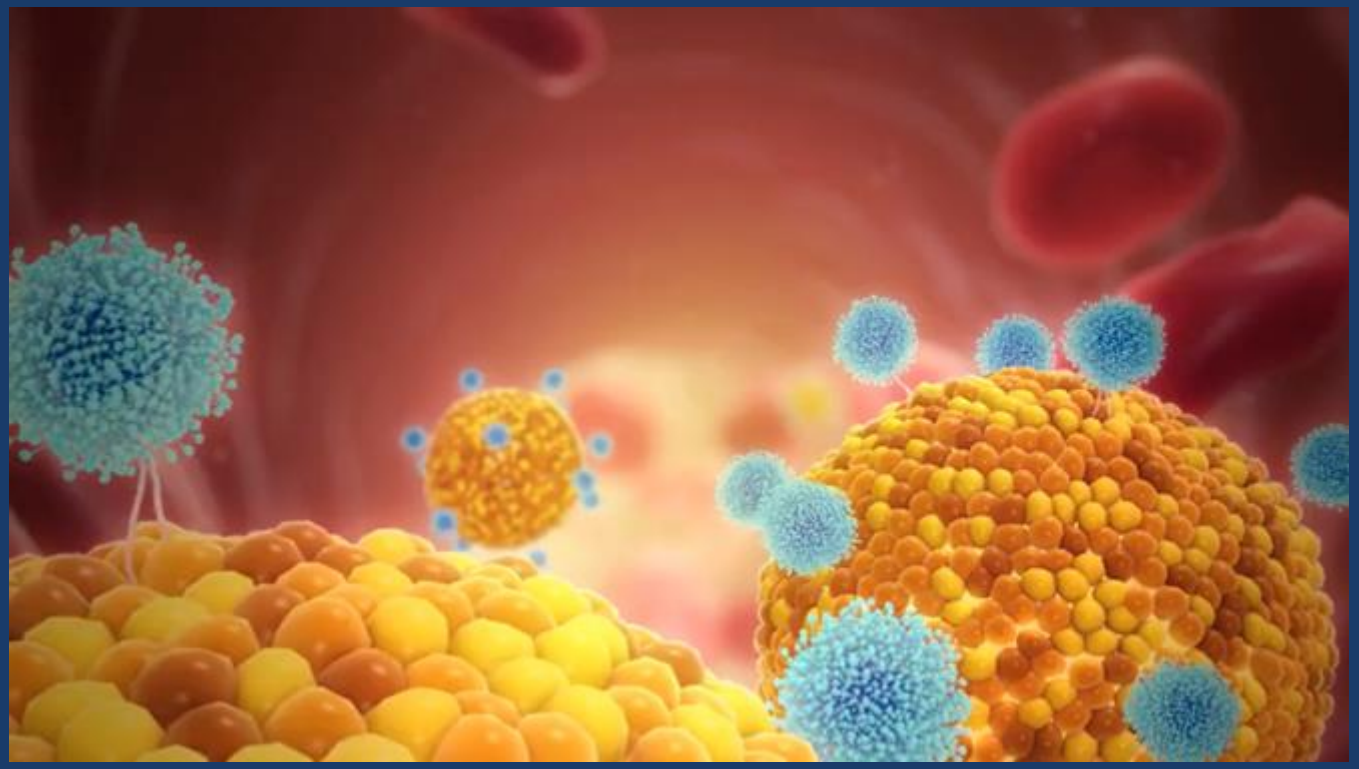
ARCT-154, if Japan Phase 3 trial successful, opportunity for PMDA approval in 2023

ARCT-810

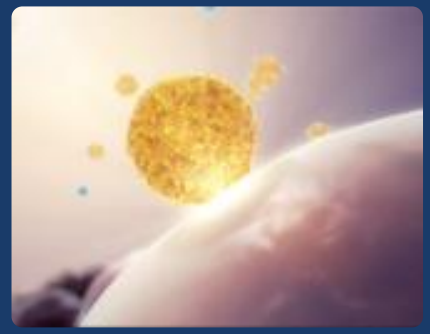
Systemically Delivered mRNA for Ornithine Transcarbamylase (OTC) Deficiency

LUNAR® - Lipid Nanoparticle (LNP) Delivery Technology

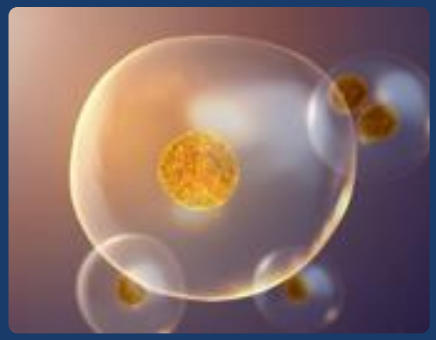
Proprietary, Biodegradable, Optimized for Each Cell Type



LUNAR® interacts with cell membrane

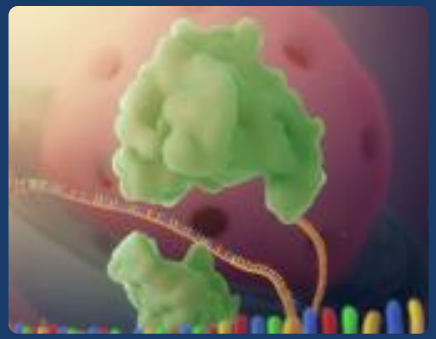


LUNAR® internalized inside endosome



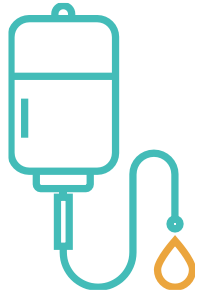
mRNA release

mRNA translated into protein of interest



Ornithine Transcarbamylase (OTC) Deficiency

ARCT-810 Market Opportunity



The most common urea cycle disorder

The urea cycle converts neurotoxic ammonia to water-soluble urea that can be excreted in urine

Deficiency in OTC causes elevated blood ammonia, which can lead to neurological damage, coma, and death

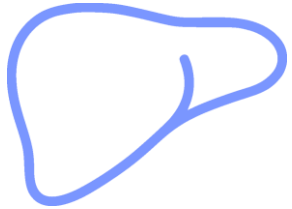
10,000 worldwide prevalence

Unmet Medical Need

Present standard of care involves a strict diet (low protein, high fluid intake) plus ammonia scavengers (e.g. glycerol phenylbutyrate)

Present standard of care does not effectively prevent life-threatening spikes of ammonia

Severe OTC Deficiency patients are referred for liver transplant, currently the only cure



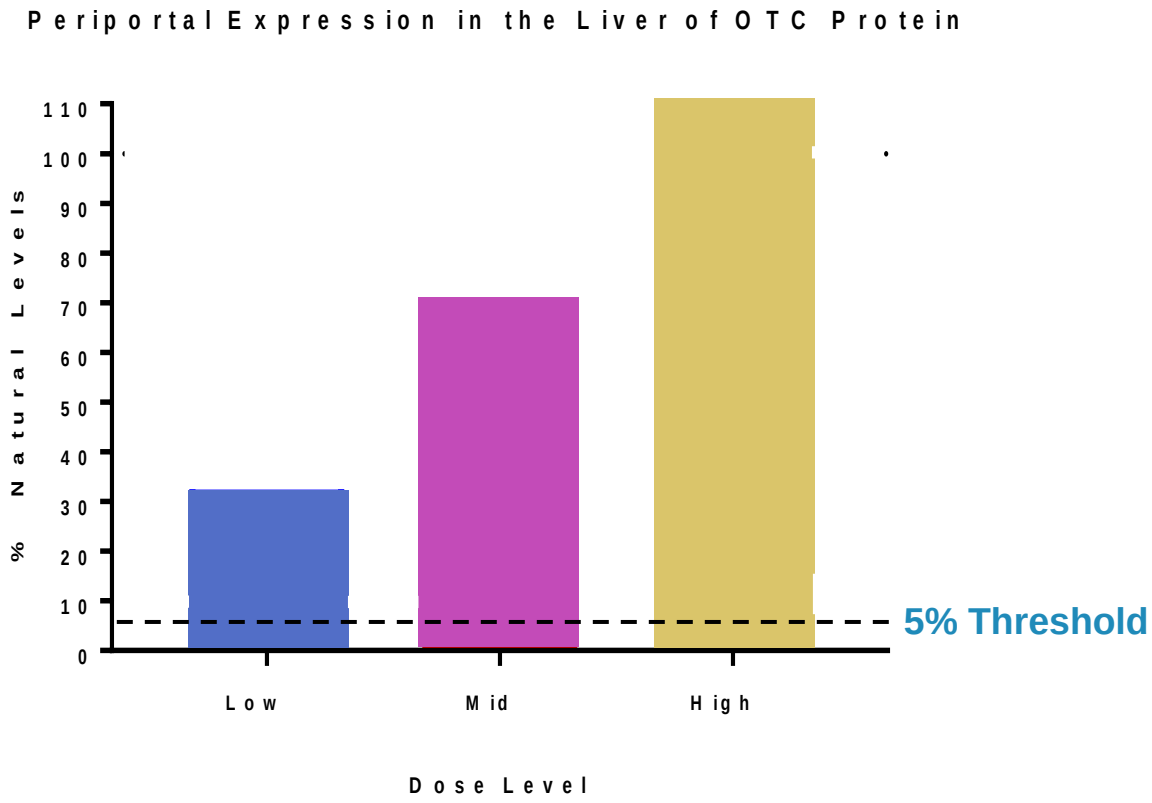
LUNAR-OTC Aims to Restore Enzyme Function

Establishing expression of OTC enzyme in liver has potential to restore urea cycle activity to detoxify ammonia, preventing neurological damage and potentially removing need for liver transplantation

LUNAR-OTC

Exceeds Target of 5% Enzyme Replacement in OTC-Deficient Mouse Model

- OTC deficiency impacts ureagenesis (ammonia detoxification)
- The main site of ureagenesis is the **periportal** region of the liver*
- The critical threshold of **5%** residual enzymatic OTC activity helps avoid severe manifestations of the disease (neonatal coma, mortality)*



LUNAR-OTC treatment increases OTC expression in mouse periportal hepatocytes (main site of ureagenesis)

*Li, L. et al. PGC-1α Promotes Ureagenesis in Mouse Periportal Hepatocytes through SIRT3 and SIRT5 in Response to Glucagon. Scientific Reports. 6:24156 | DOI: 10.1038/srep24156, April 2016
*Lamers, W.H., Hakvoort, T.B.M., and Köhler, E.S. 'Molecular Pathology of Liver Diseases' in Monga S.P.S. (ed.), MOLECULAR PATHOLOGY LIBRARY SERIES, Springer Publishing, New York, pp. 125-132 | DOI: 10.1007/978-1-4419-7107-4
*Scharre, Svenja. "*In vitro* enzyme activity predicts phenotypic severity in male individuals with ornithine transcarbamylase deficiency." SSIEM Annual Symposium 2022, Freiburg, Germany. 30 August – 2 September 2022. Poster Presentation.

ARCT-810 Clinical Update

Phase 1 (NZ) Study in Healthy Volunteers

- Completed dosing up to 0.4 mg/kg, total number of subjects N = 24, generally safe and well tolerated

Phase 1b (U.S.) Single Ascending Dose (SAD) Study in OTCD Adults

- Completed enrollment of three cohorts (0.2, 0.3, and 0.4 mg/kg) in Nov 2022
- No serious or severe adverse events
- Initiated screening of fourth cohort (0.5 mg/kg, N = 4)
- Total number of subjects to be expanded to N = 16

Phase 2 (EU) Single and Multiple Ascending Dose, Placebo-controlled Study in OTCD Adolescents & Adults

- Enrolling up to 24 subjects across two dose cohorts
- Approved to proceed in 5 countries
- 8 of 14 planned sites onboarded
- Interim data this year (2023)
  - Primary Endpoints: Safety and tolerability
  - Secondary Endpoints: PK and PD measures (ureagenesis assay, 24-hr ammonia profile)
  - Exploratory Endpoints: Plasma amino acids and OTC enzyme activity; urine orotic acid

Interim Phase 2 data expected in 2023 in conjunction with the announcement of additional liver therapeutic programs

ARCT-032

Inhaled mRNA Therapeutic Candidate for Cystic Fibrosis

Cystic Fibrosis

ARCT-032 Market Opportunity

Cystic Fibrosis

85,000-100,000 worldwide prevalence

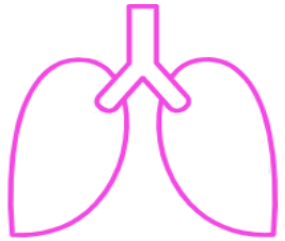
Caused by mutations in the CFTR gene, resulting in poor chloride transport and dehydrated, sticky mucus in the airways

Chronic airway obstruction leads to infection and inflammation, which causes progressive airway damage and ultimately, respiratory failure

Unmet Medical Need

Highly effective CFTR modulators are not approved for treatment of all people with CF and may not be tolerated in others.

Standard of care therapies do not prevent the chronic, progressive loss of lung function that ultimately requires lung transplantation or leads to early death



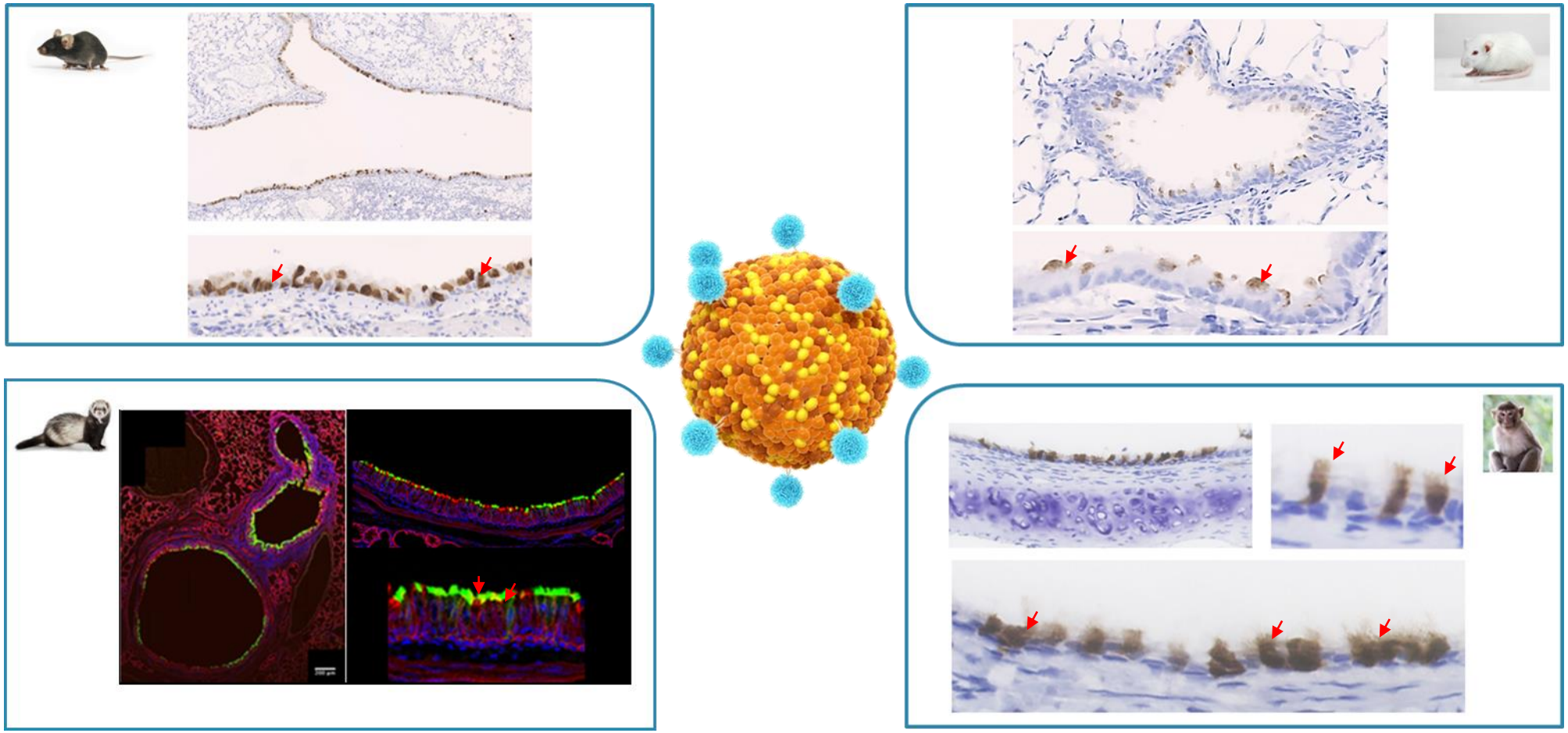
LUNAR-CF Aims to Restore CFTR Function

An mRNA replacement therapy has the potential to produce wild-type CFTR into the lungs of CF patients, independent of genotype

Functional CFTR protein can restore chloride efflux in the airways, reducing mucus accumulation and airway damage and minimizing the progressive respiratory impairment observed in people with CF

LUNAR®-mRNA in Healthy Animals (four different species)

Successful delivery to airway epithelium; transduction demonstrated by Brown and Green staining

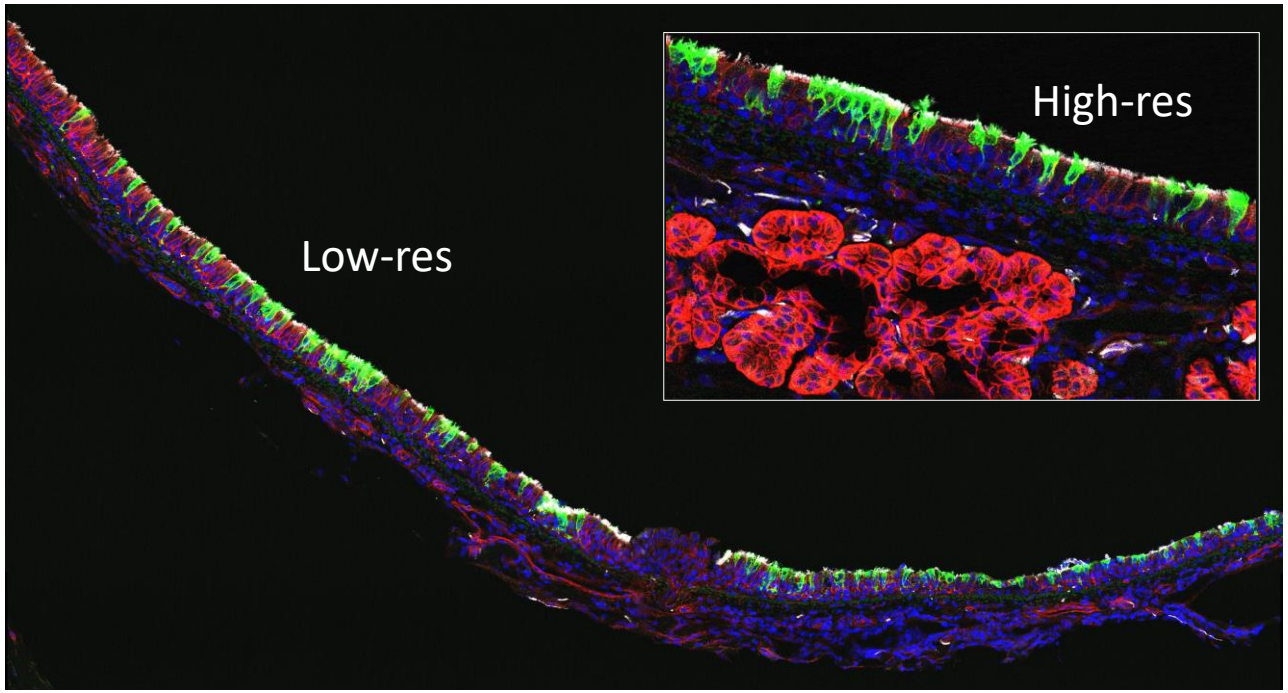


LUNAR® delivery to airway epithelium is demonstrated in rodent and non-rodent species

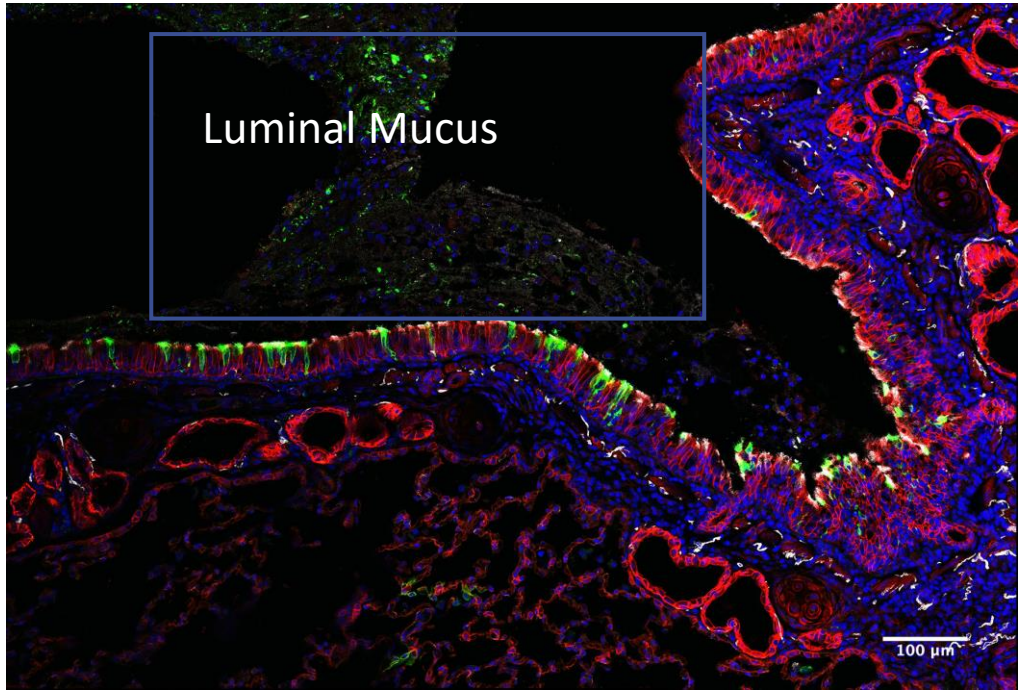
LUNAR®-mRNA in Cystic Fibrosis Ferret Model

Successfully Transduces Epithelium in the Presence of CF Mucus

Trachea



Bronchus



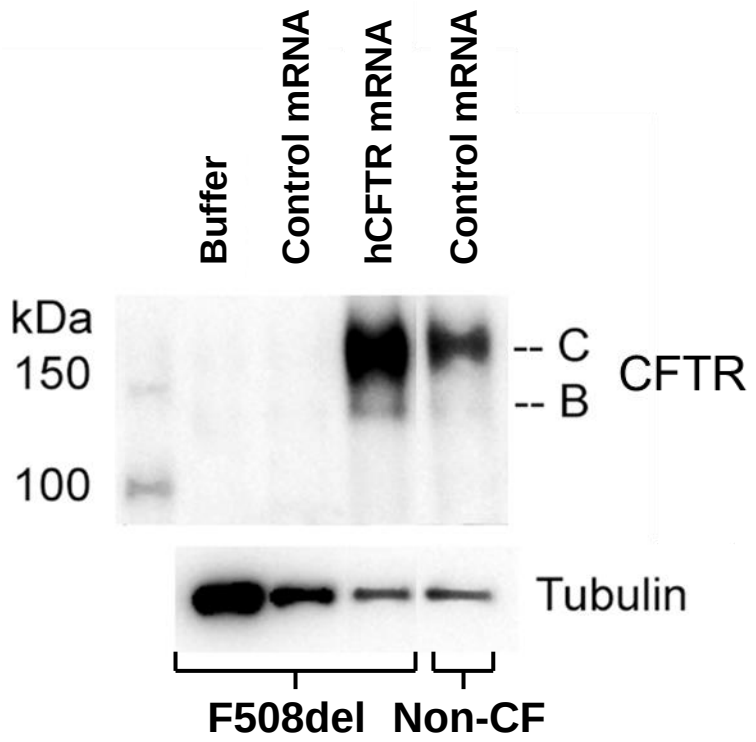
Green denotes functional expression of protein (Cre)

LUNAR® effectively delivers mRNA expressing Cre in a Ferret CF Model (G551D)

In collaboration with Univ. of Iowa John Engelhardt and Xioming Liu

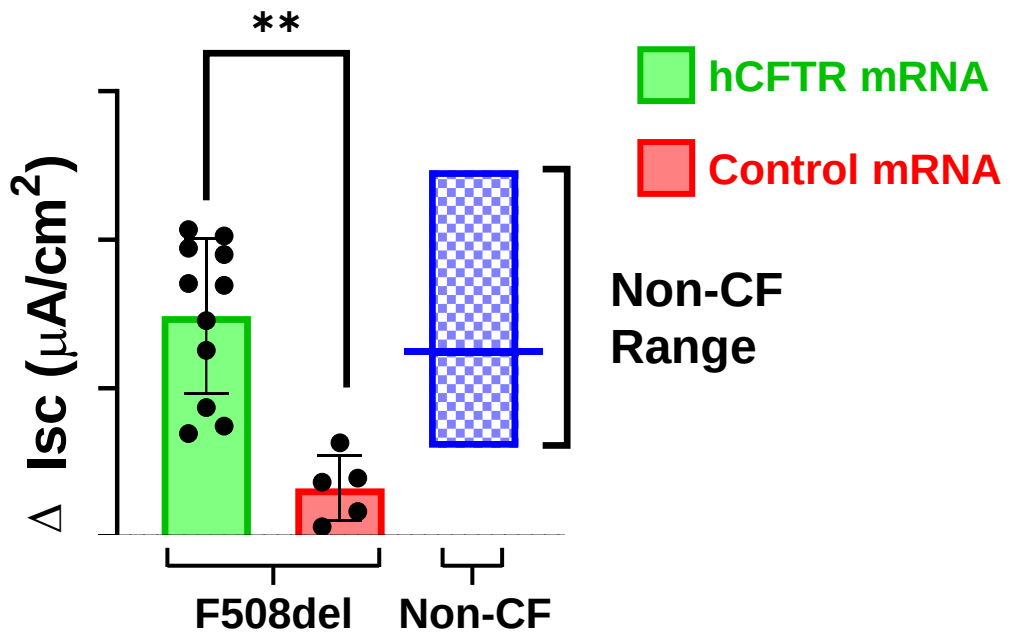
ARCT-032 Restores CFTR Expression & Function

High Expression Levels of CFTR protein



In collaboration with UAB CFRC and Javier Campos-Gomez

Restored chloride activity (chloride gradient)



**P<0.01; Data from two F508del donors; Using chamber studies performed with chloride secretory gradient

Restoration of CFTR expression and function in CF human bronchial epithelial cells

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