inomagen™
THERAPEUTICS

Series Seed

April 2024

Rishi Arora MD, Founder & CEO

Inomagen™
THERAPEUTICS

We are an Early Stage Biotechnology Company Developing a Non-Viral Gene Therapy that Targets the Underlying Mechanisms of Atrial Fibrillation

Inomagen's gene therapy has the potential to surpass cardiac ablation as the treatment of choice for atrial fibrillation

EXECUTIVE SUMMARY

Problem	• Atrial Fibrillation (AF) is a growing epidemic affecting >6M in U.S.; major cause of stroke; annual incremental cost of AF in U.S. is $26B • Current AF therapies including drugs and ablation are ineffective for many patients; only 50% efficacy for persistent AF
Solution	• Supported by grants totaling >$20M, our gene therapy targets major molecular mechanisms underlying AF with demonstrated effectiveness in proof-of-concept studies in two large animal models • Inomagen is also developing the first transvenous method of facilitating endocardial gene delivery using reversible electroporation, overcoming known AAV challenges, with potential to transform the cardiac gene therapy industry • Inomagen's gene delivery procedure is similar to AF catheter ablation, with the potential for improved effectiveness surpassing ablation as the therapy of choice for AF treatment • Inomagen has an exclusive License Agreement with Northwestern University for a patent portfolio protecting the biologic and electroporation device therapies
Latest Progress	• Demonstrated high levels of marker gene transfection in all regions of the left atrium (>70%) using a transcatheter approach; finalized electroporation parameters for gene delivery • Completed prototype development with an engineering firm of a proprietary electroporation catheter for gene delivery • One year remaining of a multi-year $3.67M SBIR Fast Track Grant for IND enabling studies
Team	• A team of industry veterans and key opinion leading cardiovascular physicians bring biotechnology and medical device experience to the company
Financing	• Raising up to a $5M Series Seed round in H1 2024 to ensure that the company can achieve key milestones and progress towards our IND filing on the way to initiating clinical study in 2026

inomagen™ THERAPEUTICS

THE SCIENCE

- The Problem
- The Solution
- How Our Therapy Works
- Advantages Over Ablation

THE PROBLEM: ATRIAL FIBRILLATION (AF)

AF is a **global epidemic** in the aging population with largely ineffective treatments available.

AF Epidemiology

- Presently **6M** Americans with AF increasing to 16M by 2050
- Lifetime risk of AF is 1 in 3 for people over 50
- The population >65yrs old will double by 2040

AF Causes Significant Morbidity and Mortality

- Risk of Stroke increases ~4-5x
- Leading cause of Congestive Heart Failure (~50%)
- Risk of Heart Attack (MI) increases ~ 2x

The Consequences of AF

454,000

Hospitalizations
in the US annually

158,000

Number of AF related deaths
in the US annually

THE PROBLEM: INEFFECTIVE PRESENT THERAPIES

Drugs

- Less than 50% efficacy
- Can cause life threatening arrhythmias

Cardiac Ablation (Paroxysmal)

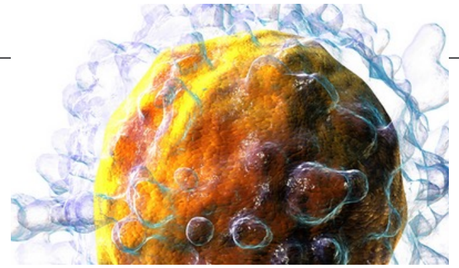
- 60-70% efficacy for early stage (paroxysmal)
- Irreversibly destroys cardiac tissue
- Risks of serious complications including mortality

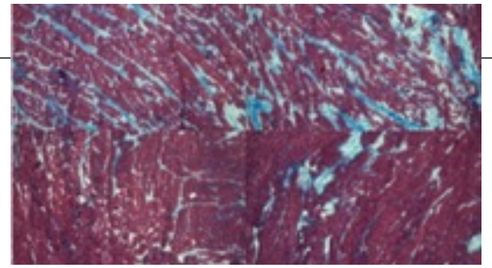
Cardiac Ablation (Persistent AF)

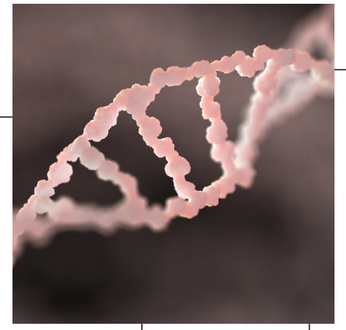
- Ablation only 50% effective for Persistent AF
- Nearly 50% of all AF patients progress to Persistent (Chronic) AF
- Majority of these patients require **a second destructive** ablation

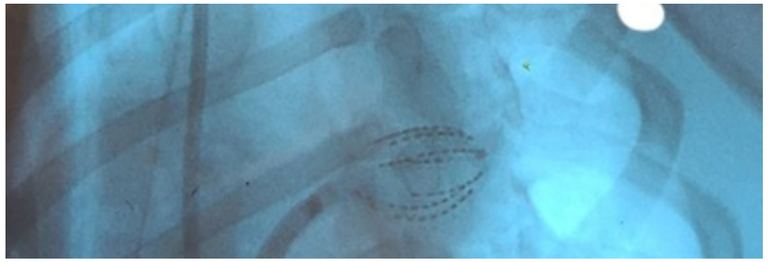
Current therapies do not treat the underlying mechanism of the disease

THE SOLUTION: TARGETING MOLECULAR MECHANISMS









AF Induced Damage

Reactive Oxygen Species

AF causes molecular changes in the heart resulting in the generation of damaging reactive oxygen species (ROS).

ROS Cardiac Changes

Remodeling of the Heart

ROS result in ionic channel changes (electrical remodeling via defective Na+ and K+ channels) and fibrosis (structural remodeling) within the heart.

These changes progress as one goes from a paroxsysmal AF to a persistent AF state making the disease increasingly more difficult to treat

Targeting the Problem

NADPH Oxidase (NOX2)

Inomagen has identified a trans-gene known as NADPH oxidase isoform (NOX2) as a major enzymatic source of oxidative injury in the atria.

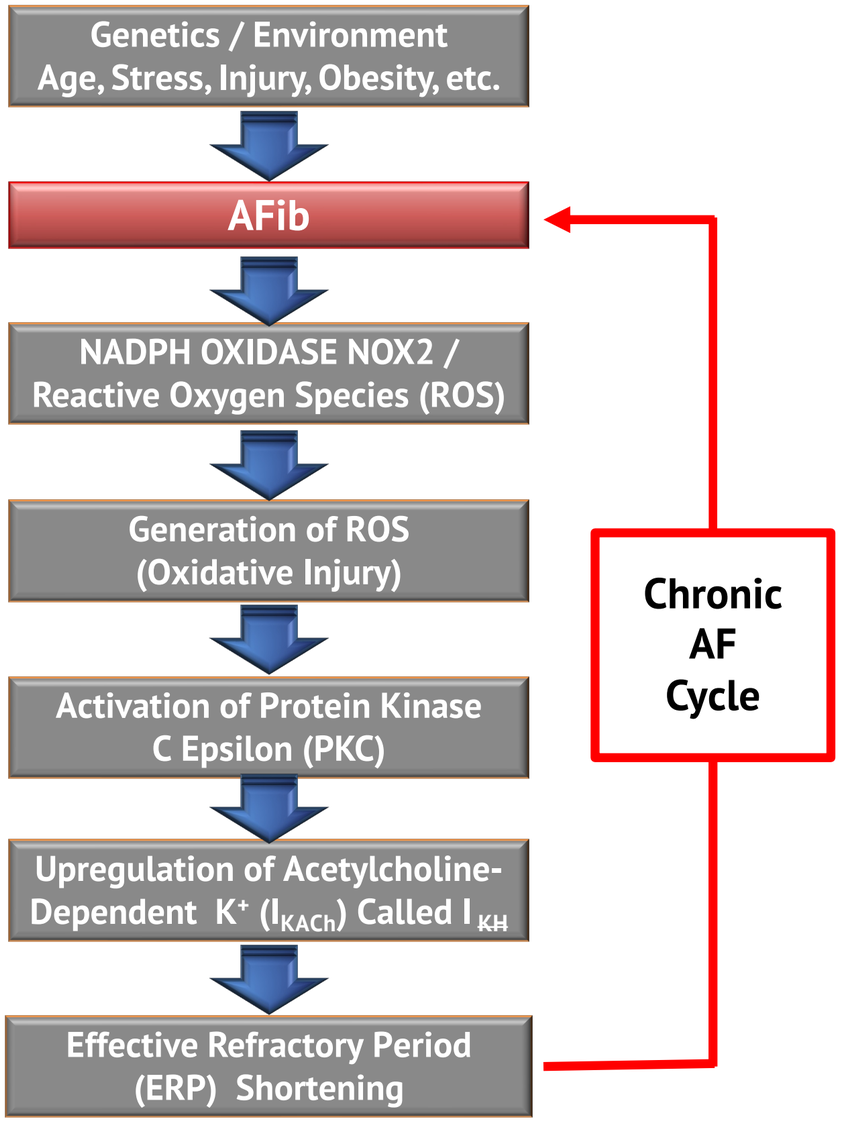
Our Solution

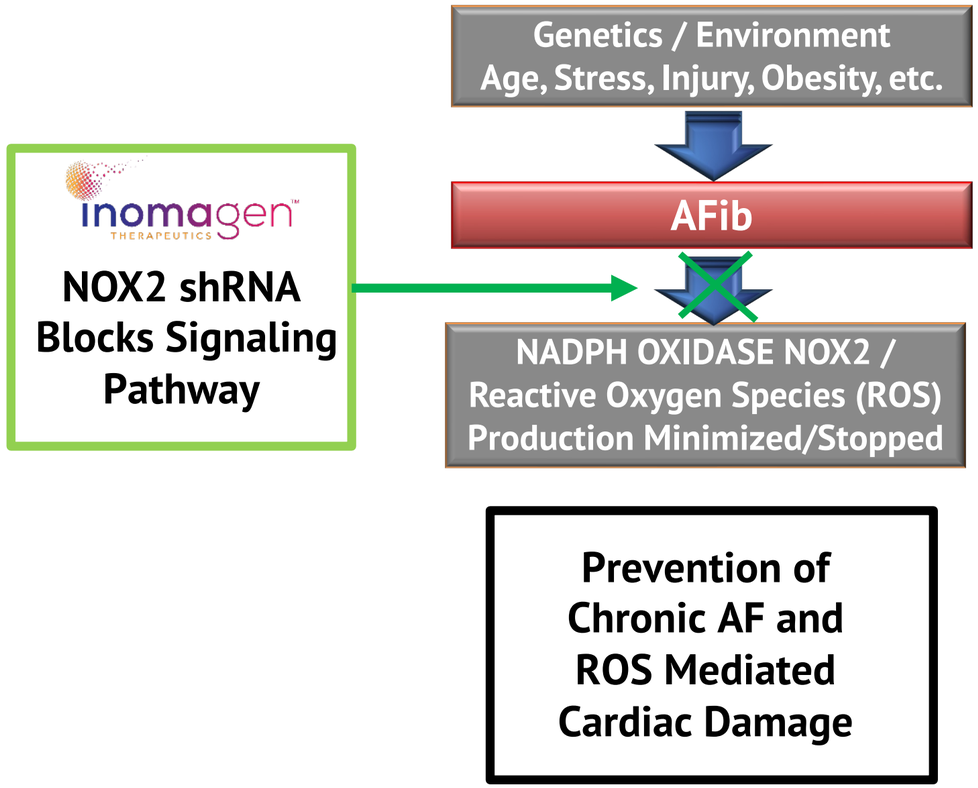
Targeted shRNA Therapy

Inomagen demonstrated in over 40 Large Animal Studies that suppressing NOX2 gene expression using shRNA prevents chronic AF and can even reverse cardiac electrical and structural damage

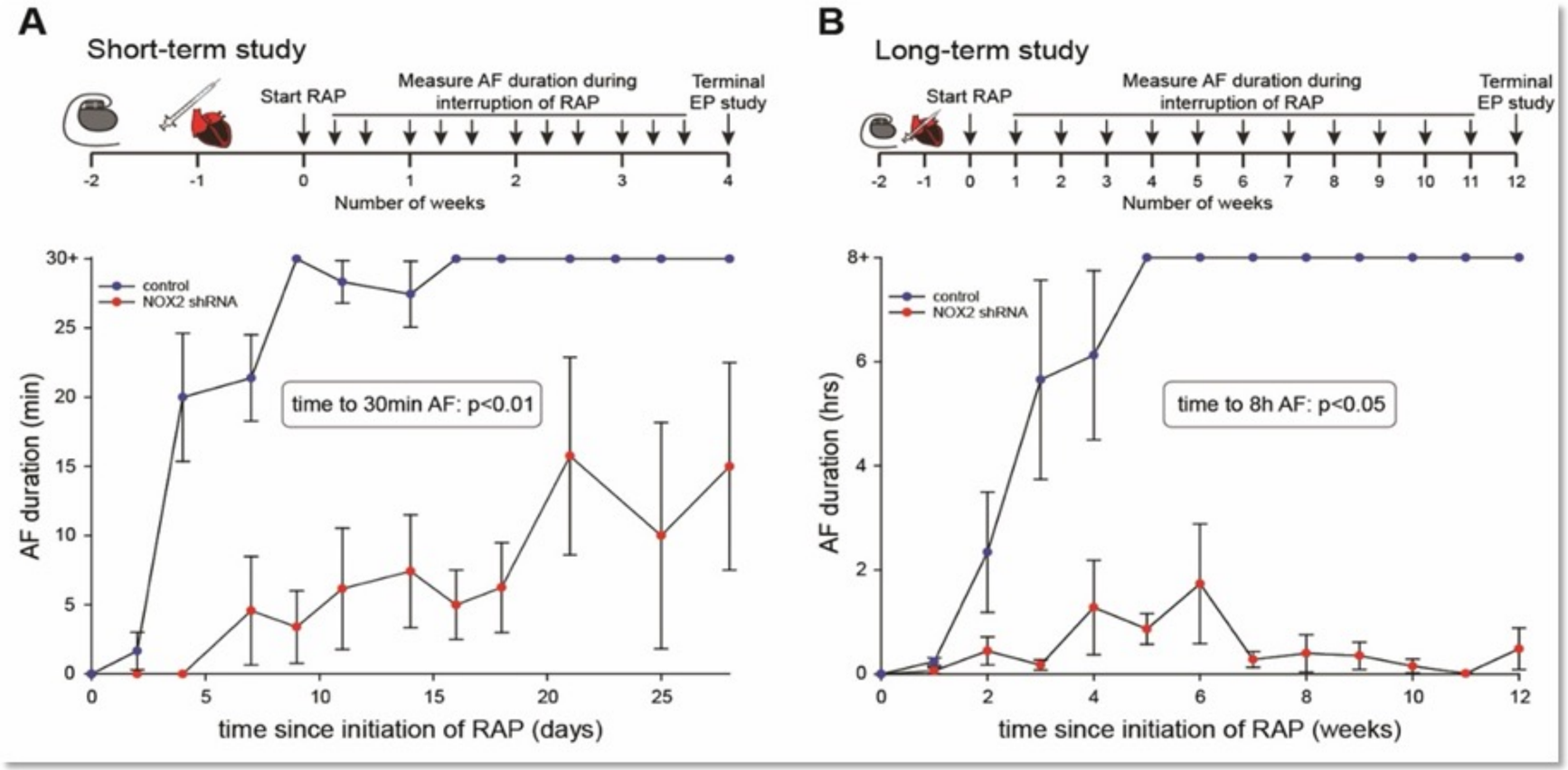
Inomagen has obtained similar data for other proprietary targets and continues to expand our portfolio

HOW INOMAGEN'S NOX2 SUPPRESSION WORKS





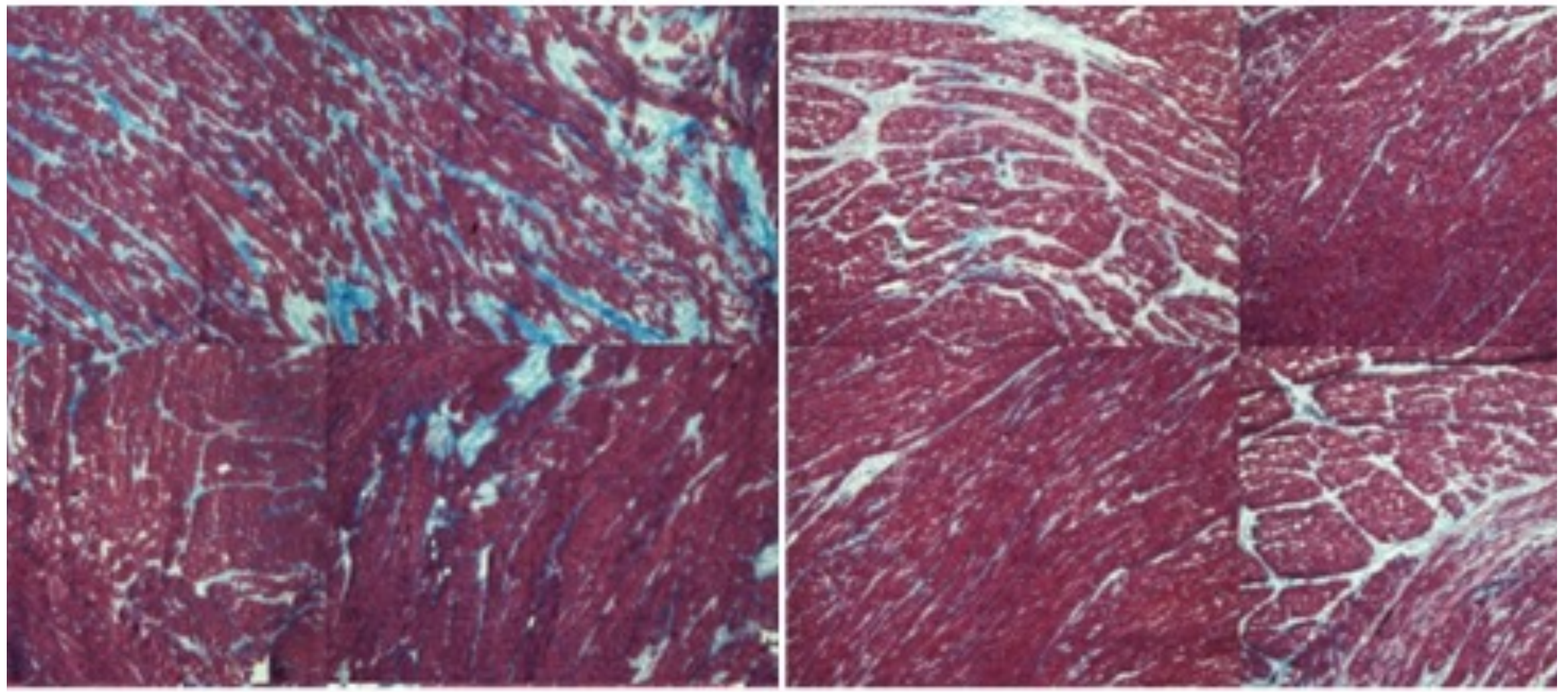
THE SCIENCE: PREVENTING ELECTRICAL REMODELING

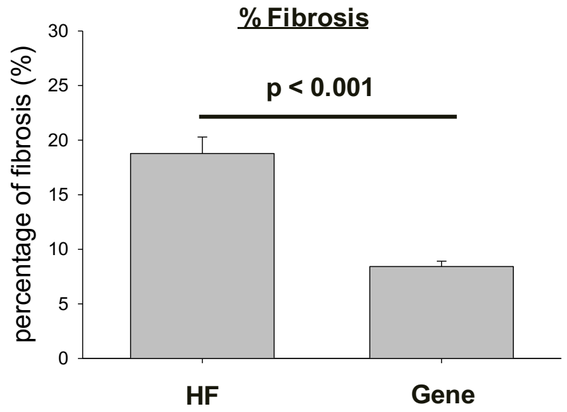


Inomagen's Gene Therapy (NOX2 shRNA) prevented onset of AF in both a short and long term rapid atrial pacing (RAP) model

Yoo, Pfenniger et al, Circulation 2020

THE SCIENCE: MINIMIZING FIBROSIS





Inomagen's Gene Therapy (NOX2 shRNA) Dramatically Reduced AF Induced Fibrosis (i.e., structural remodeling)

GENE DELIVERY SYSTEM

- The Problem
- Our Method
- Our System
- Our Proprietary Parameters

INOMAGEN'S NON-VIRAL GENE DELIVERY OVERCOMES KNOWN CHALLENGES OF VIRAL GENE THERAPIES

Most experimental methods for gene delivery to the heart are utilizing a viral vector (AAV) which has challenges

Gene Delivery	Viral (AAV)	Inomagen Non-Viral Plasmid
Description	IV Infusions	Plasmid delivery via catheter
Transfection Rates	Too Low	Reversible Electroporation results in higher rates
Off-Target Effects	Frequent due to systemic delivery	None as gene is delivered directly to target tissue
Immunogenic Mediated Toxicity	Possible	None

Gene therapy community grapples with toxicity issues, as pipeline matures

Cancer, hepatotoxicity, haematological and neurotoxicity concerns cause experts to call for more transparency and better manufacturing standards for AAV-based candidates.

Asher Mullard

News in Brief | Published: 05 August 2020

High-dose AAV gene therapy deaths

Nature Biotechnology **38**, 910 (2020) | Cite this article

18k Accesses | **59** Citations | **89** Altmetric | Metrics

Inomagen's revolutionary approach uses *reversible electroporation* for gene plasmid delivery

- Inomagen is developing a safe and effective non-viral gene delivery solution
  - TRAnsVenous Gene Electroporation (TRAVGE) System
- Potential to transform the cardiac gene therapy industry

INOMAGEN'S REVOLUTIONARY APPROACH USING REVERSIBLE ELECTROPORATION FOR GENE DELIVERY

Delivery of genetic material to the cardiac atrium (the source of AF) is notoriously difficult with existing methods.

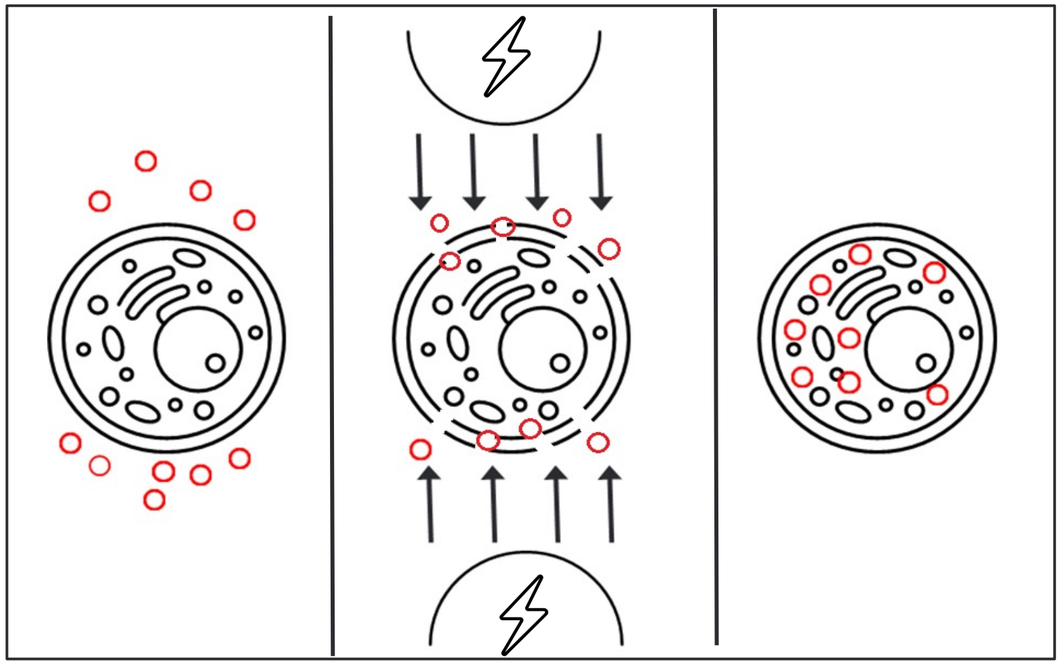
Inomagen has solved for this with a novel trans-venous method of facilitating endocardial gene delivery using Reversible Electroporation.

Our catheter applies a low voltage electric field to cells. This increases the permeability of the cell membrane wall, allowing DNA to be introduced.

This method allow for genetic material, packaged in Naked Plasmid DNA, to only be delivered directly to a specific site with no off-target effects!

Given the market and the need, Inomagen's gene delivery system has the potential to become a **platform technology** for endovascular gene delivery (e.g., NOX2 or any gene)

Usable for NOX2 shRNA or any other gene



Cardiac Myocyte	Electroporation	Transfection
Cell with DNA package outside the cell membrane	*Low energy field applied to cells by Inomagen's Gene Delivery System*	*DNA package now inside cell membrane, cell remains healthy*

OUR GENE DELIVERY SYSTEM

TRAnsVenous Gene Electroporation (TRAVGE) System

Electroporation Catheter (LAMPE):

Inomagen's proprietary catheter, designed and optimized to deliver reversible electroporation in the atria

Closed Tower Contains:

- Generator
- Pacer
- EPEL Box
- Recording System Amplifier

Exposed Ports For:

- Generator Leads
- ECG Leads
- Electroporation Catheter

TRAVGE System in Development

PROPRIETARY GENE THERAPY PARAMETERS

Inomagen's extensive SBIR Phase I large animal work has developed valuable gene therapy parameters

(confidential)

- Gene Parameters
- Electroporation Parameters
- Timing Parameters

A PROCEDURE FAMILIAR TO PROVIDERS

Catheter-based Procedure Steps	Cardiac Ablation	Inomagen Therapeutics
1. Gain access via femoral vein	✓	✓
2. Navigate to the right atrium	✓	✓
3. Cross the atrial septal wall to the left atrium	✓	✓
4. Deliver non-destructive energy through the catheter	✗	✓
5. Deliver genetic material via catheter	✗	✓
6. Perform multiple therapeutic maneuvers in L and R atria	✓	✓
7. Remove catheters	✓	✓
8. Recovery in 24hr observation	✓	✓

Low friction to adoption

Inomagen's Large Area Multi-polar Electroporation (LAMPE) procedure mirrors the steps of cardiac ablation

Leverages existing provider skills to facilitate easy adoption while allowing for targeted gene delivery instead of destructive ablation

POTENTIAL ADVANTAGES OVER AF ABLATION

	AF Ablation Shortcomings	Inomagen AF Gene Therapy Advantages
Efficacy	**<50%** for non-paroxysmal (persistent) AF representing a majority (2/3$^{rd's}$) of drug refractory patients	Goal of achieving **>70% efficacy** for all AF patients including persistent AF
Procedure Success	Up to 40% requires **repeat procedures** to identify and successfully ablate atrial heart tissue	Projected to be a **single procedure** with a consistent, reproducible atrial application of gene
Impact on Future AF Treatment	**Permanently destroys atrial tissue** from ablation procedures can limit future treatment options	**Functionally restorative/regenerative** with no damage to heart tissue expected
Safety	**Higher risk** of phrenic nerve damage (primary nerve of the diaphragm) and esophageal injury; **Longer Procedure** increases risk from a number of sources	**Low risk** as thermal energy sources are not utilized to burn heart tissue; **Shorter Procedure** decreases risk

BUSINESS

- Business Model
- Target Markets
- IP Estate
- Timeline to Key Milestones
- Our Team, Board, and Advisors
- Raising Series Seed
- Potential Exits and Acquirers
- Maximizing Investor ROI

BUSINESS MODEL: SOLVING MULTIPLE NEEDS

Inomagen Therapeutics

CORE BUSINESS FOCUS | *OUTLICENSING*

Gene Therapy

NOX2 shRNA and additional gene targets

Treating Chronic AF

- Prevention of Chronic AF
- Reversal of AF-induced electrical and structural damage

Gene Target Pipeline

- Additional proprietary targets; 2nd generation therapies

Gene Delivery System

Targeted gene delivery to cardiac tissue

Inomagen Therapy

- Deliver primary and future gene targets to atrial tissue

Platform Technology

- Expansion into cardiac ventricles (e.g., Heart Failure) for companies in need of a gene delivery solution

OS Mapping Algorithm

Mechanism-guided AF ablation

Ready for Clinic

Oxidative Stress (OS) Hotspot Mapping

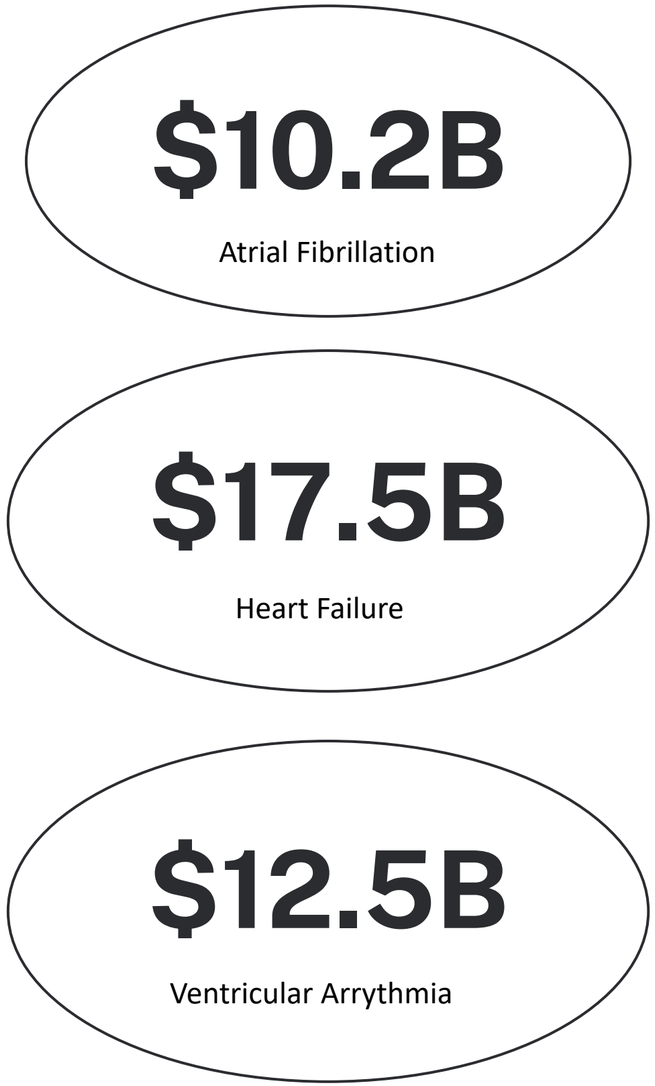
- Targeted ablation at ‘Hotspot’ sites in patients with Persistent AF
- Same mechanistic target as NOX2 shRNA

Additional Targets

- Additional non-pulmonary vein AF trigger discoveries

INOMAGEN'S TARGET MARKETS

- 360,000 ablations performed for AF in 2022
- Global Cost per procedure $26k in 2023
- Estimated Gene cost <$3k per procedure



AF Market

The lack of an ideal effective therapy creates the need for a new generation of treatments. If successful, Inomagen's gene therapy can ultimately surpass cardiac ablation.

Heart Failure Gene Therapy Market

As of 2022, there are 18 gene therapies under development. Given the expansive nature of the disease state, many more therapies are expected to be developed and in need of a gene delivery solution.

Ventricular Arrhythmia Market

VA's have been targeted by gene therapy approaches to overcome the limitations of current treatments. As of 2022, there are 4 new molecular-based gene therapies in development with a strong market demand for new solutions.

ROBUST IP ESTATE

Extensive Patent Portfolio

Patent portfolio includes 15 Issued and 3 Allowed U.S. patents covering:

- Biologics – multiple genes protected
- Gene delivery system

Exclusive License Agreement with Northwestern University

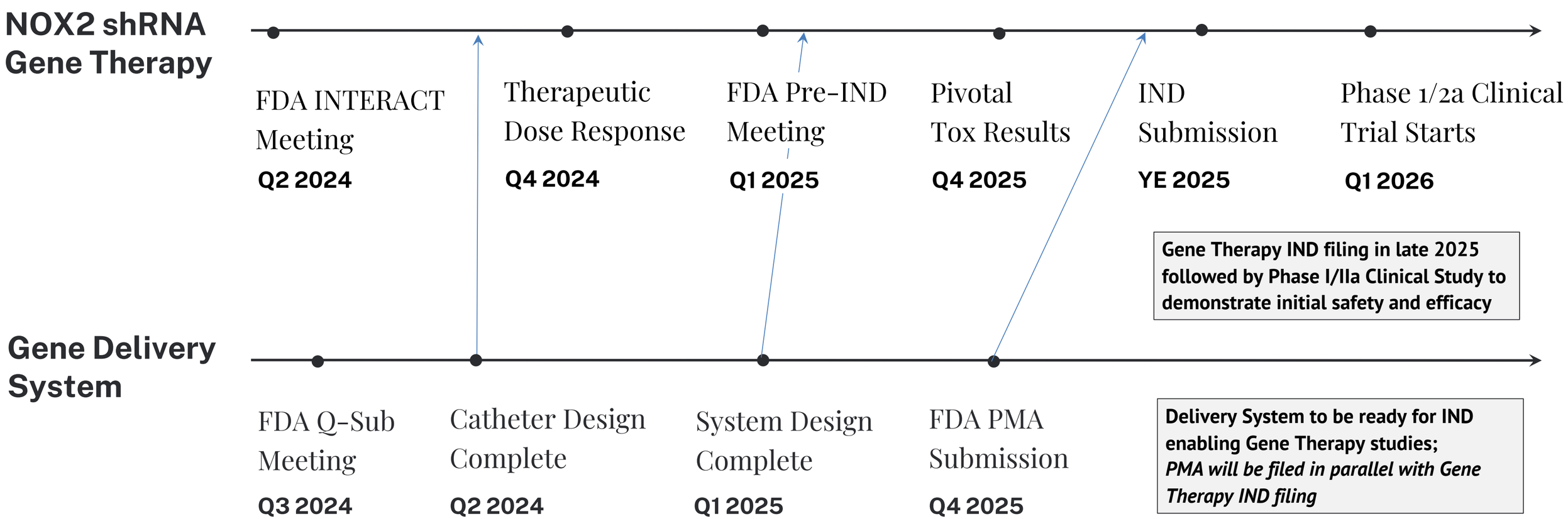
Inomagen has an exclusive and highly favorable license agreement with Northwestern University (NU) for the company's gene therapy technology

Additional IP Generation

Several patent applications are pending with additional IP filings expected in areas related to our studies outside of the AF application (e.g., heart failure, ventricular arrhythmias)

Patent Title	Issued Patents (Issue Date)	Pending Applications
Methods for Treating Atrial or Ventricular Arrhythmias	United States 8,193,151 (6/5/2012)	N/A
Devices for Material Delivery, Electroporation, Sonoporation, and/or Monitoring Electrophysiological Activity	United States 10,369,360 (8/16/2019)	United States 16/533,265 (Allowed 2/28/2024)
Composition and Methods for Treating or Preventing Atrial Fibrillation	United States 9,931,333 (4/3/2018)	N/A
Composition and Methods for Treating Atrial Fibrillation	United States 8,518,884 (8/28/2013)	N/A
Inhibition of Fibrosis and AF by TGF-Beta Inhibition in the Posterior Left Atrium (PLA)	United States 9,078,918 (7/4/2015)	US 16/458,326
Using Intracardiac Electrograms to Predict Location of Fibrosis and Autonomic Nerves in the Heart	United States 9,149,200 (10/6/2015) 9,955,892 (5/1/2018)	N/A
Contribution of Oxidative Stress to AF Electrograms	United States 9,615,758 (4/11/2017) 9,907,479 (3/6/2018)	N/A
Inhibition of Oxidative Stress in Atrial Fibrillation	United States 9,932,588 (4/6/2018) 10,988,767 4/27/2021) 11,781,144 (10/10/2023) Germany/France/UK EP 3068440 (1/8/2020)	N/A
Targeted Delivery of Biologic Therapeutic Agents	United States 11,185,674 (11/30/2021)	N/A
Gene Therapy Treatment of Atrial Fibrillation	United States 11,865,186 (1/9/2024)	PCT/US2020/015063
Materials and Methods for Gene Delivery in the Heart		US 16/773,540 PCT/US2020/015225
Methods and System for the Identification and Modeling of Atrial Fibrillation Reentry		US 17/521,545 (Allowed 10/25/2023)
System and Method to Detect and Treat Arrhythmogenic Regions in Atrial Fibrillation		US 17/308,756 (Allowed 11/13/2023) PCT/US2021/030889
Integration of Electrophysiology Mapping Systems with Electroporation Synchronized with Pacing		US 63/088,829 PCT/US2021/053912
Composition and Methods for the Inhibition of Nerve Growth Factors and the Treatment/Prevention of Atrial Fibrillation		PCT/US2022/033444
Transvenous Reversible Electroporation		US 63/406,538 PCT/US2023/073941

GENE THERAPY TIMELINE TO KEY MILESTONES



Series Seed up to $5M	Series A $12-15M	Series B $25M

MEET THE TEAM

Founder & CEO
Rishi Arora MD

Dr. Arora is a well-published physician-scientist and a key thought leader in the area of atrial fibrillation. In addition to being a practicing electrophysiologist, Dr. Arora runs one of the busiest laboratories at Northwestern University where he has raised over $20M in NIH grants for his work on AF therapies.

Chief Medical Officer
Gerard Abate MD

Dr. Abate has a background as a clinical cardiologist and is well experienced in the healthcare industry. Over the past 30 years Dr. Abate has held numerous Pharma/Diagnostics leadership roles including Amarin Pharmaceuticals, Daiichi Sankyo, Atherotech, and as the Executive Director of Medical Affairs at Quest Diagnostics.

Chief Business Officer
Eric Sandberg

Eric has 30+ years of medical technology leadership experience at Guidant, Boston Scientific, Axogen and several start-up ventures, in roles that have included CEO, CBO, and CCO, and brings significant commercial experience in the cardiovascular space including cardiac rhythm management.

Chief Financial Officer
Scott Jordan

Scott is a FINRA licensed representative with 30+ years of experience as a life sciences business development executive, and investment banker. Previously, Scott was CFO of two early-stage companies, Iterion Therapeutics and Salarius Pharmaceuticals. As a result of the company achieving pivotal financing and scientific milestones, Salarius listed on NASDAQ via a reverse merger with Flex Pharma in July of 2019.

MEET THE TEAM

SVP Gene Therapy R&D
Robert Moen MD, PhD

Dr. Moen is a seasoned veteran of the gene therapy space with over 30+ years industry experience primarily in cellular and gene therapy with Baxter, Geneic Sciences, and Genetic Therapy Inc.
He has extensive experience designing IND-enabling experimental protocols and is well versed in clinical, regulatory, and quality systems development and management.

Lead Engineer
David Johnson

David is a highly skilled biomedical research engineer with extensive time in both industry and academia. He time includes 17 years at GE Healthcare, and experience as a compliance CTO in the nuclear pharmaceutical industry. In addition to his role at Inomagen, David works with Dr. Arora in his lab as a gene therapy research engineer.

Manager, Clinical Science
Jim Hausserman MD, MS

Jim has a microbiology and bacterial genetics background with extensive experience advancing early-stage life science startups. Having a medical degree has enabled him to excel in translational research, pushing cutting-edge science towards the clinic through regulatory assistance, clinician outreach, and study design.

VP Business Development
Robin Drassler

Robin has over 25 years of commercial experience in medical devices including COO at Gardner Medical Instruments, VP Sales & Market Development at Attune Medical, and various sales and market development roles at Covidien (Medtronic). He holds a BA degree in Business Economics from University of Illinois.

BOARD OF DIRECTORS AND ADVISORY BOARD

Board of Directors

Mark Penn MD, PhD

Dr. Penn is a renowned Cardiologist who has helped pioneer and commercialize several important innovations in his field, while establishing two parallel careers as an inventor and healthcare investor. Currently, Dr. Penn is a practicing cardiologist and director of research at the Summa Health Heart and Vascular Institute (Akron, Ohio), as well as director of the Institute's Cardiovascular Medicine Fellowship. He is also professor at Northeast Ohio Medical University where he leads the Skirball Laboratory for Cardiovascular Cellular Therapeutics.

Board of Directors

Jim Vogler JD

Jim is senior partner in Barack Ferrazzamo LLP's Litigation and Intellectual Property Groups. He has served on several business boards, including U.S. Laboratories Inc. and Pharos Innovations LLC. He is admitted to practice in the State of Illinois, the U.S. Supreme Court, the Fifth and Seventh U.S. Courts of Appeal, and numerous U.S. District Courts. Additionally, he has served on the non-profit boards of Rise International, which builds schools in rural Africa (over 190 to date); Children's Heart Foundation; Williams Heart Foundation; and The Chicago Foundation.

Advisory Board Member

Ken Ellenbogen MD

Dr. Ellenbogen is director of cardiac electrophysiology and pacing at VCU Health. He is 2023-2024 President-Elect of the Heart Rhythm Society, and has served as a Chair of the Education Committee and member of the Board of Trustees. He has published more than 350 original scientific reports and over 200 book chapters, editorials and review articles. He is the editor or co-editor of five textbooks of cardiac electrophysiology and pacing, and has presented over 300 abstracts at major scientific meetings. He has served on the editorial boards of multiple journals, including *Heart Rhythm*.

Advisory Board Member

Alan Kadish MD

Dr. Kadish is President of The Tuoro College and University System. He has served as Director of Clinical Trials, Distinguished Professor of Cardiology, and Associate Chief of Cardiology at Northwestern. He distinguished himself as a prominent cardiologist, dedicated teacher and researcher, and experienced administrator. An accomplished and prolific research scientist, he has published over 250 peer-reviewed papers, received numerous grants, including from the NIH and the National Science Foundation, and contributed to several textbooks.

Advisory Board Member

Peter McNerney

Pete is Adjunct Professor in Healthcare at Kellogg at Northwestern University, and Founder and Senior Advisor to Thomas McNerney and Partners.
He has 30+ years healthcare operations and venture capital including Baxter, Memtec N.A., The Kensington Group, and Coral Ventures. He has served as President of the Minnesota Venture Capital Association and the Board of Trustees of Blue Cross and Blue Shield of Minnesota. Pete received a B.A. from Yale and MBA from Stanford University.

Advisory Board Member

Gregg Sutton

Gregg has >30 years of engineering experience in the medical device industry including several highly successful early-stage device development companies, including Surmodics, NorMedix, Atritech, Angioguard, and Vascular Solutions,, leading teams in development and launch of high-profile, first-of-their-kind devices, including the Watchman device. With a degree in mechanical engineering and >40 patents granted or pending, Gregg has substantial experience in all aspects of medical device development, including IP, design, product development, and mfg.

RAISING SERIES SEED

EQUITY INVESTORS

$5M Series Seed Offer

Inomagen is raising up to $5M Series Seed round to ensure that the company can achieve key milestones and progress towards our IND filing in late 2025.

Complements ongoing $3.67M Fast Track SBIR grant and convertible notes totaling $2M

TARGET CLOSE

H1 2024

ANTICIPATED RUNWAY

12 Months

Gene Delivery System Development

Continue design, development, and testing of our Gene Delivery System (Low-Energy Electroporation Cardiac Catheter and Pulsed Field Generator).

Regulatory Consultant Support

Continue to fund our team of gene therapy and medical device regulatory experts to ensure successful FDA Q-Sub and Pre-IND Submissions

Planned Achievements with Series Seed Proceeds

1. Fully built Cardiac Gene Delivery Catheters for IND enabling studies
2. Optimization of Proprietary Plasmid Vector
3. First NOX2 Therapeutic Dose Response results
4. Completion of FDA INTERACT and Q-sub meetings

inomagen™ THERAPEUTICS

POTENTIAL EXIT AND ACQUIRERS

Potential Exit Windows in 2026 and 2027

1) Filing of IND with proof-of-concept in large animal models (Q1/Q2 2026)
2) End of Phase I/IIa clinical study with preliminary human safety and efficacy data (Q2/Q3 2027)

Several Prospective Acquirers are Tracking Inomagen's Progress

- Strategic Device Companies with a stake in AF therapies and pulse field ablation (PFA) platforms
- Large Biotech and Pharma seeking novel therapeutic solutions for AF, and/or non-AAV gene delivery solutions for CHF

Device Licensing Opportunities in 2026

- Proprietary gene delivery device for cardiac gene therapy companies for non-AF applications (e.g., CHF, ventricular arrhythmias)

MAXIMIZING INVESTOR ROI

Inomagen Leverages Non-Dilutive Funding Opportunities

Inomagen has been able to minimize early investor dilution and maximize potential returns through the use of Government Grant Funding

- $3.67M NIH/NHLBI SBIR I and II Grants
- $20M+ NIH Grants to NU Arora Lab

NIH
National Institutes of Health

Industry Highly Values Next Generation AF Solutions

In 2021, Boston Scientific acquired pre-revenue Farapulse, Inc. for $786M in total value

In 2022, Medtronic acquired pre-revenue Affera, Inc. for $904M

inomagen™ THERAPEUTICS

INOMAGEN SUMMARY

Atrial fibrillation is a growing epidemic with ineffective solutions

Inomagen's gene therapy has the potential to surpass cardiac ablation as the treatment of choice for AF

Inomagen's gene delivery approach has the potential to transform the cardiac gene therapy market

Believe value creation will deliver >10X return for Series Seed investors through strategic acquisition

CONTACT INFORMATION

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ERIC SANDBERG, CHIEF BUSINESS OFFICER
SCOTT JORDAN, CHIEF FINANCIAL OFFICER
ROBIN DRASSLER, VP BUSINESS DEVELOPMENT