

Treating Post-Heart Attack Heart Muscle with microRNA Technology

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2026



PROLIFERATE. REGENERATE. RESTORE.

Experienced team driving biotech innovation

TECHNOLOGY

PRO302 is a proprietary technology combining miR302 with a hydrogel.

This mixture is introduced into damaged heart muscle following a heart attack and can help proliferate heart muscle.

Proven results in preclinical models

Foundational IP strategy in place

Clear pathway to human trials

Simple and scalable technology

Irreversible Damage: The Burden of Heart Failure

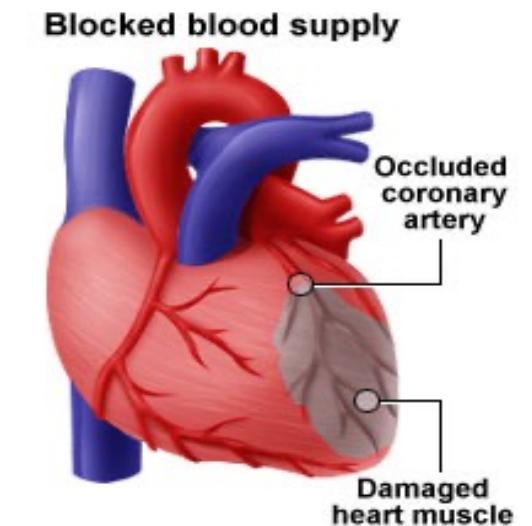
Heart disease is the #1 cause of death in US & globally

~800,000 heart attacks in the US annually

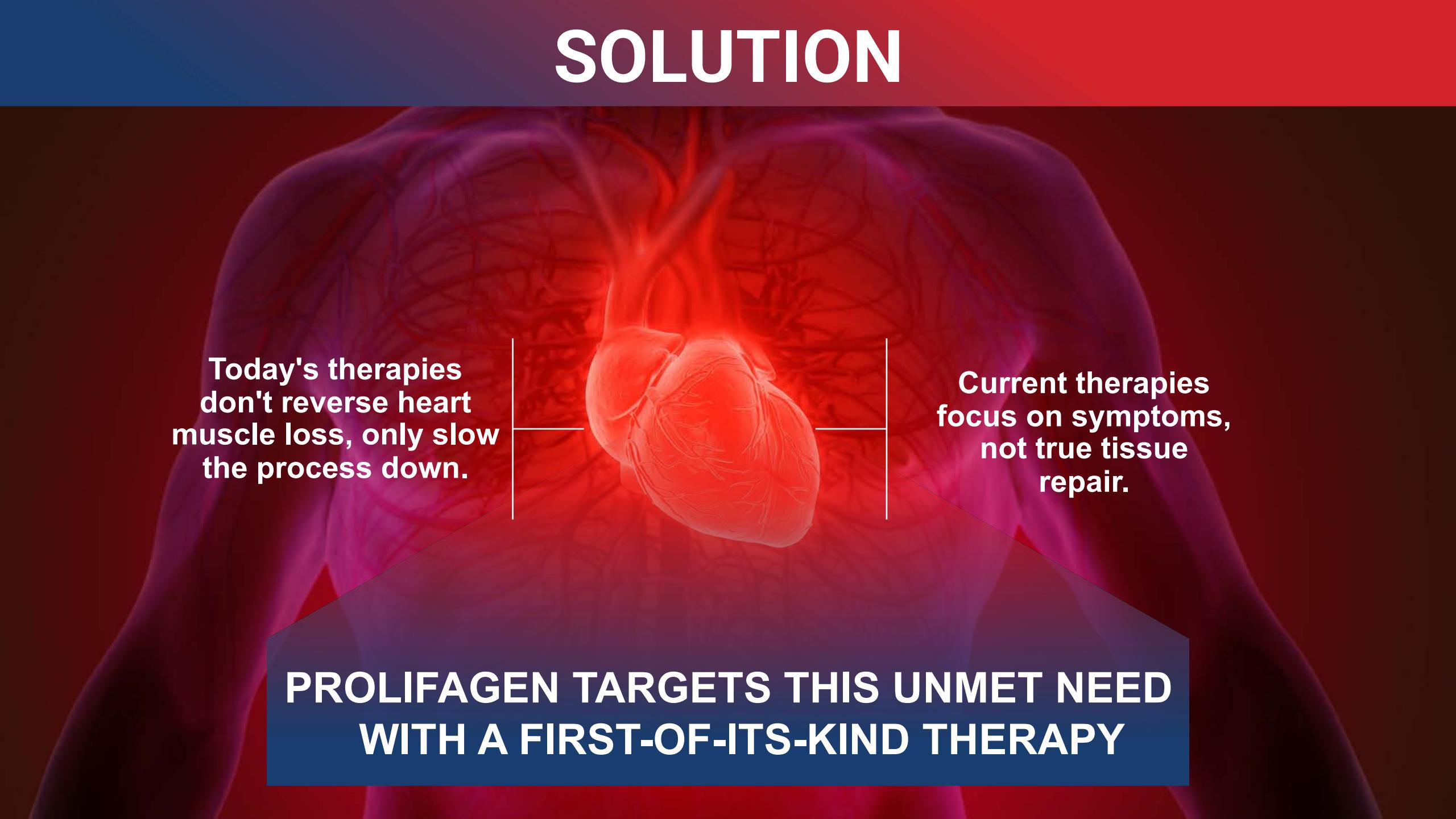
30% of those who suffer a heart attack proceed to heart failure

50% of patients with heart failure die within 5 years of diagnosis

\$69.7B Projected 2030 US heart failure cost burden



SOLUTION



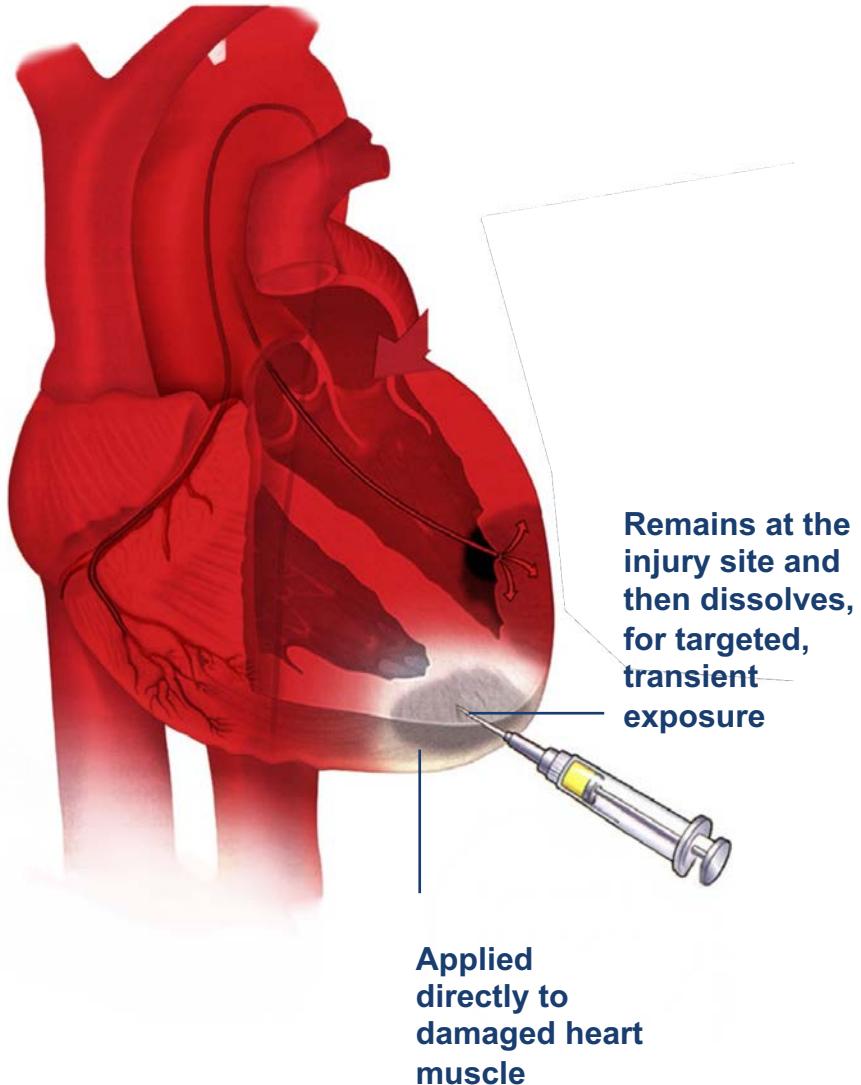
Today's therapies
don't reverse heart
muscle loss, only slow
the process down.

Current therapies
focus on symptoms,
not true tissue
repair.

**PROLIFAGEN TARGETS THIS UNMET NEED
WITH A FIRST-OF-ITS-KIND THERAPY**

PRO302: Combines microRNA's Power with Localized, Controlled Hydrogel Technology

Precise, localized application and repair



miRNA-302

- Synthetic
- Controllable
- Switch on/Switch Off

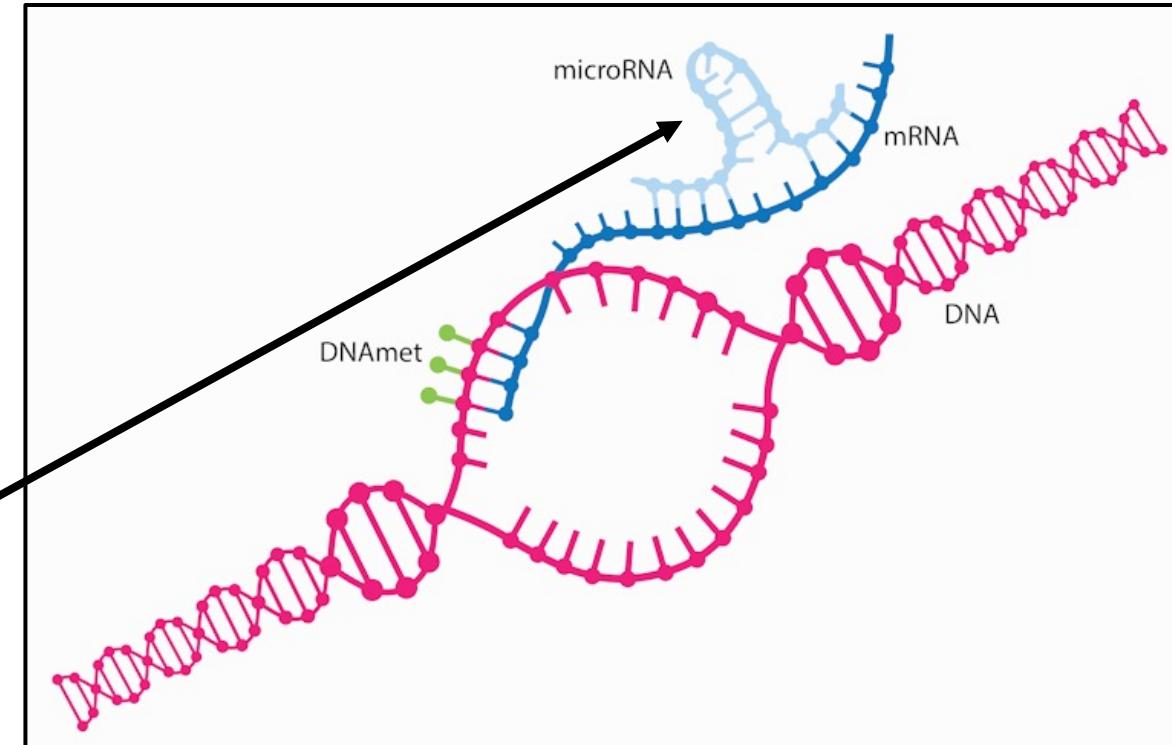
Hydrogel

- Hyaluronic Acid
- Shear Thinning
- Local & Transient

microRNA302 (Payload)	Hydrogel (Delivery Platform)	Combined Effect
Synthetic, controllable, safe	Localizes and times delivery	Direct heart muscle repair
Fine-tunes cell repair	Dissolves after therapy	Limits side effects & systemic exposure
“Switch on and off” as needed	Shear-thinning for easy injection	Only at the injury site

What is microRNA?

- **DNA**
 - Carries information needed to build protein
- **mRNA (aka: Messenger RNA)**
 - Carries information from DNA
 - Template for Protein Production
 - 400 to 400,000 Nucleotides long
- **siRNA**
 - Double Stranded / Exogenous
 - 19-23 Nucleotides
 - Regulate Gene Expression
- **miRNA (aka: Micro RNA)**
 - Single Stranded / Endogenous
 - 22-23 Nucleotides long
 - Regulate Cellular Processes

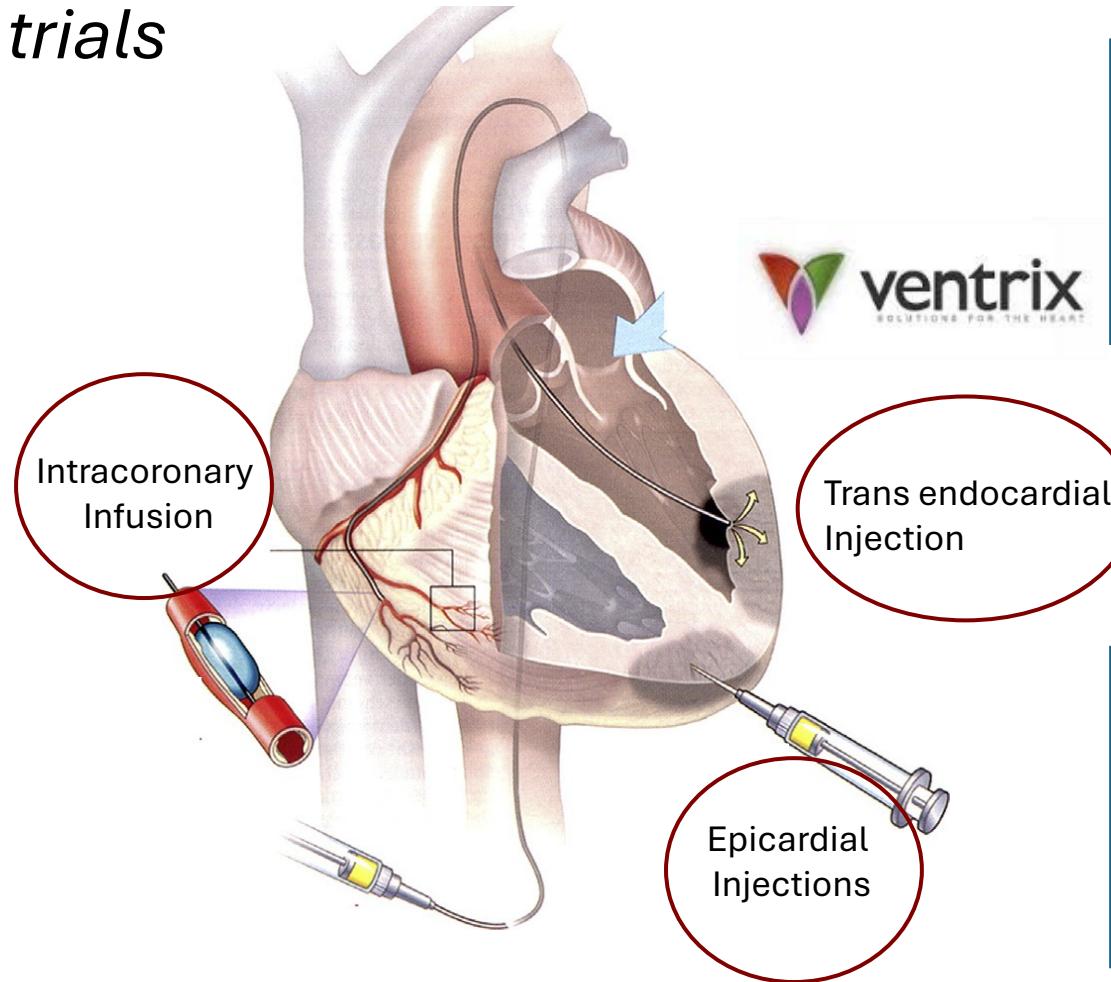


Hydrogels in Cardiac Repair

Hydrogels in clinical trials



Phase II: NCT01226563 (PRESERVATION I)
Large MI patients (303),
Safe, but not effective
Too little material that actually reaches infarct?



Phase I: NCT02305602
60 days to 3 years after MI (15)
MyoStar catheter
Safety shown



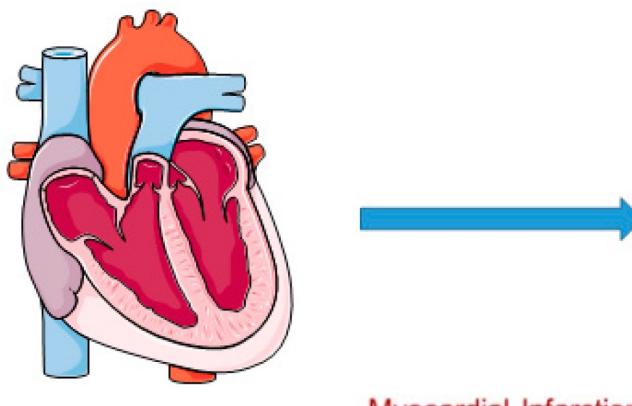
Phase II: NCT01311791 (AUGMENT-HF)
Heart failure patients (78)
Improved VO₂ levels,
No functional/remodeling changes
Delivered too late?



PRO302

- Cardiomyocyte Proliferation
 - Prevention of Scarring

Normal Heart



Myocardial Infarction

Death of cardiomyocytes

Scar tissue formation

Thinning of the heart wall

Left ventricular remodeling

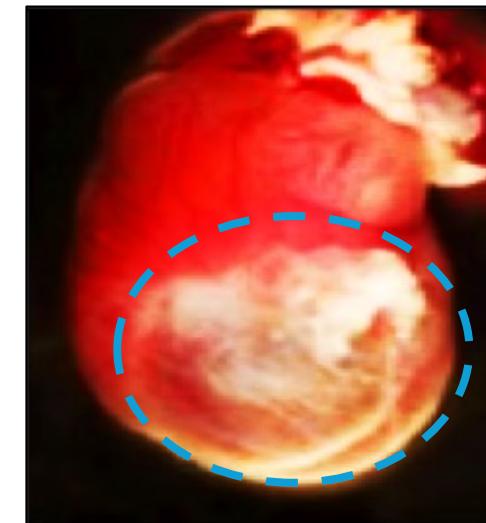
Decreased pumping capacity

Remodeling
(Scar Tissue)

Proof in Preclinical Models

Preclinical Data

- Mice Study
- In-Vitro Human Data
- Two Pig Studies



Mouse heart without PRO-302 shows significant scarring



Mouse heart after heart attack treated with PRO-302 shows a reduced area of damaged tissue

Billion Dollar Opportunity

 **Prolifagen**
PROLIFERATE. REGENERATE. RESTORE.

**The Fathers of microRNA—
Received the 2024 Nobel Prize
in Physiology or Medicine**

\$1.1B



\$1.7B



Novo Nordisk Acquires Cardior Pharmaceuticals for \$1.11B in Effort to Bolster Cardiovascular Disease Pipeline

March 26, 2024
By Don Tracy, Associate Editor

News Article



Deal includes the novel treatment CDR132L, which is currently in Phase II clinical trials for heart failure.

Novo Nordisk announced that it has acquired Cardior Pharmaceuticals in hopes of improving its pipeline in cardiovascular disease management. The acquisition includes Cardior's top drug candidate, CDR132L, which is currently in Phase II of clinical development



Image Credit: Adobe Stock Images/ckybe



Novartis to acquire Regulus Therapeutics and farabursen, an investigational microRNA inhibitor to treat ADPKD, the most common genetic cause of renal failure

Apr 30, 2025

- Regulus is a clinical-stage biopharmaceutical company developing microRNA therapeutics with a focus on autosomal dominant polycystic kidney disease (ADPKD), a severe renal disease
- Lead asset for ADPKD, farabursen, is a novel, next-generation oligonucleotide targeting miR-17 that recently completed a Phase 1b multiple-ascending dose clinical trial
- Transaction includes USD 0.8 billion upfront with a potential additional USD 0.9 billion payment upon the achievement of a future regulatory milestone; transaction is expected to close in the second half of 2025, subject to customary closing conditions



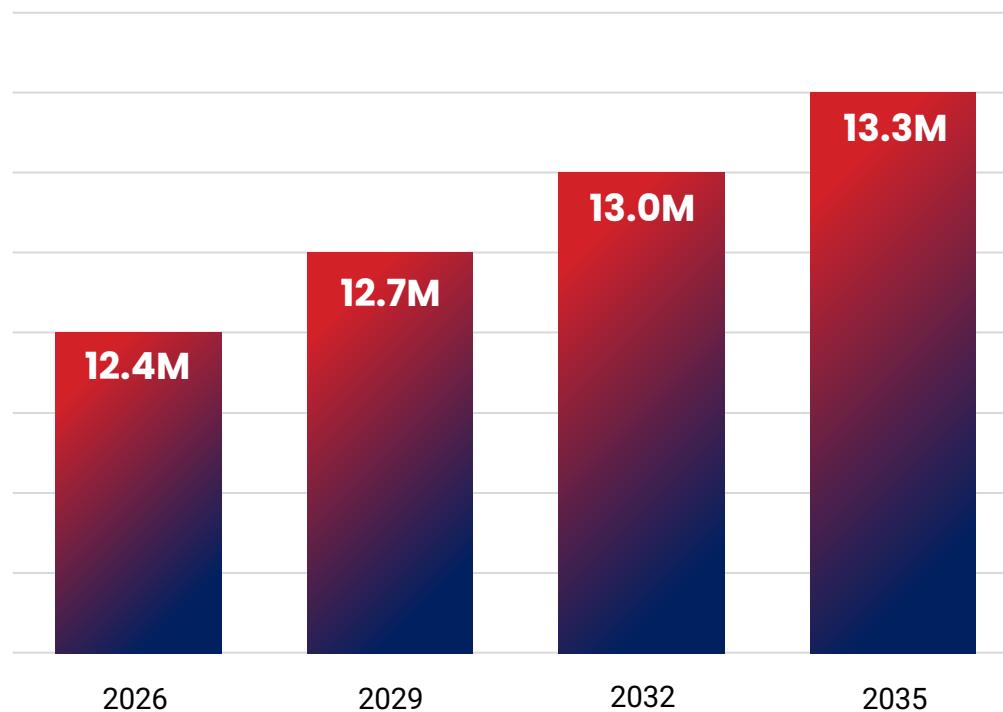
Victor Ambros



Gary Ruvkun

Increasing Rate of Heart Attacks in US

Estimated number of people living with prior MI in the US



22-30% OF HEART ATTACK PATIENTS ARE
CANDIDATES FOR PRO-302
~240,000 patients per year

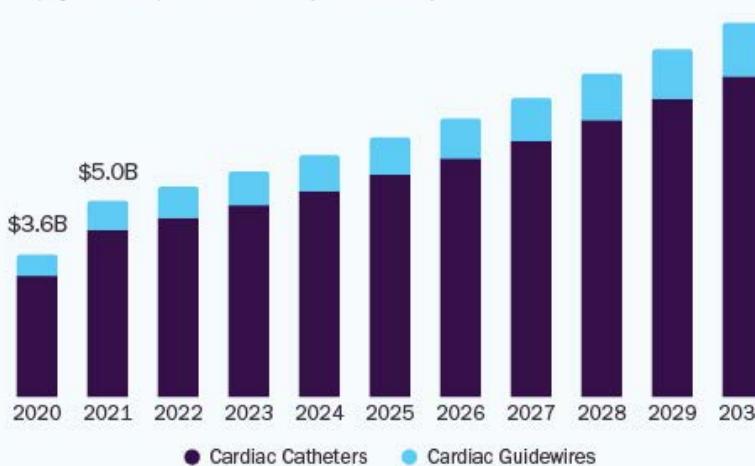
Drivers for Increased MI in US

- Rising diabetes
 - over 35 million people older than 40 have diabetes
- Hypertension Rates
 - 45-50% of adults have hypertension
- Aging Population
 - 20% of US will be >65yo by 2030
- Obesity Epidemic
 - >40% of US

Market Benchmarks Forecast Significant Growth

U.S. Cardiac Catheters & Guidewires Market

Size, by Product, 2020 - 2030 (USD Billion)



GRAND VIEW RESEARCH

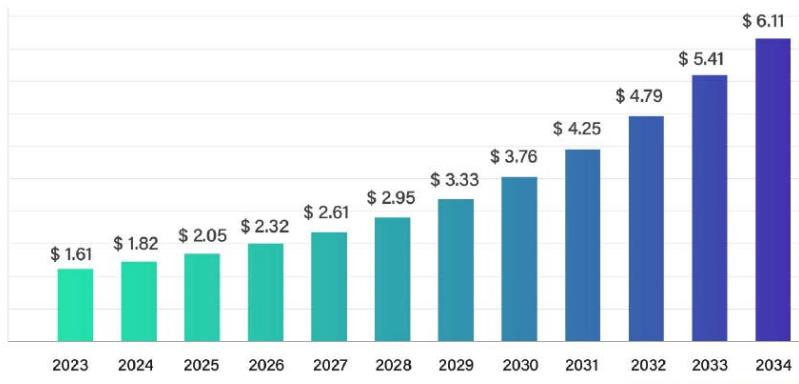
7.5%

U.S. Market CAGR,
2023 - 2030

Source:
www.grandviewresearch.com



microRNA Market Revenue 2023 to 2034 (USD Billion)



GRAND VIEW RESEARCH

11.8%

U.S. Market CAGR,
2024 - 2030

Source:
www.grandviewresearch.com

Chronic HF
\$3.5B (US)

2018
GROSS SALES

2035 FORECASTED
GROSS SALES

Chronic HF
\$20.4B (US)

PRO-302 Outpaces the Competition on All Key Success Factors

	EXISTING THERAPIES			NEW THERAPIES		
	Angiogenesis-focused approaches	Bio materials	Reperfusion injury prevention	Prolifagen miR-302	Gene therapy	Stem cells
Transient regeneration mechanism – safety	✓	NA	NA	✓	✗	✗
Timing: Opportunity for intervention outside of emergency situation	✓	✓	✗	✓	✓	✓
Single molecular entity (vs gene therapy or exogenous cells)	✓	NA	✓	✓	✗	✗
Direct regeneration of functional cardiac muscle	✗	✗	NA	✓	✓	✓

Market Pipeline

Company	Investigational therapy	Therapy	Target Indication	Development phase
Cardior Pharmaceuticals	CDR132L	miR Inhibitor	Prevent secondary remodeling (Scarring)	Phase 2
Bellerophon Therapeutics	BCM	Injectable Gel	Prevent Cardiac Remodeling	Phase 2
Medley / YAP Therapeutics	YAP101	Short Hairpin RNA (shRNA)	Viral Vector to deliver shR to heart muscle and stimulate heart muscle regeneration	Phase 1
Ventrix Bio	ECM	Extracellular Matrix (ECM) hydrogel	Prevent secondary remodeling (Scarring)	Phase
Longeveron	Laromestrocel (Lomecel-B™)	Cell therapy	Hypoplastic Left Heart Syndrome (HLHS)	Phase 2a
Braveheart Bio	BHB-1893	Cardiac Myosin Inhibitors (CMI)	Hypertrophic cardiomyopathy (HCM)	Phase 3 in 2026

Foundational IP strategy in place

Patents Covering

- Mechanism
- Composition
- Delivery



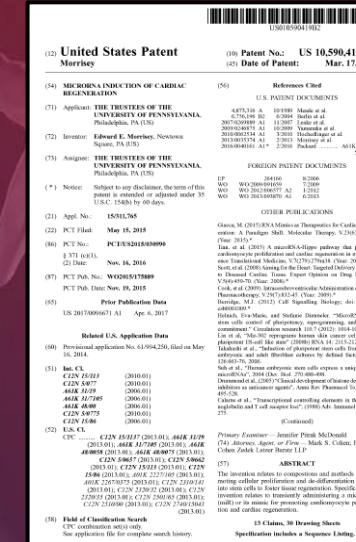
US Patent 9,115,345

- "Micro RNA Induction of Pluripotential Stem Cells"
- Issue Date: 8/25/2015
- Priority Date: 3/25/2011



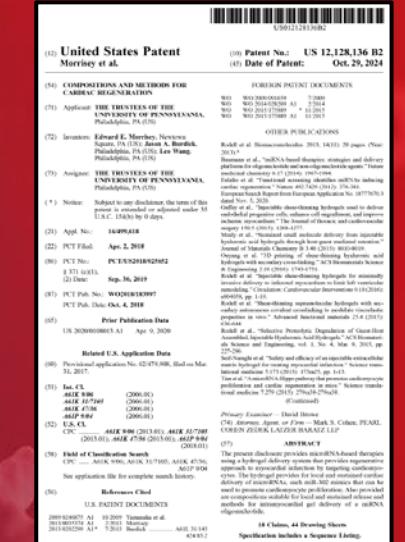
US Patent 10,590,419

- "Micro RNA Induction of Cardiac Regeneration"
- Issue Date: 3/17/2020
- Priority Date: 5/15/2015



US Patent 12,128,136

- "Compositions of Methods for Cardiac Regeneration"
- Issue Date: 10/29/2024
- Priority Date: 4/2/2018



University of Pennsylvania Favorable Licensing Terms Exclusive License

Experienced Team Driving Biotech Innovation

Decades of biotech and commercialization success, first-in-class RNA science, and major exits

30+

Successful launches

\$\$\$

Multiple exits



Scientific expertise



Mike Behr

CEO-BOD

- 30+ Years in Life Science Industry
- Multiple Ground-Up Start Ups
- Successful Exit & No Liquidations



Kiernan Seth, PhD

CDO

- 25+ Years in BioPharma Industry
- Lexicon, Pfizer, BMS
- Cardiovascular Electrophysiology



Andreas Bader, PhD

Consulting CSO

- 20 Years Biotech R&D
- Phase I & II Clinical Trials
- Multiple Start-Up Exits
- Co-Founder of Mirna: 1st miR Clinicals



Will Houston, CFA

CFO

- CFO to Multiple LS Start-Ups
- Financial Model Strategies



Claudine Bruck, PhD

BOD-Founder

- 30 Years GSK
- Multiple BOD Seats



Alex Shaw, PhD

BOD

- Multiple LS Start-Ups
- Multiple Exits



Dave Pfeiffer, MBA

BOD

- Multiple Life Science CEO
- Multiple BOD Seats

Renowned Scientific and Clinical Advisors

A team of experts specializing in:



**Cardiovascular medicine
and research**



**microRNA
technology**



Bioengineering



**IP patent
protection**



Ed Morrisey, PhD
Scientific Founder
SAB Chair
Univ of PA



Jason Burdick, PhD
Univ of Colorado



**Gordana Novakovic,
PhD**
Columbia University



Jose Oberholzer, MD
Univ of Illinois
Zurich Univ Hospital



Leo Wang, MD, PhD
Univ of PA



Errol Taylor, JD
IP Consultant

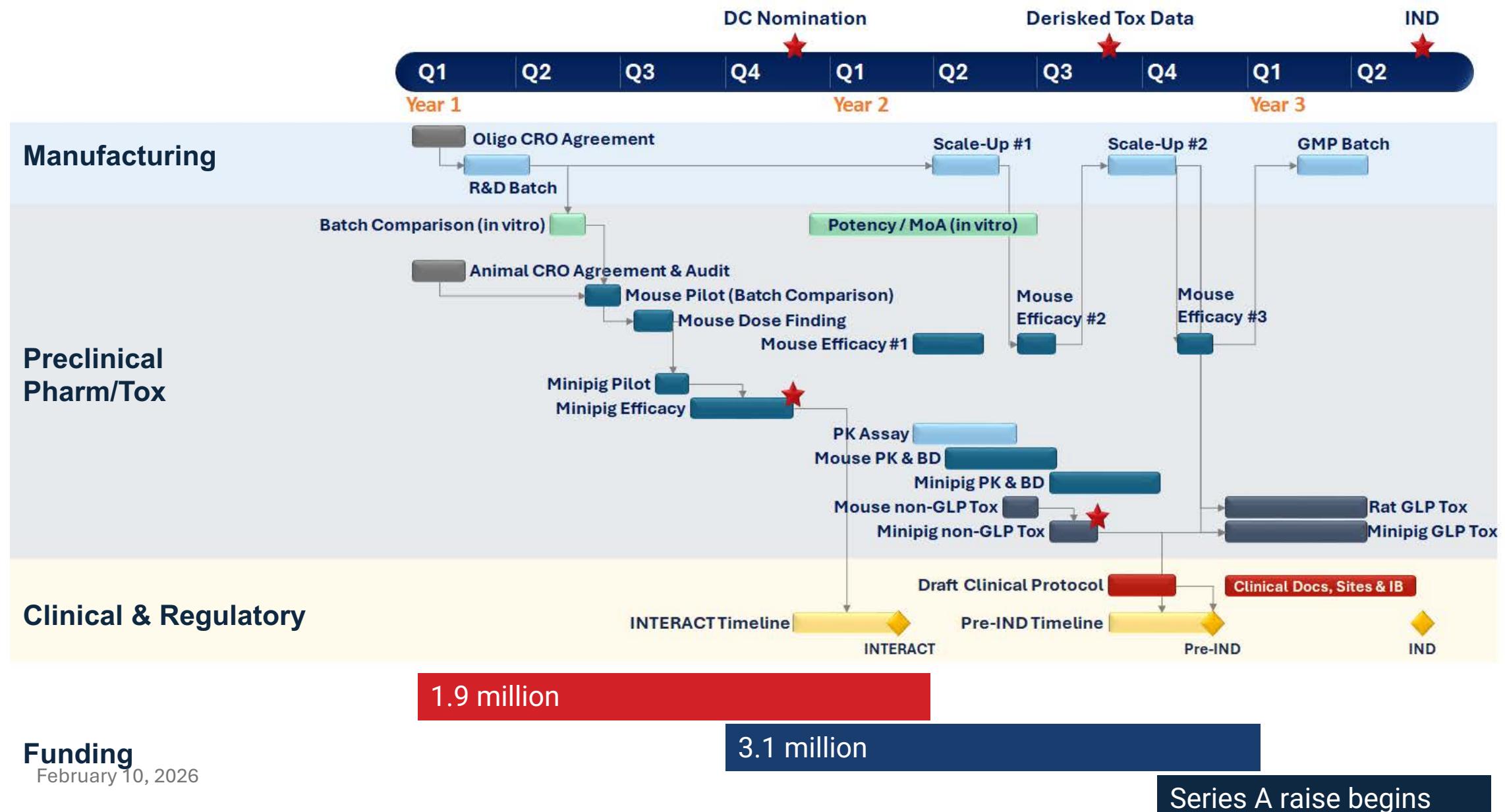


Howard Herrmann, MD
Univ of PA



Rob Gorman, MD
Majoro Cardiac
Innovations

Accelerated Path to IND and First-in-Human Trials



Fueling the Next Milestone: Expanding a Strong Foundation



\$5M
Pre-Clinical
Funding

\$1.9M

\$3.1M

IND-Enabling Studies

Expanded Pig Study
Pharmacology & Toxicology Models

Manufacturing Readiness

Chemical Manufacturing Controls (CMC)
Delivery Mechanism of PRO302

Complete IND-Enabling Studies

PK/PD Analysis

Manufacturing Scale-Up

Regulatory and Clinical Prep

Regulatory Analysis

Strategic Expansion

Expansion of Prolifagen IP Portfolio

Financial Plan

	Months 1-12	Months 13-18	Months 19-24	Total
Pharmacology	\$47K	\$342K	\$89K	\$525K
PK / Pig Study	\$606K	\$519K	\$0	\$1.13M
Toxicology	\$50K	\$50K	\$300K	\$400K
CMC Characterization	\$150K	\$50K	\$0	\$200K
Clinical Prep	\$0	\$0	\$100K	\$100K
Regulatory / Reimbursement	\$70K	\$36K	\$21K	\$127K
Manufacturing	\$571K	\$379K	\$0	\$950K
Business Development	\$81K	\$27K	\$27K	\$135K
Salaries and GA	\$728K	\$403K	\$403K	\$1.53M
Misc	\$19K	\$10K	\$10K	\$39K
TOTAL:	\$2.37M	\$1.82M	\$949K	\$5.13M

Join Us in Leading the Next Transformation in Cardiac Care

Experienced Team with a Proven Record of Success

Solution for a Significant Unmet Need

Ahead of the Curve with miRNA Technology

Cardiology Existing Market
miRNA Emerging Market

Exit Potential



A Pennsylvania Biotechnology Center Company

Thank you

Mike Behr CEO

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