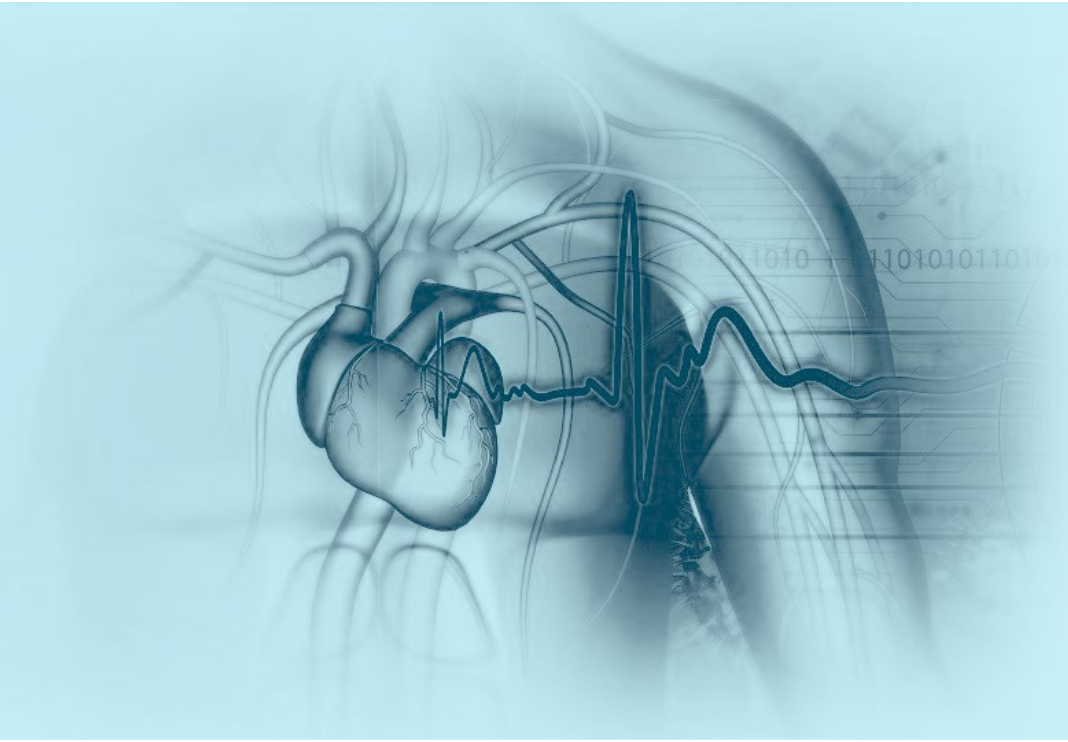
Pulse Biosciences®

Investor Presentation

November 2023

Forward Looking Statements

All statements in this presentation that are not historical are forward-looking statements, including, among other things, statements relating to the effectiveness of the Company's nsPFA technology and CellFX System to non-thermally clear cells while sparing adjacent non-cellular tissue, statements concerning the Company's expected product development efforts, such as the possible initiation of a first-in-human safety feasibility study of its nsPFA endocardial ablation catheter system, statements concerning the Company's future regulatory strategies and possible government clearances and approvals, statements concerning customer adoption and future use of the CellFX System to address a range of conditions such as atrial fibrillation and benign thyroid nodules, statements about the Company's future financing opportunities and operating expenses, and Pulse Biosciences' expectations, whether stated or implied, regarding whether the Company's nsPFA technology will become a disruptive treatment option for treating cardiac arrhythmias, benign thyroid nodules or any other medical condition and whether future clinical studies will show the CellFX System is safe and effective to treat any medical condition, and other future events. These statements are not historical facts but rather are based on the Company's current expectations, estimates, and projections regarding its business, operations and other similar or related factors. Words such as "may," "will," "could," "would," "should," "anticipate," "predict," "potential," "continue," "expects," "intends," "plans," "projects," "believes," "estimates," and other similar or related expressions are used to identify these forward-looking statements, although not all forward-looking statements contain these words. You should not place undue reliance on forward-looking statements because they involve known and unknown risks, uncertainties, and assumptions that are difficult or impossible to predict and, in some cases, beyond Pulse Biosciences' control. Actual results may differ materially from those in the forward-looking statements as a result of a number of factors, including those described in the Company's filings with the U.S. Securities and Exchange Commission. Pulse Biosciences undertakes no obligation to revise or update information in this presentation to reflect events or circumstances in the future, even if new information becomes available.



Powering the next generation in bioelectric medicine with **Nanosecond Pulsed Field Ablation** technology.

Pulse Biosciences®

Proven Leadership Team

Kevin Danahy
Chief Executive Officer & President

Medtronic · Johnson & Johnson · ZIMMER BIOMET · INTUITIVE

Darrin Uecker
Chief Technology Officer & Director

gynesonics · computermotion

Mitch Levinson
Chief Strategy Officer

thermage · coolsculpting by ZELTIQ · NELLCOR

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Chief Medical Officer
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Adventist HealthCare White Oak Medical Center

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Pulse Biosciences®

Positioned to Unlock the $8 Billion Cardiac Atrial Fibrillation (AF) Market

Powering the next generation in bioelectric medicine with **Nanosecond Pulsed Field Ablation (nsPFA)** Technology

Proprietary Technology
Only company bringing novel Nanosecond Pulsed Field Ablation (nsPFA) technology to the health care of patients

Novel AF nsPFA Devices
nsPFA enabled applicators deliver highly differentiated value in the treatment of AF

Robust Patent Portfolio
Surrounding the technology, devices, and use of nsPFA

148
issued patents globally owned & licensed

+103
Patent Pending Applications

Broad Medical Device Expertise
Development expertise across many disciplines

Pulse Biosciences®

Addressing the Entirety of the Growing AF Market

Global Atrial Fibrillation (AF) Disease State:

>$8B

Electrophysiology Market

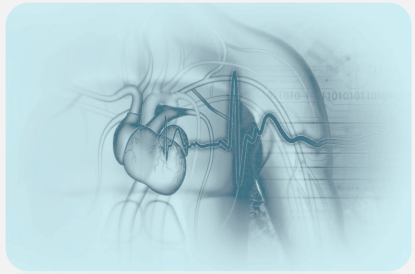
Market Growing at 10-15% CAGR[2]

AF Patients 2019:
~43M Global[1]

Expected 2050:
~72M Global[1]

Surgical Ablation

Potential to address 2M annual open-heart procedures by closing the technology gap



Catheter Ablation

>1M Catheter Ablations Performed Per Year

The same nsPFA energy can be utilized through a programmatic approach to have significant impact across both surgical and catheter-based market segments.

1. Prevalence Data: Institute for Health Metrics and Evaluation (IHME). Global Health Data Exchange. Seattle, WA: IHME, University of Washington. Available at http://ghdx.healthdata.org/gbd-results-tool. Location: Countries, Year: 2019, Context: cause, Age: all ages, Metric: number, Measure: prevalence, Sex: both, Cause: B.2.8. Atrial fibrillation and flutter. (Accessed August 24, 2021)
2. Wong CX, Brown A, Tse HF, et al. Epidemiology of Atrial Fibrillation: The Australian and Asia-Pacific Perspective. Heart Lung Circ. 2017;26(9):807-879
3. Wolfe AF Symposium Report 2023
4. Oppenheimer Report 2020

Pulse Biosciences®

Advantages of nsPFA Technology

Catheter and clamp devices designed to improve patient outcomes

Novel Energy Modality

+

Devices that Leverage the Energy

Differentiated Clinical Results

Eliminating the substantial tradeoff between safety and efficacy

CellFX nsPFA cardiac ablation catheter:

- Precisely focused, circumferential ablation targeted for pulmonary vein isolation **in a single 5 second** application with CellFX nsPFA
- Mitigates need for repeated repositioning and treating

CellFX nsPFA cardiac ablation clamp:

- Consistency in achieving transmural ablations in **1.25 seconds**, independent of tissue type or thickness
- ~1/20th of the time it takes for radiofrequency ablation

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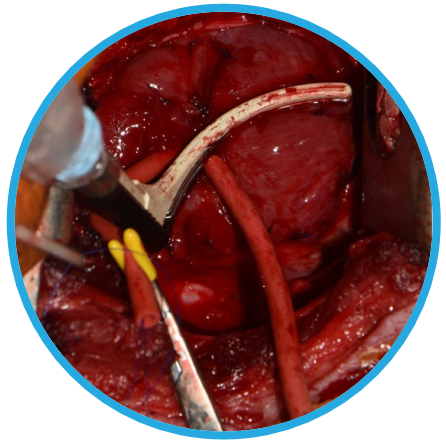
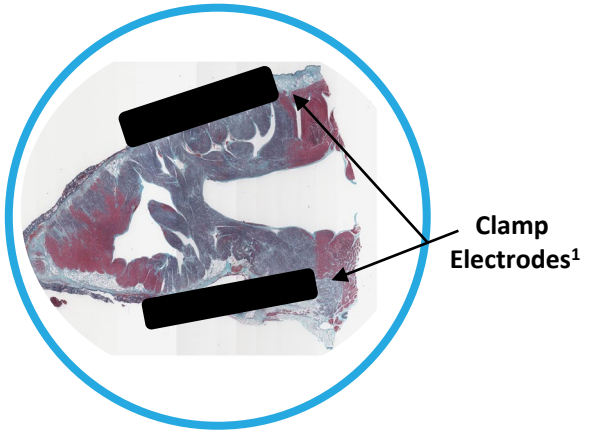
Open Surgical Delivery of nsPFA Energy – Cardiac Ablation





- A nonthermal cardiac ablation clamp capable of complete transmural ablations in **under 3 seconds**
- Initial preclinical studies have demonstrated **speed, precision and transmurality up to ~25mm between electrodes**
- Collaborating with top institutions and physicians in pursuit of **regulatory clearance**
- **Fundamental IP** for nsPFA energy in cardiac ablation

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1) 2-Day Histology: Gomori trichrome stain showing treated tissue through the left atrial appendage in a porcine model

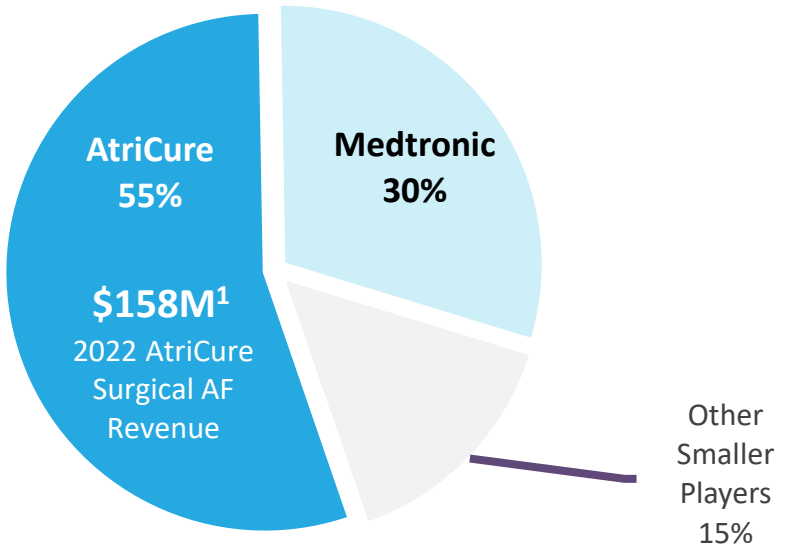
Cardiac Clamp Strategic Opportunity

High Strategic Value

1. Fast and Easy Market Entry
2. nsPFA Superior Product Offering
3. Ability to **Prove Effectiveness for AF** Prior to Catheter Launch
4. Provides Complete Solution
5. Sizable Revenue Opportunity Prior to Catheter Launch

Global Market Overview[2]

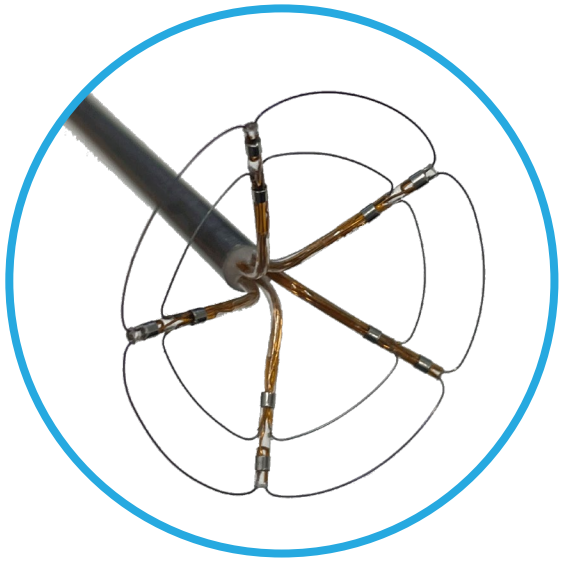
Total AF Surgical Market 2022 >$250M[1,2]



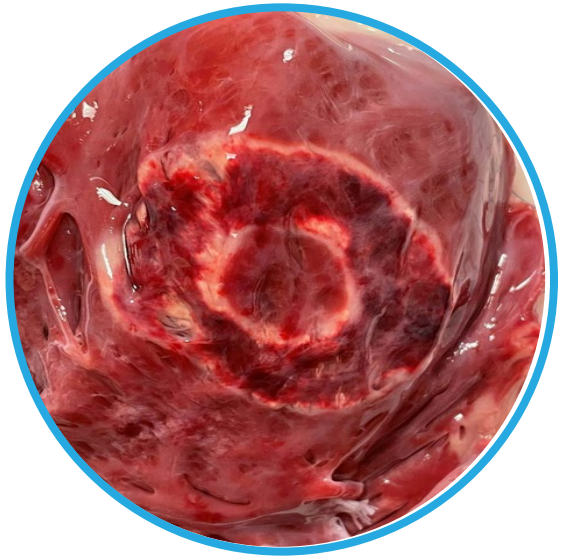
1) AtriCure 2022 Annual Report 2) Oppenheimer Market Research 2020

Catheter Delivery of nsPFA Energy – Cardiac Ablation

nsPFA Generator Platform



Proprietary nsPFA-Optimized Catheter Design

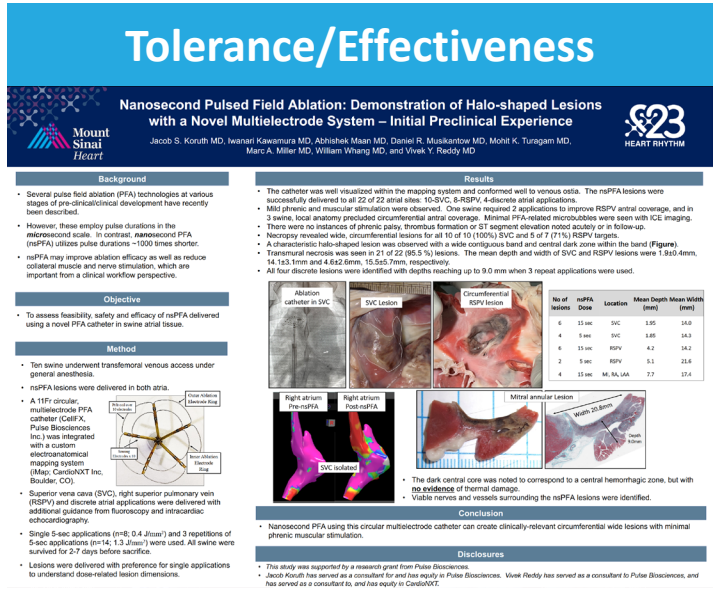


2-Day Endocardial Surface ~5cm Diameter

- Circumferential ablation catheter enabled by nsPFA energy for single-shot PVI ablation
- Reduced muscle spasm and nerve capture due to short duration nsPFA pulses
- No thermal injury due to lower energy of nsPFA pulses
- Preclinical data demonstrating safe, fast and effective ablations

nsPFA Preclinical Evidence Supporting Safety, Tolerability and Effectiveness

Tolerance/Effectiveness



Nanosecond Pulsed Field Ablation: Demonstration of Halo-shaped Lesions with a Novel Multielectrode System – Initial Preclinical Experience

Jacob S. Koruth MD, Iwanari Kawamura MD, Abhishek Maan MD, Daniel R. Musikantow MD, Mohit K. Turagam MD, Marc A. Miller MD, William Whang MD, and Vivek Y. Reddy MD

Mount Sinai Heart · HRS 2023 HEART RHYTHM

Background

- Several pulse field ablation (PFA) technologies at various stages of pre-clinical/clinical development have recently been described.
- However, these employ pulse durations in the ***micro***second scale. In contrast, ***nano***second PFA (nsPFA) utilizes pulse durations ~1000 times shorter.
- nsPFA may improve ablation efficacy as well as reduce collateral muscle and nerve stimulation, which are important from a clinical workflow perspective.

Objective

- To assess feasibility, safety and efficacy of nsPFA delivered using a novel PFA catheter in swine atrial tissue.

Method

- Ten swine underwent transfemoral venous access under general anesthesia.
- nsPFA lesions were delivered in both atria.
- A 11Fr circular, multielectrode PFA catheter (CellFX, Pulse Biosciences Inc.) was integrated with a custom electroanatomical mapping system (iMap, CardioNXT Inc, Boulder, CO).
- Superior vena cava (SVC), right superior pulmonary vein (RSPV) and discrete atrial applications were delivered with additional guidance from fluoroscopy and intracardiac echocardiography.
- Single 5-sec applications (n=8; 0.4 J/cm²) and 3 repetitions of 5-sec applications (n=14; 1.3 J/cm²) were used. All swine were survived for 2-7 days before sacrifice.
- Lesions were delivered with preference for single applications to understand dose-related lesion dimensions.

Results

- The catheter was well visualized within the mapping system and conformed well to venous ostia. The nsPFA lesions were successfully delivered to all 22 of 22 atrial sites: 10-SVC, 8-RSPV, 4-discrete atrial applications.
- Mild phrenic and muscular stimulation were observed. One swine required 2 applications to improve RSPV antral coverage, and in 3 swine, local anatomy precluded circumferential antral coverage. Minimal PFA-related microbubbles were seen with ICE imaging.
- There were no instances of phrenic palsy, thrombus formation or ST segment elevation noted acutely or in follow-up.
- Necropsy revealed wide, circumferential lesions for all 10 of 10 (100%) SVC and 5 of 7 (71%) RSPV targets.
- A characteristic halo-shaped lesion was observed with a wide contiguous band and central dark zone within the band (**Figure**).
- Transmural necrosis was seen in 21 of 22 (95.5 %) lesions. The mean depth and width of SVC and RSPV lesions were 1.9±0.4mm, 14.1±3.1mm and 4.6±2.6mm, 15.5±5.7mm, respectively.
- All four discrete lesions were identified with depths reaching up to 9.0 mm when 3 repeat applications were used.

No of lesions	nsPFA Dose	Location	Mean Depth (mm)	Mean Width (mm)
6	15 sec	SVC	1.95	14.0
4	5 sec	SVC	1.65	14.3
6	15 sec	RSPV	4.2	14.2
2	5 sec	RSPV	5.1	21.6
4	15 sec	MI, RA, LAA	7.7	17.4

- The dark central core was noted to correspond to a central hemorrhagic zone, but with **no evidence** of thermal damage.
- Viable nerves and vessels surrounding the nsPFA lesions were identified.

Conclusion

- Nanosecond PFA using this circular multielectrode catheter can create clinically-relevant circumferential wide lesions with minimal phrenic muscular stimulation.

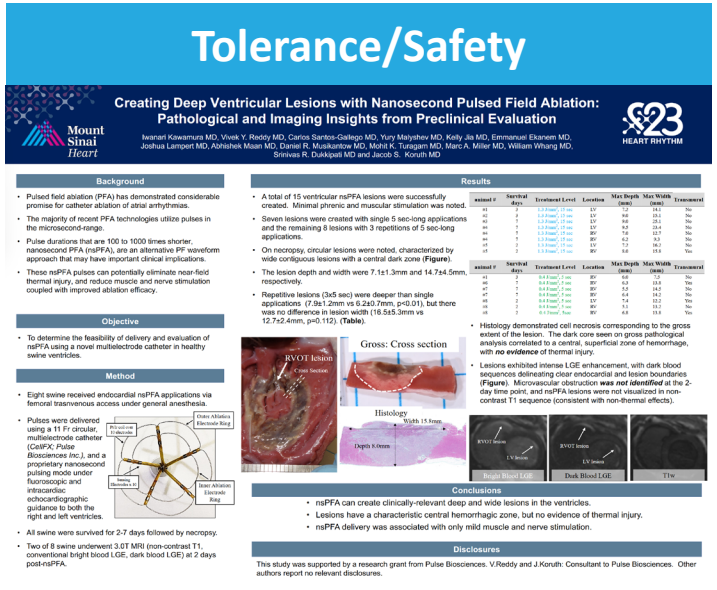
Disclosures

- *This study was supported by a research grant from Pulse Biosciences.*
- *Jacob Koruth has served as a consultant for and has equity in Pulse Biosciences. Vivek Reddy has served as a consultant to Pulse Biosciences, and has served as a consultant to, and has equity in CardioNXT.*

nsPFA can create clinically relevant circumferential wide lesions with minimal phrenic muscular stimulation.

Nanosecond Pulsed Field Ablation: Demonstration of Halo-Shaped Lesions with a Novel Multielectrode System: Initial Preclinical Experience (Jacob S Koruth MD, et al.)

Tolerance/Safety



Creating Deep Ventricular Lesions with Nanosecond Pulsed Field Ablation: Pathological and Imaging Insights from Preclinical Evaluation

Iwanari Kawamura MD, Vivek Y. Reddy MD, Carlos Santos-Gallego MD, Yury Malyshev MD, Kelly Jia MD, Emmanuel Ekanem MD, Joshua Lampert MD, Abhishek Maan MD, Daniel R. Musikantow MD, Mohit K. Turagam MD, Marc A. Miller MD, William Whang MD, Srinivas R. Dukkipati MD and Jacob S. Koruth MD

Mount Sinai Heart · HRS 2023 HEART RHYTHM

Background

- Pulsed field ablation (PFA) has demonstrated considerable promise for catheter ablation of atrial arrhythmias.
- The majority of recent PFA technologies utilize pulses in the microsecond-range.
- Pulse durations that are 100 to 1000 times shorter, nanosecond PFA (nsPFA), are an alternative PF waveform approach that may have important clinical implications.
- These nsPFA pulses can potentially eliminate near-field thermal injury, and reduce muscle and nerve stimulation coupled with improved ablation efficacy.

Objective

- To determine the feasibility of delivery and evaluation of nsPFA using a novel multielectrode catheter in healthy swine ventricles.

Method

- Eight swine received endocardial nsPFA applications via femoral trasnvenous access under general anesthesia.
- Pulses were delivered using a 11 Fr circular, multielectrode catheter (*CellFX; Pulse Biosciences Inc.*), and a proprietary nanosecond pulsing mode under fluoroscopic and intracardiac echocardiographic guidance to both the right and left ventricles.

- All swine were survived for 2-7 days followed by necropsy.
- Two of 8 swine underwent 3.0T MRI (non-contrast T1, conventional bright blood LGE, dark blood LGE) at 2 days post-nsPFA.

Results

- A total of 15 ventricular nsPFA lesions were successfully created. Minimal phrenic and muscular stimulation was noted.
- Seven lesions were created with single 5 sec-long applications and the remaining 8 lesions with 3 repetitions of 5 sec-long applications.
- On necropsy, circular lesions were noted, characterized by wide contiguous lesions with a central dark zone (**Figure**).
- The lesion depth and width were 7.1±1.3mm and 14.7±4.5mm, respectively.
- Repetitive lesions (3x5 sec) were deeper than single applications (7.9±1.2mm vs 6.2±0.7mm, p<0.01), but there was no difference in lesion width (18.5±5.3mm vs 12.7±2.4mm, p=0.112) (**Table**).

animal #	Survival days	Treatment Level	Location	Max Depth (mm)	Max Width (mm)	Transmural
#1	2	1.3 J/cm², 15 sec	LV	9.0	19.1	No
#2	2	1.3 J/cm², 15 sec	LV	9.0	19.1	No
#3	2	1.3 J/cm², 15 sec	LV	9.0	28.1	No
#4	7	1.3 J/cm², 15 sec	LV	9.0	23.4	No
#4	7	1.3 J/cm², 15 sec	RV	7.6	12.7	No
#4	7	1.3 J/cm², 15 sec	RV	6.2	9.3	No
#5	2	1.3 J/cm², 15 sec	LV	7.3	16.2	No
#5	2	1.3 J/cm², 15 sec	RV	8.0	15.8	No

animal #	Survival days	Treatment Level	Location	Max Depth (mm)	Max Width (mm)	Transmural
#3	2	0.4 J/cm², 5 sec	RV	6.0	7.9	No
#6	7	0.4 J/cm², 5 sec	RV	6.3	13.8	Yes
#7	7	0.4 J/cm², 5 sec	RV	5.5	14.5	No
#7	7	0.4 J/cm², 5 sec	RV	6.4	14.2	No
#8	2	0.4 J/cm², 5 sec	LV	7.4	13.2	Yes
#8	2	0.4 J/cm², 5 sec	RV	6.8	15.0	Yes
#9	2	0.4 J/cm², 5 sec	RV	6.8	15.0	Yes

- Histology demonstrated cell necrosis corresponding to the gross extent of the lesion. The dark core seen on gross pathological analysis correlated to a central, superficial zone of hemorrhage, with ***no evidence*** of thermal injury.
- Lesions exhibited intense LGE enhancement, with dark blood sequences delineating clear endocardial and lesion boundaries (**Figure**). Microvascular obstruction ***was not identified*** at the 2-day time point, and nsPFA lesions were not visualized in non-contrast T1 sequence (consistent with non-thermal effects).

Conclusions

- nsPFA can create clinically-relevant deep and wide lesions in the ventricles.
- Lesions have a characteristic central hemorrhagic zone, but no evidence of thermal injury.
- nsPFA delivery was associated with only mild muscle and nerve stimulation.

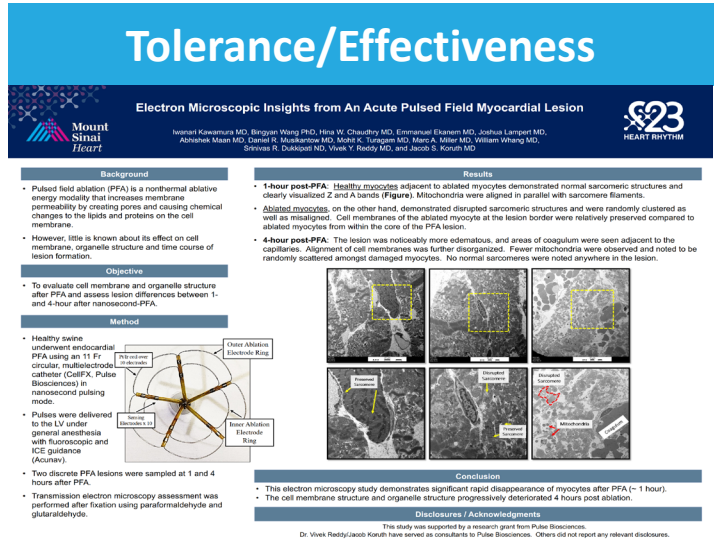
Disclosures

This study was supported by a research grant from Pulse Biosciences. V.Reddy and J.Koruth: Consultant to Pulse Biosciences. Other authors report no relevant disclosures.

nsPFA can create clinically relevant deep and wide lesions, which did not demonstrate any evidence of thermal injury and delivery was associated with only mild muscle and nerve stimulation.

Creating Deep Ventricular Lesions with Nanosecond Pulsed Field Ablation: Pathological and Imaging Insights from Preclinical Evaluation (Iwanari Kawamura MD, et al)

Tolerance/Effectiveness



Electron Microscopic Insights from An Acute Pulsed Field Myocardial Lesion

Iwanari Kawamura MD, Bingyan Wang PhD, Hina W. Chaudhry MD, Emmanuel Ekanem MD, Joshua Lampert MD, Abhishek Maan MD, Daniel R. Musikantow MD, Mohit K. Turagam MD, Marc A. Miller MD, William Whang MD, Srinivas R. Dukkipati ND, Vivek Y. Reddy MD, and Jacob S. Koruth MD

Mount Sinai Heart · HRS 2023 HEART RHYTHM

Background

- Pulsed field ablation (PFA) is a nonthermal ablative energy modality that increases membrane permeability by creating pores and causing chemical changes to the lipids and proteins on the cell membrane.
- However, little is known about its effect on cell membrane, organelle structure and time course of lesion formation.

Objective

- To evaluate cell membrane and organelle structure after PFA and assess lesion differences between 1-and 4-hour after nanosecond-PFA.

Method

- Healthy swine underwent endocardial PFA using an 11 Fr circular, multielectrode catheter (CellFX, Pulse Biosciences) in nanosecond pulsing mode.
- Pulses were delivered to the LV under general anesthesia with fluoroscopic and ICE guidance (Acunav).
- Two discrete PFA lesions were sampled at 1 and 4 hours after PFA.
- Transmission electron microscopy assessment was performed after fixation using paraformaldehyde and glutaraldehyde.

Results

- **1-hour post-PFA**: Healthy myocytes adjacent to ablated myocytes demonstrated normal sarcomeric structures and clearly visualized Z and A bands (**Figure**). Mitochondria were aligned in parallel with sarcomere filaments.
- Ablated myocytes, on the other hand, demonstrated disrupted sarcomeric structures and were randomly clustered as well as misaligned. Cell membranes of the ablated myocyte at the lesion border were relatively preserved compared to ablated myocytes from within the core of the PFA lesion.
- **4-hour post-PFA**: The lesion was noticeably more edematous, and areas of coagulum were seen adjacent to the capillaries. Alignment of cell membranes was further disorganized. Fewer mitochondria were observed and noted to be randomly scattered amongst damaged myocytes. No normal sarcomeres were noted anywhere in the lesion.

Conclusion

- This electron microscopy study demonstrates significant rapid disappearance of myocytes after PFA (~ 1 hour).
- The cell membrane structure and organelle structure progressively deteriorated 4 hours post ablation.

Disclosures / Acknowledgments

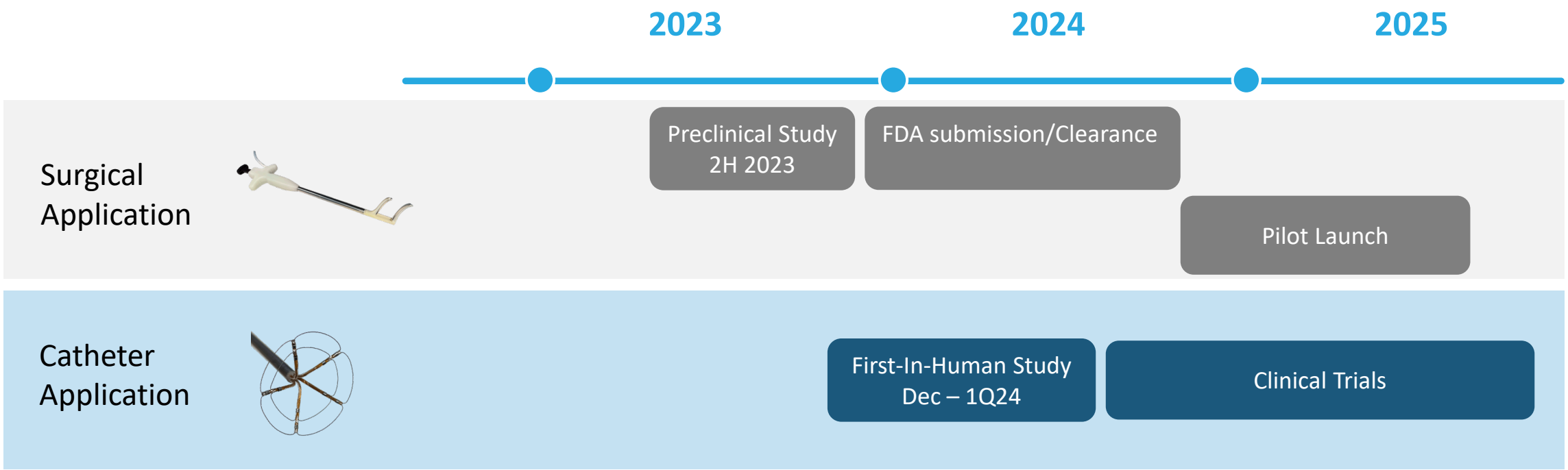
This study was supported by a research grant from Pulse Biosciences.
Dr. Vivek Reddy/Jacob Koruth have served as consultants to Pulse Biosciences. Others did not report any relevant disclosures.

This electron microscopy study demonstrates significant rapid disappearance of myocytes after PFA (~ 1 hour). The cell membrane structure and organelle structure progressively deteriorate by 4 hours post ablation.

Electron Microscopic Insights from An Acute Pulsed Field Myocardial Lesion (Iwanari Kawamura MD, et al)

Application Milestones for Treatment of AF

Recently Accelerated Development Timelines



Pulse Biosciences®

Versatile Generator Platform Delivers nsPFA Across the Anatomy

Enables rapid development of new applications

Thyroid

- Completed enrollment of phase 1 of study, phase 2 in progress
- Preclinical and clinical data demonstrating safety to collateral structures including nerves, vessels, trachea & esophagus.
- Rapid ablation of thyroid tissue
  - < 10 seconds per cc of treated tissue
- Single treatment efficacy with evidence of 100% clearance within ablation zone in less than 90 days

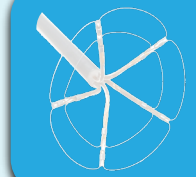
FDA 510k submission
filed November 2023

Pulse Biosciences®

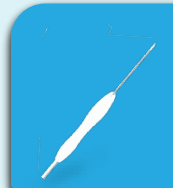
Pulse Biosciences®

Expect to be revenue-generating with 2 of 3 product lines in 2024

CellFX nsPFA cardiac ablation clamp - expect to file FDA 510(k) submission between December and end of January 2024



CellFX nsPFA cardiac ablation catheter – regulatory approvals received to commence catheter ablation feasibility study with first study procedures scheduled for mid-December 2023



CellFX nsPFA percutaneous electrode – filed FDA 510(k) submission in November with plans to commercialize following clearance