



Rocket Pharmaceuticals Danon Disease Program Update

September 11, 2023



SEEKING GENE THERAPY CURES

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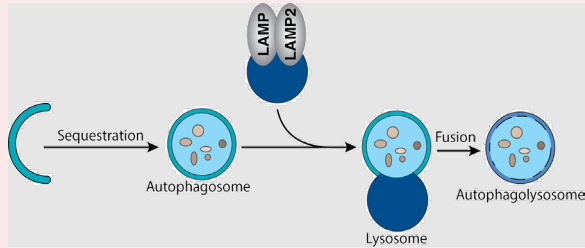
Various statements in this presentation concerning Rocket's future expectations, plans and prospects, including without limitation, Rocket's expectations regarding the safety and effectiveness of product candidates that Rocket is developing to treat Danon Disease (DD), the expected timing and data readouts of Rocket's ongoing and planned clinical trials, the expected timing and outcome of Rocket's regulatory interactions and planned submissions, Rocket's plans for the advancement of its Danon Disease program, including its planned pivotal trial, and the safety, effectiveness and timing of related pre-clinical studies and clinical trials, may constitute forward-looking statements for the purposes of the safe harbor provisions under the Private Securities Litigation Reform Act of 1995 and other federal securities laws and are subject to substantial risks, uncertainties and assumptions. You should not place reliance on these forward-looking statements, which often include words such as "believe," "expect," "anticipate," "intend," "plan," "will give," "estimate," "seek," "will," "may," "suggest" or similar terms, variations of such terms or the negative of those terms. Although Rocket believes that the expectations reflected in the forward-looking statements are reasonable, Rocket cannot guarantee such outcomes. Actual results may differ materially from those indicated by these forward-looking statements as a result of various important factors, including, without limitation, Rocket's ability to monitor the impact of COVID-19 on its business operations and take steps to ensure the safety of patients, families and employees, the interest from patients and families for participation in each of Rocket's ongoing trials, patient enrollment, trial timelines and data readouts, our expectations regarding our drug supply for our ongoing and anticipated trials, actions of regulatory agencies, which may affect the initiation, timing and progress of pre-clinical studies and clinical trials of its product candidates, our ability to submit regulatory filings with the U.S. Food and Drug Administration (FDA) and to obtain and maintain FDA or other regulatory authority approval of our product candidates, Rocket's dependence on third parties for development, manufacture, marketing, sales and distribution of product candidates, the outcome of litigation, our competitors' activities, including decisions as to the timing of competing product launches, pricing and discounting, our integration of an acquired business, which involves a number of risks, including the possibility that the integration process could result in the loss of key employees, the disruption of our ongoing business, or inconsistencies in standards, controls, procedures, or policies, our ability to successfully develop and commercialize any technology that we may in-license or products we may acquire and any unexpected expenditures, as well as those risks more fully discussed in the section entitled "Risk Factors" in Rocket's Annual Report on Form 10-K for the year ended December 31, 2022, filed February 28, 2023 with the SEC and subsequent filings with the SEC including our Quarterly Reports on Form 10-Q. Accordingly, you should not place undue reliance on these forward-looking statements. All such statements speak only as of the date made, and Rocket undertakes no obligation to update or revise publicly any forward-looking statements, whether as a result of new information, future events or otherwise.



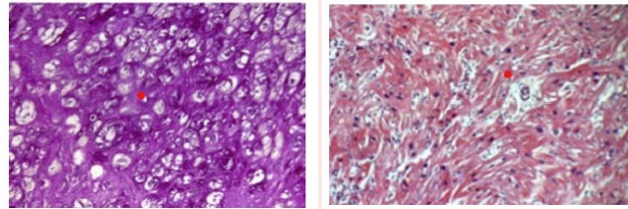
Danon Disease

Aggressive genetic hypertrophic cardiomyopathy with very high early mortality

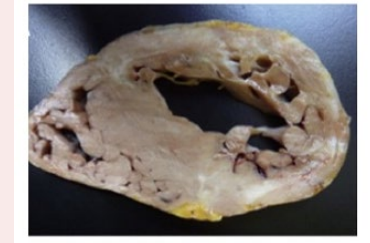
- 1 Gene mutation leads to decreased LAMP2B protein and impaired autophagy



- 2 Impaired autophagy leads to ↑ vacuoles, myocyte hypertrophy, necrosis, & fibrosis

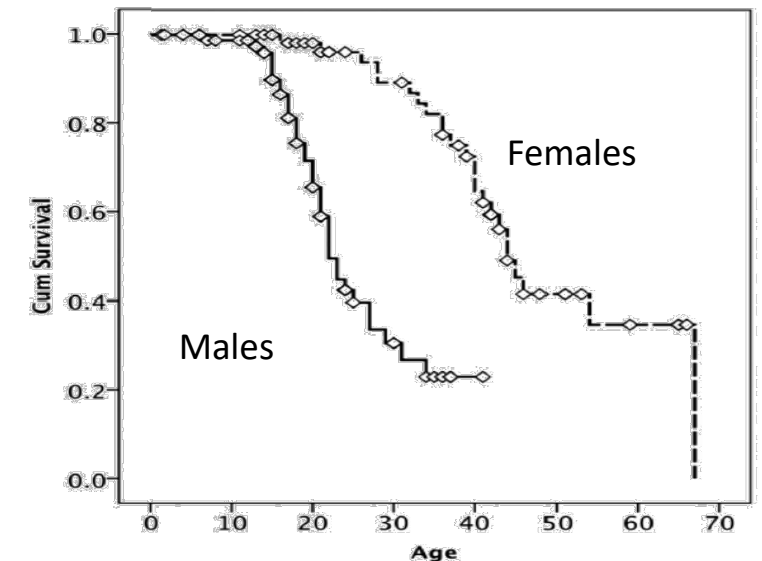


- 3 Pathologic processes lead to phenotype of extreme LV hypertrophy and cardiomyopathy



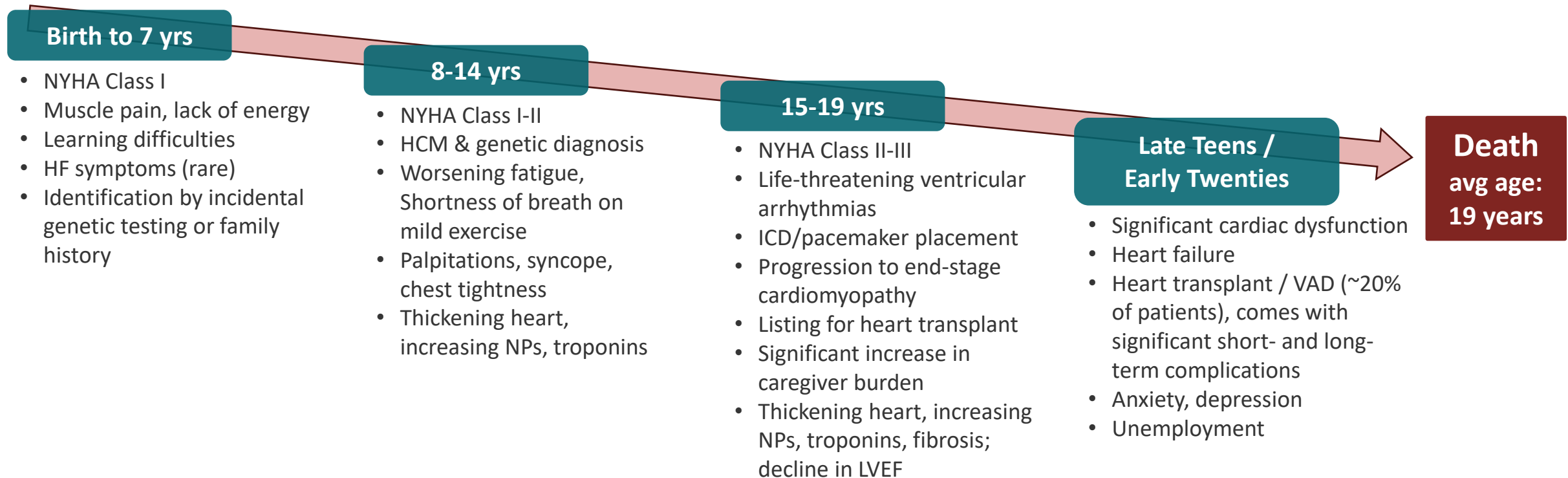
- Danon Disease is the most aggressive and lethal hypertrophic cardiomyopathy
- Monogenic, X-linked disease progresses to severe cardiomyopathy at early ages; characterized by massive LV hypertrophy and end-stage heart failure
- Uniformly fatal with early mortality (males ~19 yrs.; females ~37 yrs.)
- Only definitive treatment is cardiac transplantation, availability is limited, and associated with extensive short- and long-term morbidity and mortality (<50% 10-yr survival post HTx)

- 4 Natural History: High rates of death at early ages



Natural History: Progression of Danon Disease in Male Patients

Critical interval in childhood / early adolescence precedes rapid decline, providing optimal window of opportunity for GTx
Patients typically on maximal medical management (e.g. beta blockers, ICD) - none alter disease progression



Note: Danon disease is a life-threatening and seriously debilitating condition. Above are not meant to be a strict categorization of symptoms/outcomes by age. Heart failure and death from Danon disease can occur well before the patient reaches his twenties. **Of note, the four adult patients in the Phase 1 study with 2.5-3.5 yr follow-up post gene therapy are currently alive, clinically stable, and free from Danon disease progression at ages 21-24 years old – in contrast to the trend in the natural history of this disease.**

NYHA = New York Heart Association Class; ICD: implantable cardioverter-defibrillator; HTx = Heart Transplantation; VAD: Ventricular Assist Device
Figure created based on data from Brambatti M et al. Int J Cardiol. 2019;286:92-98; Boucek D, Jirikowic J, Taylor M. Genet Med 2011; 13(6):563-68

Phase 1 Data: Benefit Observed Across All Key Clinical Parameters

Early LAMP2, BNP, Tnl changes associated with sustained clinical improvement and guided Phase 2 endpoint selection

Cohort	Patient ID	Follow-up (months)	Myocardial LAMP2 Grade (≤M12)	Tnl Δ (≤M12)	BNP Δ (≤M12)	LV mass Δ (g)	LV Mass Index Δ (g/m ^{2.7})	Max LV Wall Thickness Δ (mm)	NYHA class Δ	KCCQ score Δ
Low dose adult/adolescent	1001	36	1 (M12)	-75% (M18)	-36%	311 → 212	85 → 57	25 → 23	II → II	44 → 49
	1002	36	3 (M12)	-79%	-76%	989 → 511	260 → 129	64 → 38	II → I (M30)	64 → 81
	1005	30	2	-57%	-64%	438 → 375	98 → 76	33 → 24	II → I	77 → 85 (M24)
High dose adult/adolescent	1006	24	1	-47%	-70%	410 → 300	90 → 63	22 → 18	II → I	79 → 82
Low dose pediatric	1008	12	1	-86%	-83%	605 → 447	140 → 96	42 → 39	II → I	50 → 82
	1009	6	1	-90%	-62%	234 → 185	83 → 63	20 → 20	II → I	52 → 78

All specified parameters either improved or stabilized (none deteriorated)

Improved Stabilized Worsened

Does not include pt 1007 in Ph1 trial who had advanced HF with EF<40% at enrollment and received HTx 5M following tx due to pre-existing advanced HF. Patient is currently stable. BNP, brain natriuretic peptide; hsTnl, high-sensitivity troponin I; KCCQ, Kansas City Cardiomyopathy Questionnaire; LAMP2, lysosome-associated membrane protein 2; LV, left ventricle; NYHA, New York Heart Association. Data cut-off Sept 27 2022; Grade 0=negative staining; Grade 1 ≤25%; Grade 2 =26%-50%; Grade 3 =51%-75%; Grade 4 >75%. Low dose = 6.7x10¹³ GC/kg, high dose = 1.1x10¹⁴ GC/kg

Latest Pediatric Data Shows Sustained Improvements in Biomarkers, Symptoms, and Function (Updated Data)

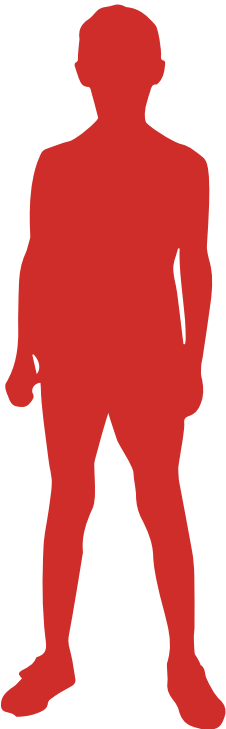
Subject ID: A501-008-1008

Baseline Characteristics

AGE AT INFUSION	MAX LV WALL THICKNESS
12.3 years	41.9 mm, z-score +32
ICD yes ¹	6MWT
WPW yes	438 meters

18 months

Variable	Baseline ²	Most Recent Follow-up
LAMP2 protein ³	0	1 (M12)
Troponin-I (ng/mL)	1.89	0.30 (-84%)
BNP (pg/mL)	1837	328 (-82%)
NYHA Class	II	I
LV Mass Index	140	96 (-31%) ⁴



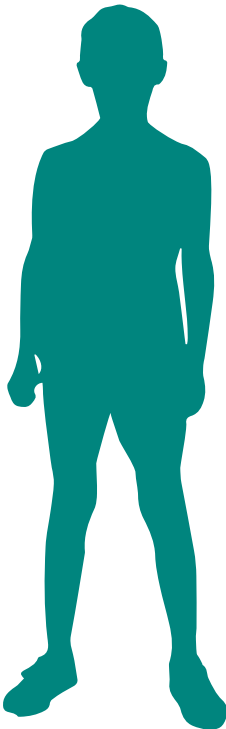
Subject ID: A501-008-1009

Baseline Characteristics

AGE AT INFUSION	MAX LV WALL THICKNESS
11.7 years	19.8 mm, z-score +12
ICD no	6MWT
WPW no	553 meters

12 months

Variable	Baseline ²	Most Recent Follow-up
LAMP2 protein ³	0	1 (M6)
Troponin-I (ng/mL)	0.67	0.08 (-88%)
BNP (pg/mL)	297	163 (-45%)
NYHA Class	II	I
LV Mass Index	83	60 (-28%) ⁴



¹ Recommended prior to enrollment; ICD implanted 3 months after RP-A501 infusion. ² Baseline values for troponin-I and BNP are the mean values from all pre-dose visits. ³ Extent of LAMP2 expression grading: Grade 0 = negative staining, Grade 1 < 25%, Grade 2 = 26-50%, Grade 3 = 51-75%, Grade 4 > 75%. ⁴ M12 Preliminary data, not yet validated.

6MWT, 6-minute walk test; BNP, brain natriuretic peptide; ICD, implantable cardioverter defibrillator; KCCQ, Kansas City cardiomyopathy questionnaire; LAMP2, lysosome-associated membrane protein 2; LV, left ventricle; NYHA, New York Heart Association; WPW, Wolff-Parkinson-White syndrome.

FDA Engagement and Alignment on Danon Program

Since the EOP1 Meeting in November 2022, Rocket has had collaborative formal and informal discussions with FDA to align on the optimal pivotal Phase 2 study design

Previously Disclosed Trial Elements

- ✓ *Pivotal, single-arm study*
- ✓ *Peds safety run-in*
- ✓ *Dosage (6.7×10^{13} GC/kg)*
- ✓ *Safety protocol & management plan*
- ✓ *CMC (product comparability and potency assay)*
- ✓ *NHS to serve as external comparator*
- ✓ *RMAT designation granted*

Recent Engagement and Alignment

- ✓ *F2F meeting with review team and senior FDA leadership*
- ✓ *Co-primary endpoint to support accelerated approval consisting of LAMP2 expression & LV Mass reduction of $\geq 10\%$*
- ✓ *N=12 patients for pivotal study with potential for primary endpoint readout at 12 months*
- ✓ *Study to support AA with a path towards conversion to full approval (with longer follow-up)*

Phase 2 Trial Design – 12 Patients with 12-month Primary Endpoint Duration

Pivotal, global, single-arm, open label study with external comparator

PIVOTAL PHASE 2 STUDY DESIGN

Adolescent/Adult Cohort ≥15y

RP-A501 Tx

(Additional pediatric dosing following Safety Run-in)

Primary Endpoint Assessment

~12m

End of Study

60m

Pediatric (8-14y) Safety Run-in (n=2)

RP-A501 Tx

Peds pt #1

Peds pt #2

90d

← 1m →

← Safety observation →

- Dose: 6.7×10^{13} GC/kg of commercially representative RP-A501 material
- Initial n=2 peds followed for 90 days for key AAV-associated toxicities prior to subsequent ped pt enrollment
- Key eligibility criteria: male age ≥8y, *LAMP2* mutation, NYHA II-III, evidence of LV hypertrophy, elevated hsTnI

CO-PRIMARY ENDPOINT (AA)

- LAMP2 protein ≥ Grade 1 (IHC) AND
- Left Ventricular Mass (LV Mass): ≥10% ↓

SECONDARY & EXPLORATORY ENDPOINTS

- hs-troponin I (key secondary)
- Natriuretic peptides
- QoL instruments (KCCQ, PedsQL, PGI-C, PGI-S)
- NYHA Class
- 6MWT
- Event free survival
- Treatment emergent safety events
- Actigraphy

RISK MANAGEMENT PLAN, TRIAL OVERSIGHT

- Immunomodulatory regimen of Rituximab, Sirolimus, corticosteroids.
- Clinical monitoring team to closely monitor labs, clinical sequelae for AAV-associated toxicities.
- IDSMC: expertise in adult and pediatric cardiomyopathy, immunology, and biostatistics

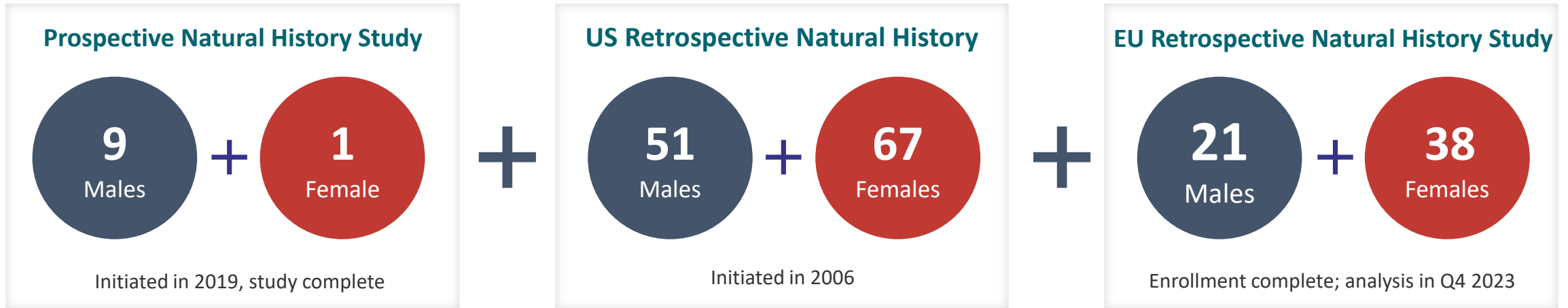
CONCURRENT NATURAL HISTORY STUDY



Tx, treatment; LV, left ventricular; NYHA; IDSMC, Independent Data Safety and Monitoring Committee; hs-troponin I; KCCQ; HF; m, month; y, year; pts, patients

Prospective, Retrospective Natural History Study as External Comparator

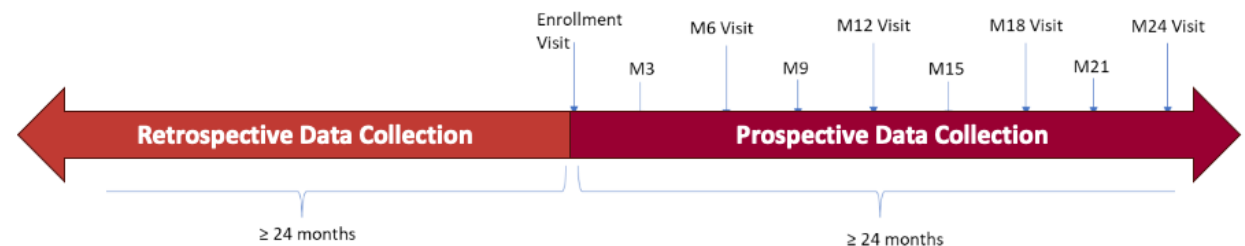
Allows for robust comparisons and aligned with FDA guidance



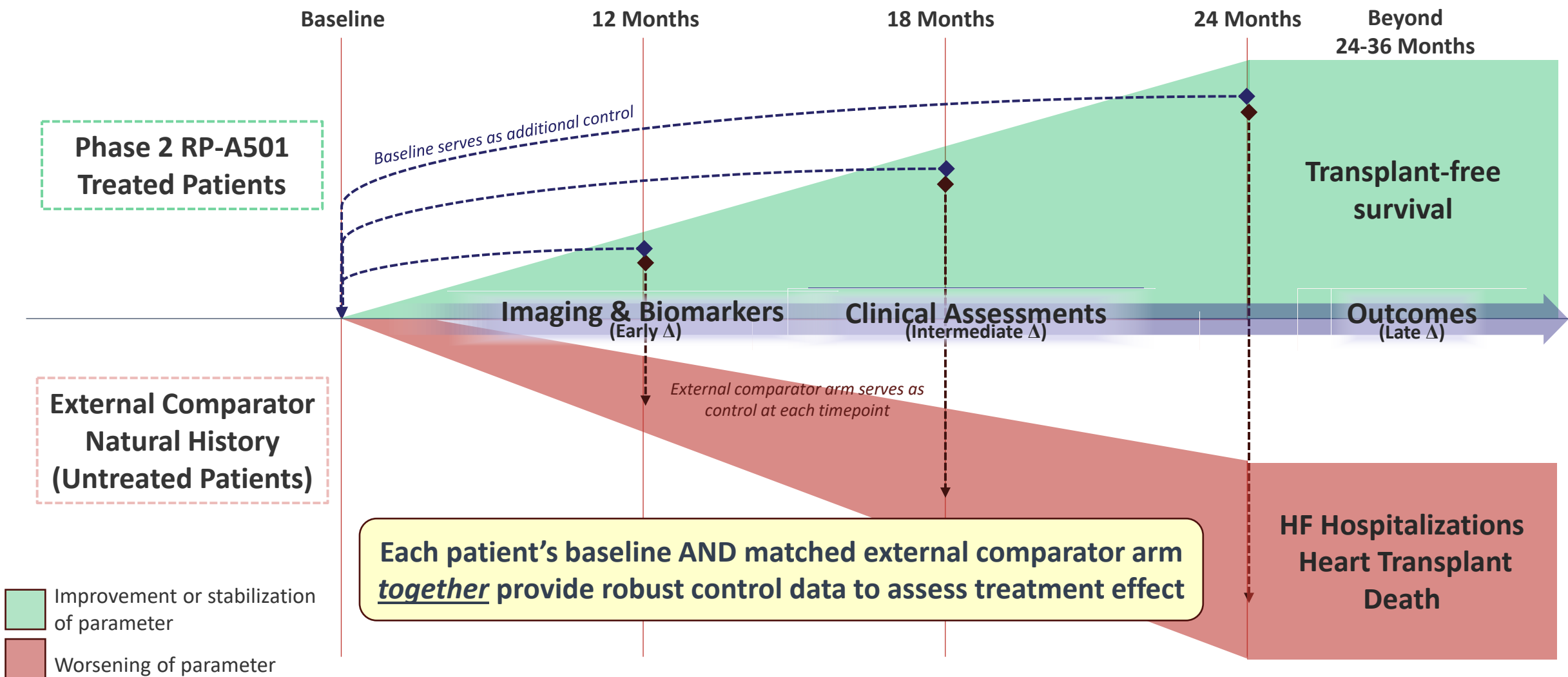
To be expanded through an additional prospective Rocket-initiated natural history study

Key Elements of Study Design:

- Entry criteria and endpoints similar to Phase 2 trial
- Appropriate matching to ensure robust comparisons
- Retrospective data collection to supplement prospective evaluation to ensure sufficient comparative data



Totality of Evidence to Demonstrate Treatment Effect



Note: Illustrative representation of potential treatment effects versus natural history

Co-Primary Endpoints for Accelerated Approval



Primary Endpoint Is Reasonably Likely to Predict Clinical Benefit

Justification for use of LAMP2 protein expression and LV Mass

WT Full Length LAMP2 Protein Expression

- Mutation of *LAMP2* is root cause of Danon disease
- Epidemiologic support: even modest levels of LAMP2 confer a 2-decade survival advantage in female patients
- RP-A501 delivers full coding sequence of WT *LAMP2* gene
- Pre-clinical LAMP2 restoration conferred histologic, functional and survival benefits in LAMP2 knock-out model¹
- Phase 1: LAMP2 expression associated with decreased vacuolar area, improved myofibrillar disarray, clinical improvement

Left Ventricular Mass

- Largest known hearts are Danon disease hearts
- Severity of the cardiomyopathy in Danon disease is the major prognostic factor²
- Retrospective natural history shows year-over-year increases in LV mass in Danon disease patients
- Phase 1: Consistent and significant reductions in LV mass as early as 6 months by echocardiography and cardiac MRI

Primary Endpoint Will Be Interpreted in a Clinical Context:

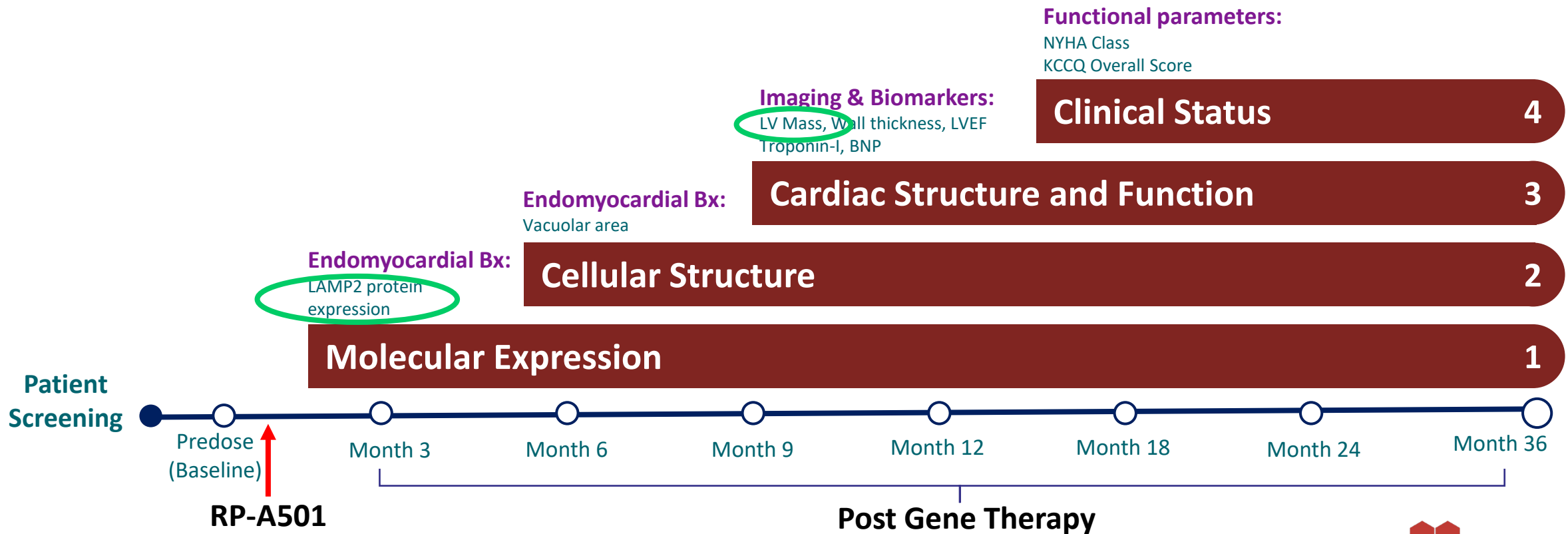
- *All components are measurable and unlikely to improve in the absence of a true treatment effect*
- *Primary endpoint will be assessed in the context of biomarkers, symptoms, QOL, clinical events derived from secondary endpoints and concurrent natural history study*
- *Phase 1 trial: LAMP2 expression and LV Mass improvements seen as early as 6 months in pediatric subjects with updated immunomodulation regimen*

¹ Manso 2020. *Sci Transl Med.*; ² D'souza 2017. *J Community Hosp Intern Med Perspect.*

Mechanistic Pathway: Protein Expression to Cardiac Structure to Clinical Outcomes

Improvements Across Cellular, Cardiac Imaging and Functional Measures in Phase 1 Study

LAMP2 expression and LV Mass are mechanistically linked to functional measures and clinical outcomes; reasonably likely to predict clinical benefit



Note: BNP, brain natriuretic peptide; Bx, biopsy; KCCQ, Kansas City cardiomyopathy questionnaire; LAMP2, lysosome-associated membrane protein 2; LV, left ventricle; LVEF, LV ejection fraction; LVPWd, LV posterior wall end diastole; MLVWT, maximal LV wall thickness; NYHA, New York Heart Association

LAMP2 Protein Expression as Co-Primary Endpoint

*RP-A501 encodes **full-length, wild-type LAMP2B**; cardiomyocytes are **non-dividing cells***



LAMP2 mutation and associated protein deficit is the **root cause** of Danon disease pathology



Grade ≥ 1 LAMP2 correlates with **evidence of efficacy** in Ph1

- Absent expression at baseline (Grade 0) in all male patients
- Improved cardiac biomarkers & hypertrophy, PRO/QOL and NYHA Class – sustained to 3+ years in adult patients, and 12+ months in pediatric patients
- **Efficacy consistent** in patients with **Grade 1 vs. Grade >1 LAMP2** expression



Ph1 expression correlates with \downarrow autophagic vacuoles and improved myofibrillar disarray, cardiac biomarkers and hypertrophy

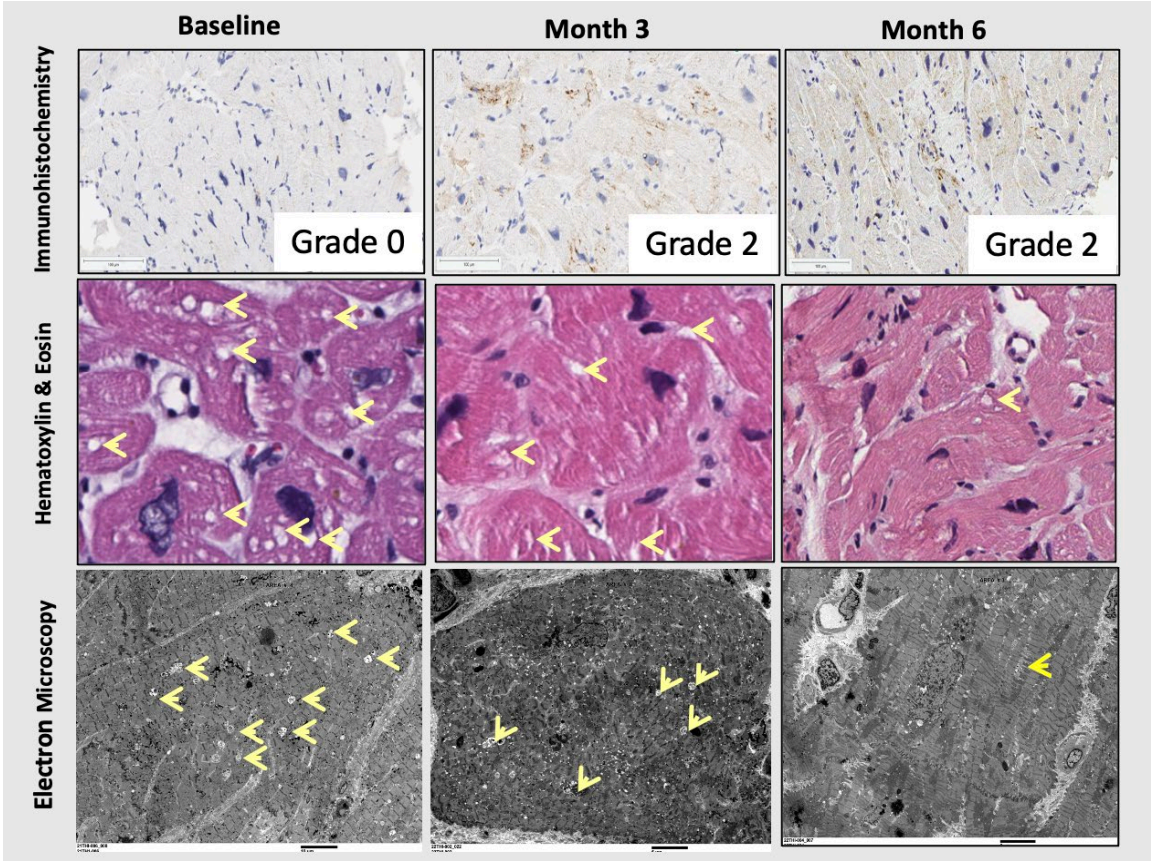


In Danon females, **partial LAMP2 expression** associated with **~ 2 decade longer survival** than males

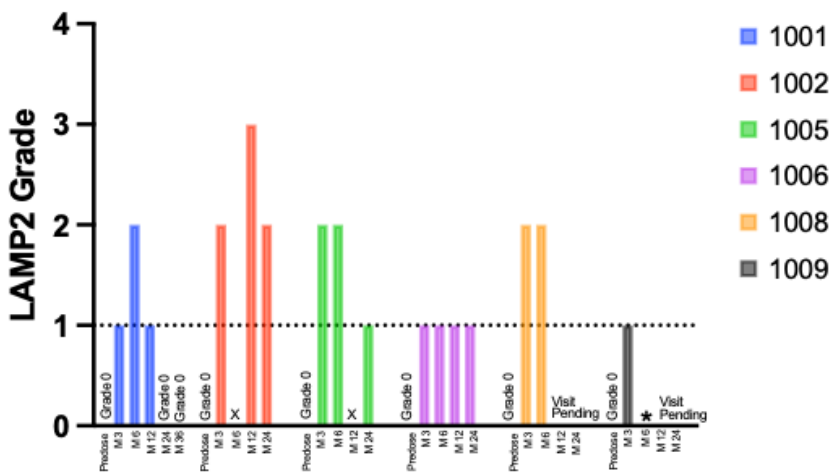
RP-A501 Increases LAMP2 Protein and Decreases Vacuolization

Enhanced autophagy leads to improved myocardial ultrastructure and clinical phenotype

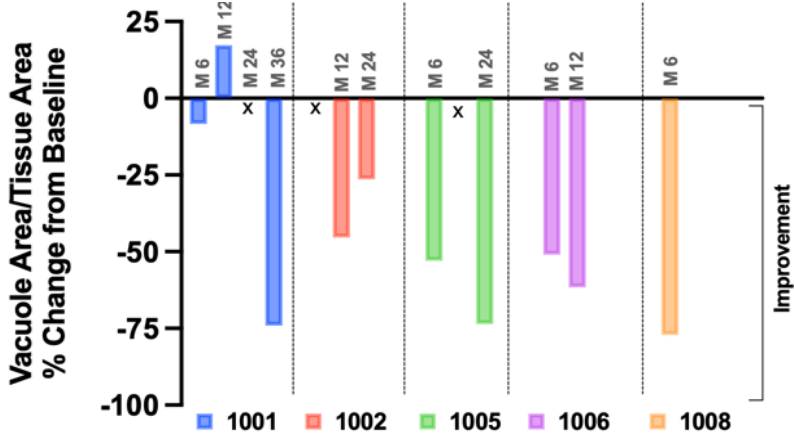
Endomyocardial Biopsy Images
(Subject 1008, RP-A501 Phase 1 Study)



Myocardial LAMP2 Protein Expression



Vacuolar Area of Endomyocardial Tissue



Left Ventricle Mass as Co-Primary Endpoint

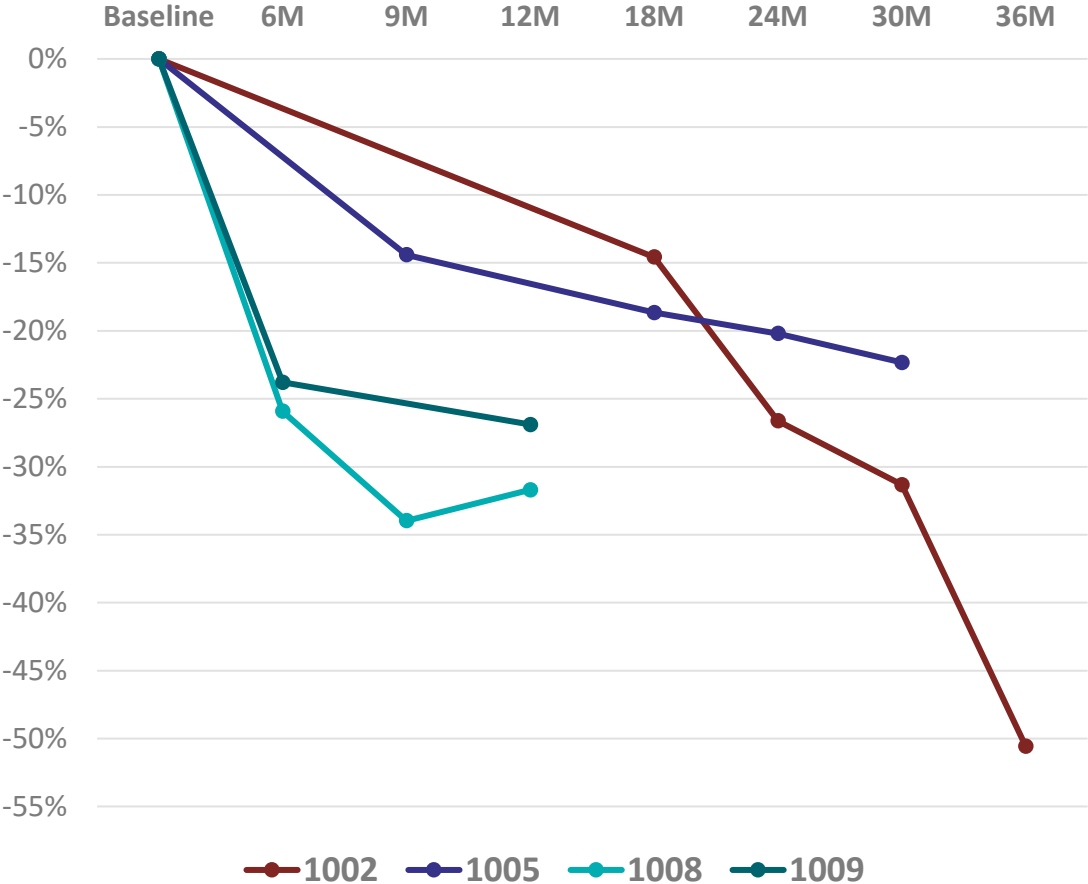
- ✓ Danon Disease is **fundamentally a disease of enlarged hearts**; the largest known hearts have been from Danon patients
- ✓ Left ventricular hypertrophy is the most consistent phenotypic **feature of disease progression**
- ✓ Left ventricular wall thickness has been shown to be a **significant predictor of CV events in cardiomyopathy**
- ✓ Meaningful **LV Mass decreases seen as early as 6-9M** in Phase 1 pediatric cohort, and LV Mass Index decreases **sustained to up to 36M in adult patients**; stark contrast to natural history
- ✓ In Phase 1 study, LV Mass **significantly correlated with improvements / stabilization in all parameters** including biomarkers (hsTnI, BNP), quality of life (KCCQ), and symptoms (NYHA)

LVH Predicts Clinical Outcomes in HF and Cardiomyopathies

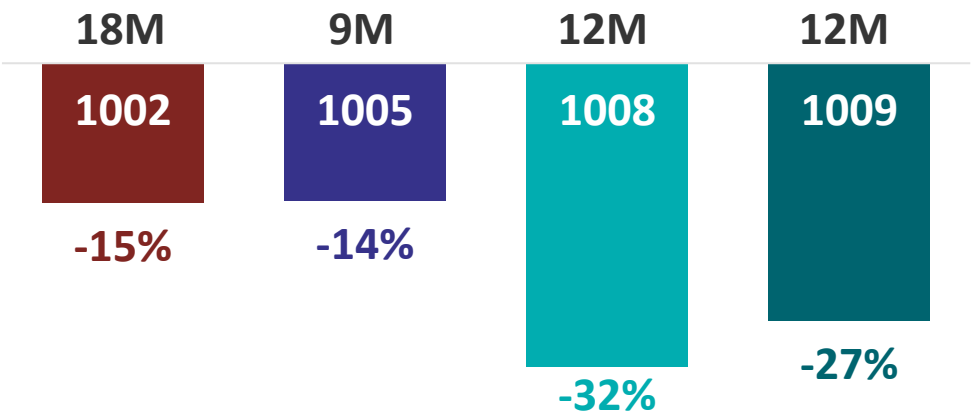
Cardiomyopathy or CVD	Measure of LVH	Event	HR; CI; p value
HFpEF (Shah 2019)	LV Mass index	CVD or HFH	HR 1.05 per 10 g/m ² ; CI 1.00 to 1.10; p = 0.03
HFpEF (de Simone 2008)	LV Mass index	HF	HR 1.03; CI 1.02-1.04; p<0.00001
HCM (Liu 2016)	LV wall thickness	All Cause Death	HR 1.48; CI 1.01 to 2.17; p<0.05
HCM (Liu 2016)	LV wall thickness	CV Death	HR 2.17; CI 1.06 to 1.89; p<0.05
HCM (Liu 2016)	LV wall thickness	Sudden Cardiac Death	HR 3.17; CI 1.64 to 6.13; p<0.05
Fabry Disease (Orsborne 2022)	LV Mass index	Composite of CV events (HFH, MI, procedures, arrhythmias)	HR 1.008; CI 1.003-1.014; p=0.005
Fabry Disease (Hanneman 2020)	LV Mass index	Composite of CV events (HF, ventricular arrhythmia, cardiac death)	HR 1.1 per 5 g/m ² ; CI 1.04-1.2; p<0.001

LV Mass Index in RP-A501 Phase 1 Study

RP-A501 Phase 1 Low-Dose Cohort: LV Mass Index % Change from Baseline¹



RP-A501 Phase 1 Study: LV Mass Index % CFB at ~12M
(9M or 18M where 12M not available)²

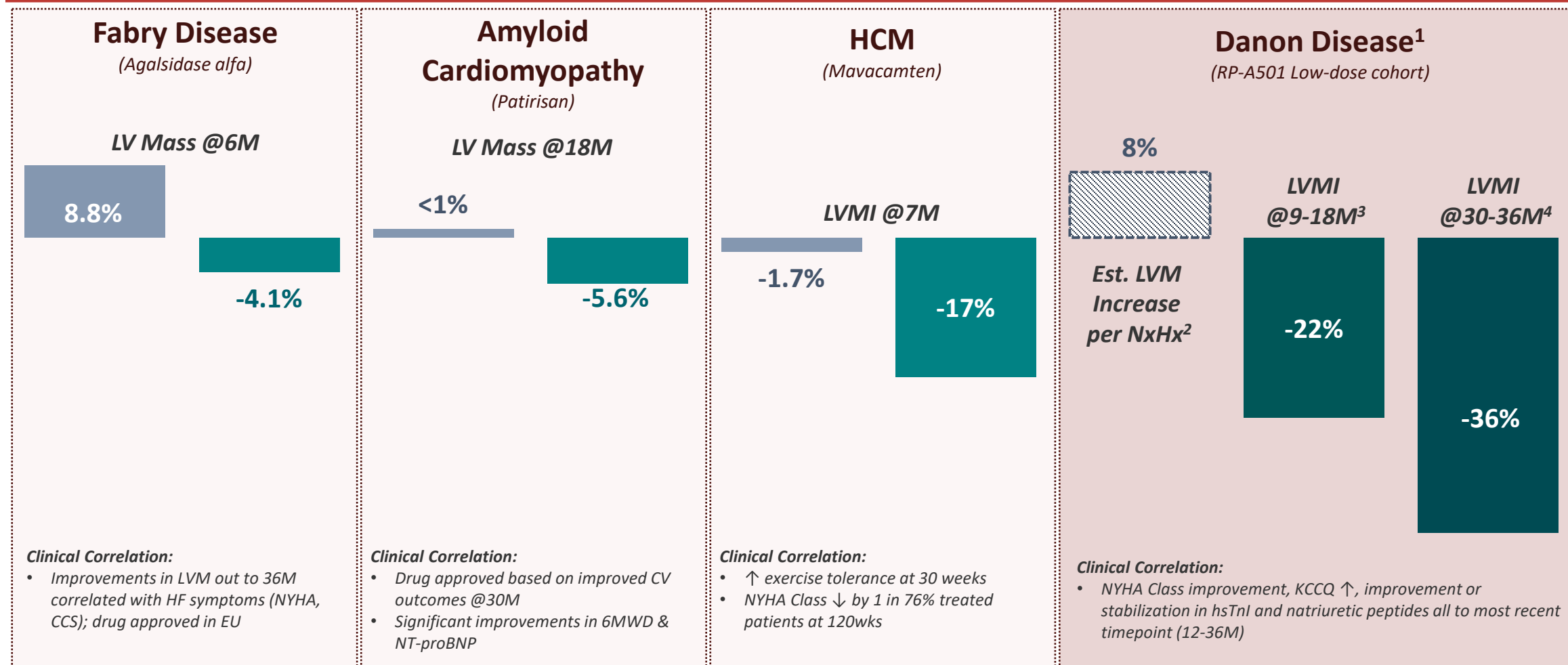


- **>20% LVMI decrease** observed as early as 6M in pediatric cohort, sustained to 12M timepoint
- Adult patients with appropriate immunomodulation show **>10% LVMI decrease** around 12M² with further decreases out to 30-36M of **22% to 51%**

¹ Does not include patient 1001 (unmonitored immunomodulation). ² 12M visit data missing for 1002 and 1005 due to pandemic-related travel issues.

LV Mass / LV Mass Index (LVMI) Improves in DD with RP-A501

LV hypertrophy decreases greater than/comparable to other approved therapies

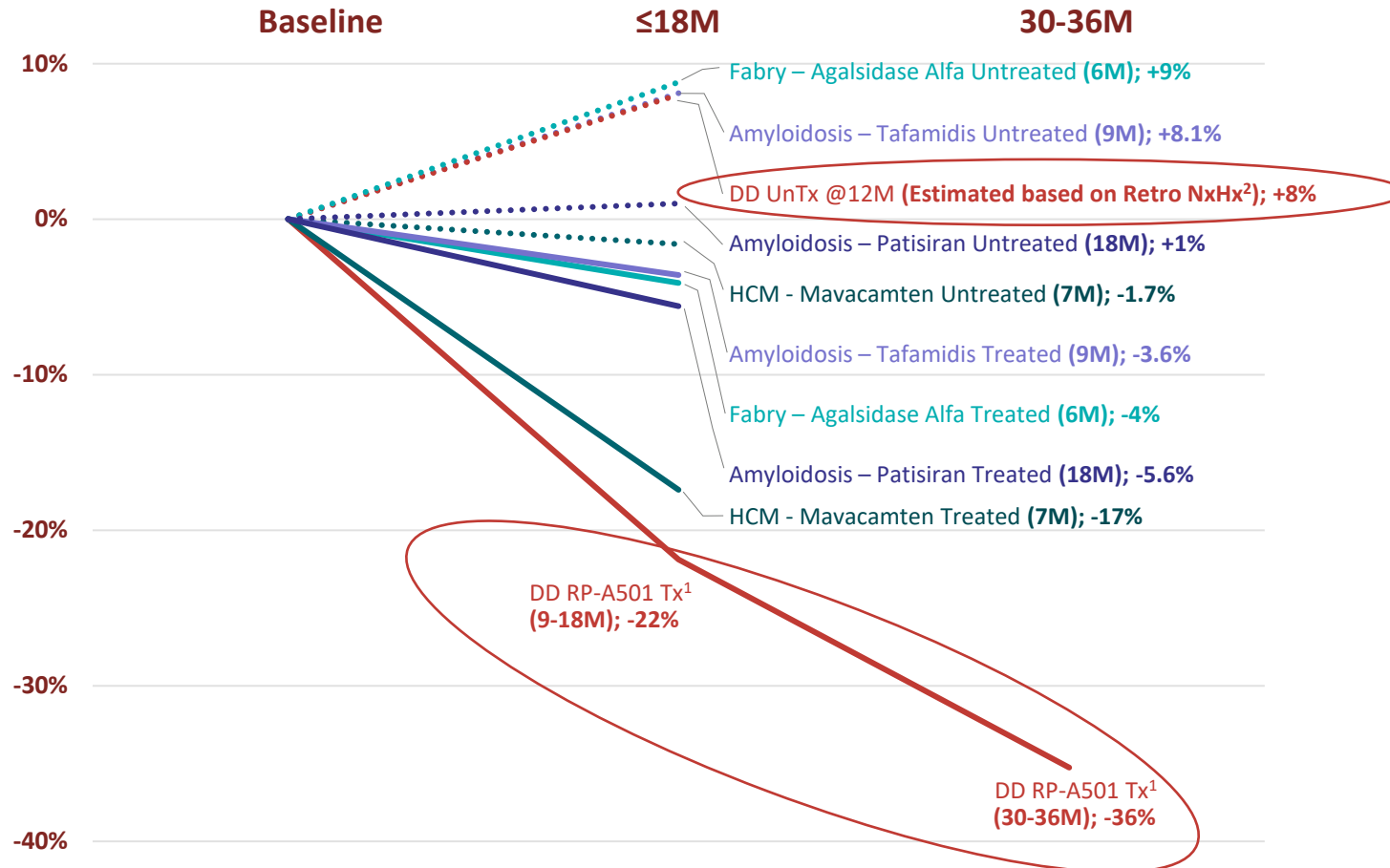


■ Placebo / Untreated ■ Estimate from retrospective NxHx Data ■ Treated

¹ RP-A501 Phase 1 low-dose cohort data; averages do not include 1001 (unmonitored immunomodulation) and 1006, 1007 (high dose patients). ² Reflects estimated LV Mass increase over 12-18M for DD patients based on retrospective natural history data-set (shown on slide 20). ³ Reflects average of 1002 18M, 1005 9M, 1008 12M, 1009 12M. ⁴ Reflects average of 1005 30M, 1002 36M Hughes 2008. Heart; Solomon 2019. Circulation; Saberi 2021. Circulation

LV Mass in RP-A501 Low-Dose Cohort Versus Recently Approved CV Therapies

LV Mass / LVMI Change from Baseline in Treated vs Untreated Patients:
RP-A501 Low-Dose Cohort¹ and Recently Approved CV Therapies



- Data from Phase 1 study shows RP-A501 is potentially transformative for cardiac structure improvements and remodeling
- On par with recently approved therapies in other CV indications (across different disease etiologies and drug MOA's)

¹ Averages do not include patient 1001 (unmonitored immunomodulation) and 1006, 1007 (high-dose cohort patients).

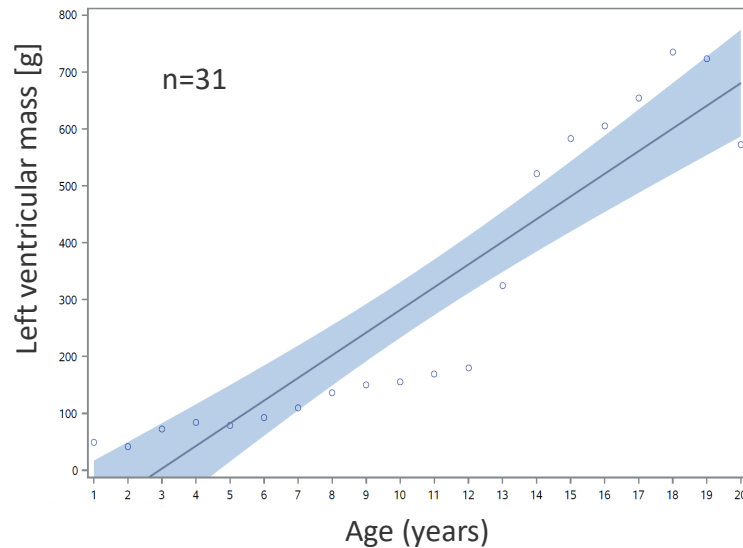
² Reflects estimated LV Mass increase over 12-18M for DD patients based on retrospective natural history data-set (shown on slide 20).
Hughes 2008. Heart; Rettl 2022. EHJ CV Imaging; Solomon 2019. Circulation; Saberi 2021. Circulation

Cardiac Imaging Captures the Progression of Danon Disease

Significant Increases in LV Mass and LV Wall Thickness Correlate with Age

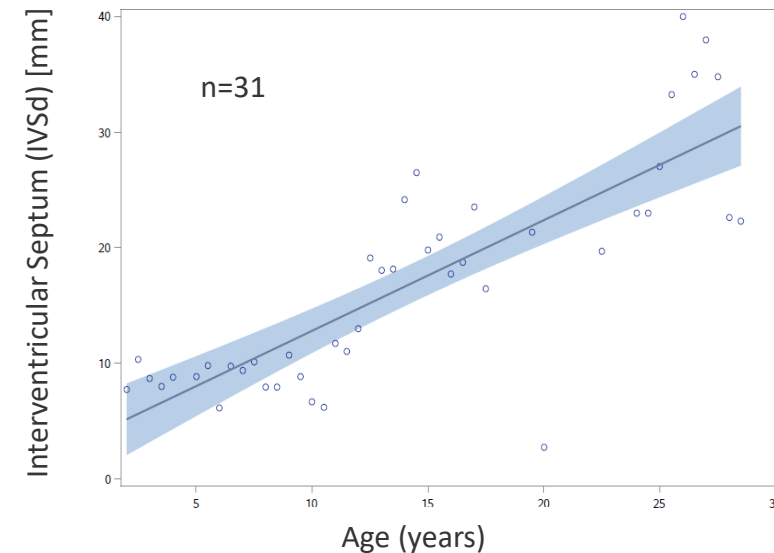
Trends in LV Mass

LV Mass increased by 39.86 ± 4.01 g per year



Trends in Septal Wall Thickness

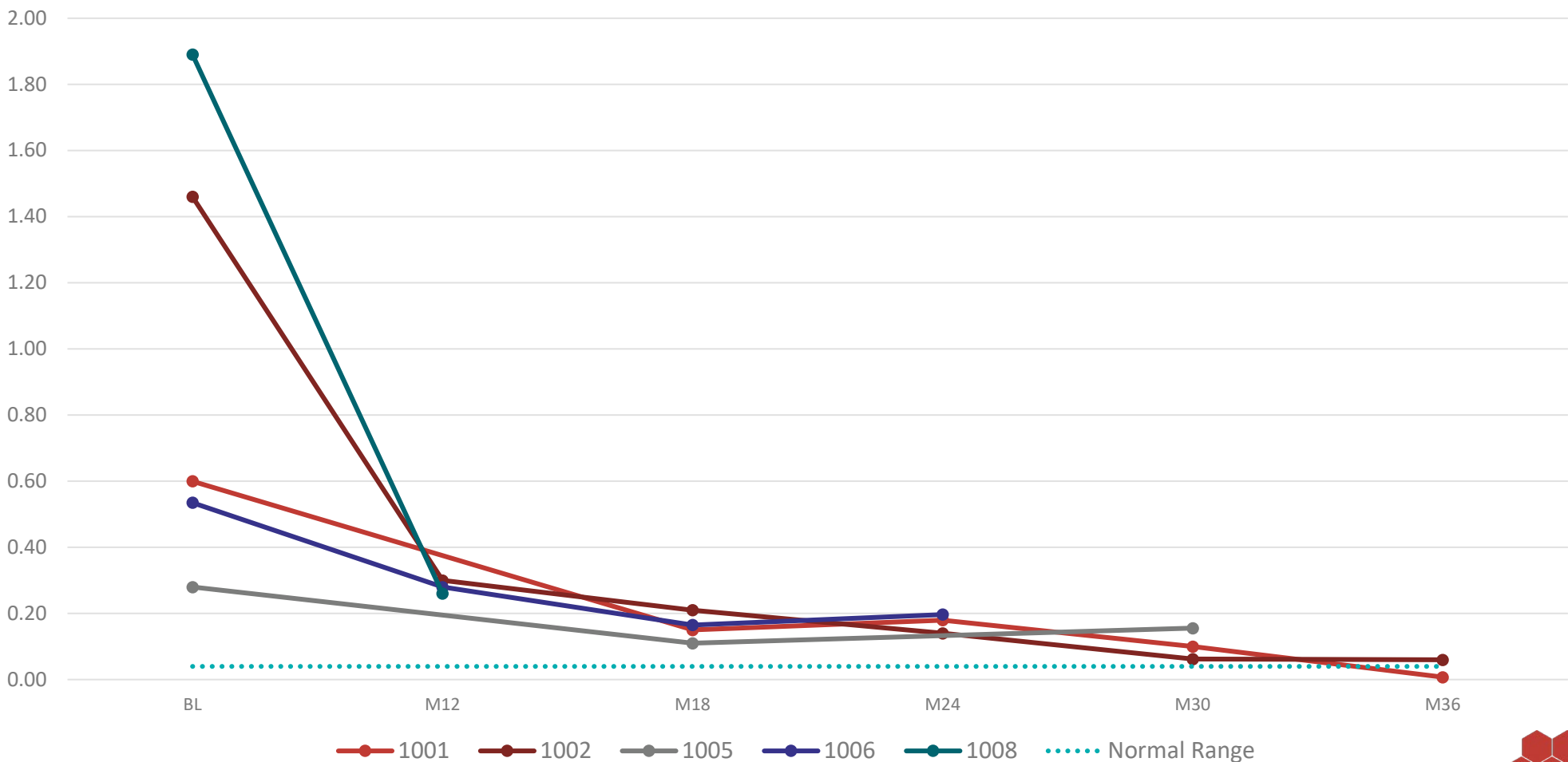
Septal wall increased by 0.92 ± 0.15 mm/year



Data from the Natural History Studies demonstrated increases in key echo parameters in DD that are known to predict disease progression in other types of cardiomyopathy

Significant and Sustained Reduction in Troponin (Key Secondary Endpoint) Observed Across Patients in Phase 1 Study

Phase 1 Trial: RP-A501 Treatment Conferred Improvement in Troponin-I Levels (ng/mL)



Note: Upper limit of normal 0.04 ng/mL, BL = baseline



Current Status and Next Steps

Ongoing Danon Global Phase 2 Study Activities

Global Phase 2 Study (N=12)

United States

- ✓ RMAT, Fast Track, Orphan Drug Designations
- ✓ IRB approval at UCSD, CHOP; sites activated
- ✓ Multiple GMP lots manufactured in-house; sufficient drug product produced for full pivotal trial
- ✓ Global natural history study underway
 - ✓ FDA alignment on design
- ✓ Initiated pediatric safety run-in






Europe (UK + EU)

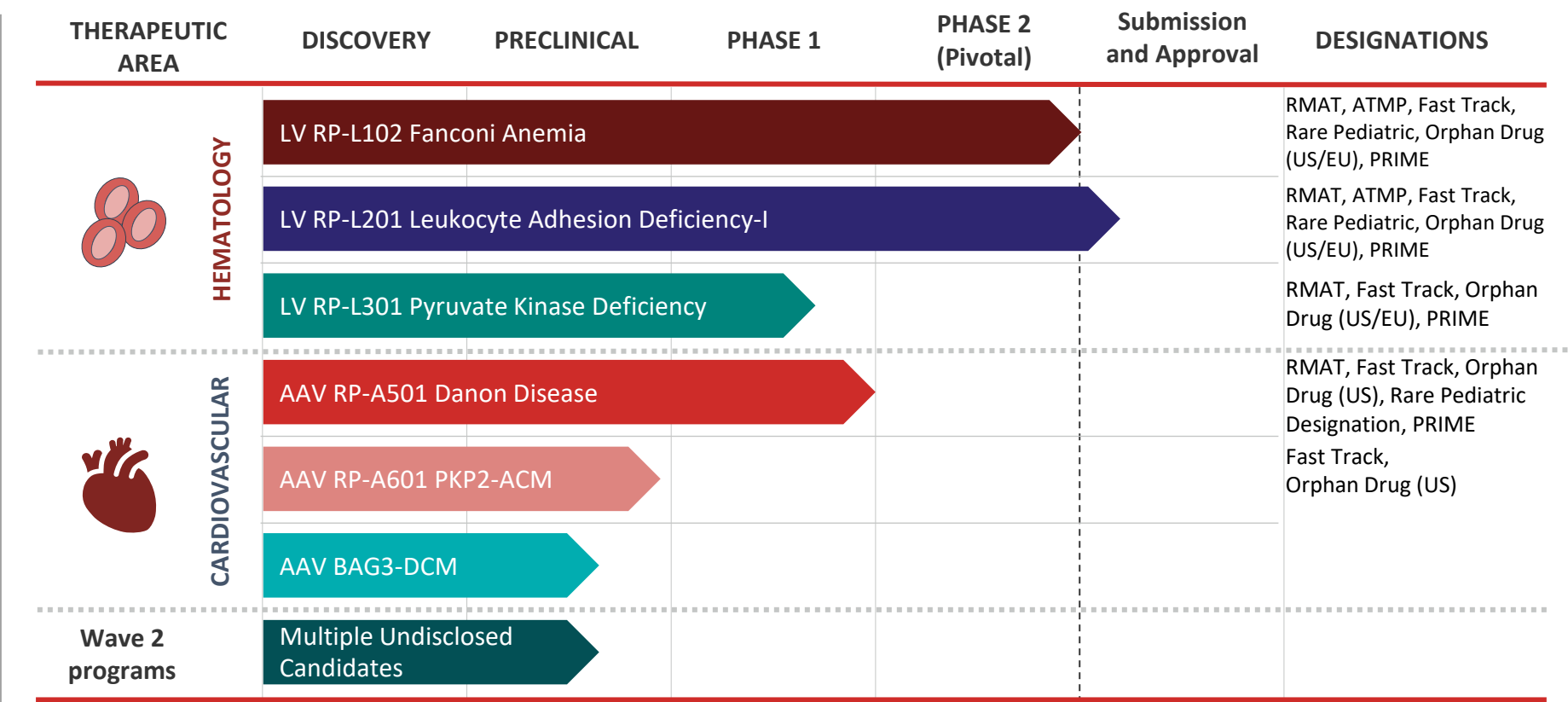
- ✓ Key regulatory designations obtained:
 - ✓ PRIME Designation
 - ✓ Orphan Drug Designation
 - ✓ Advanced Therapy Medicinal Product
- ✓ Scientific Advice Meeting held with EMA
 - ✓ On track for CTA/IMPd filing
- ✓ Multiple EU clinical site startup activities underway
- ✓ Successful QP audit of Rocket manufacturing facility; drug product cleared for EU use

Rocket Pipeline: 6 Disclosed Programs Across Two Platforms with Compelling Clinical and/or Pre-clinical Proof of Concept

Criteria used to select programs

-  First-, best- and/or only-in-class
-  On-target MOA; clear endpoints
-  Sizeable market to maximize patient impact

6+ programs with 2 programs fast approaching commercialization



AAV, adeno-associated virus; ATMP, advanced therapy medicinal product; BLA, Biologics License Application; LV, lentiviral vector; MAA, Marketing Authorisation Application; MOA, mechanism of action; PRIME, PRiority MEdicines; RMAT, regenerative medicine advanced therapy. PKP2: plakophilin 2; ACM: Arrhythmogenic Cardiomyopathy; BAG3: BLC2-associated athanogene 3 DCM: Dilated Cardiomyopathy