

Cabaletta Bio[®]

A microscopic view of several cells, likely cancer cells, with prominent red internal structures. The cells are shown in various stages of focus, with one cell in the foreground being sharp and others in the background being blurred. The red structures appear to be nuclei or specific organelles within the cells.

Corporate Presentation

MARCH 2024

Disclaimer

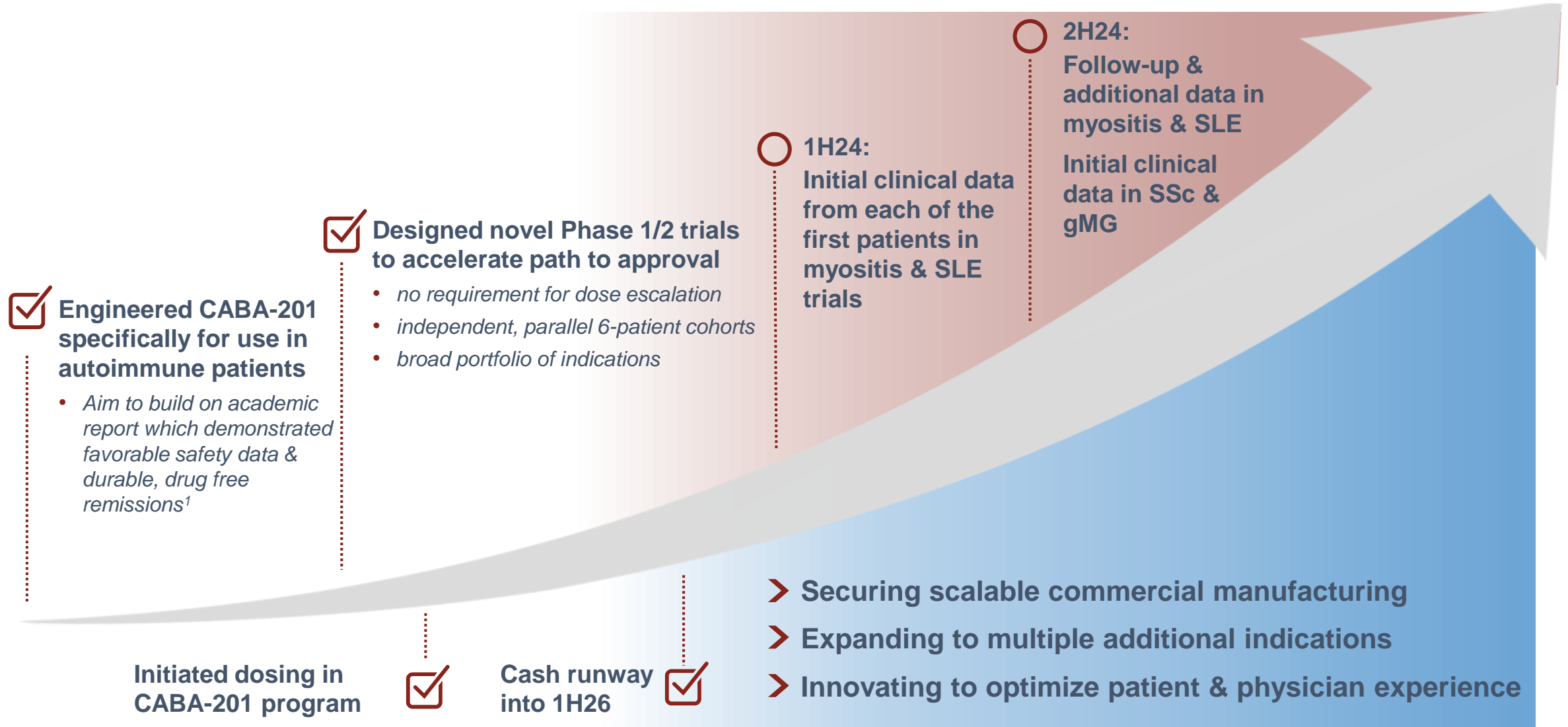
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This Presentation may contain "forward-looking statements" within the meaning of the Private Securities Litigation Reform Act of 1995 relating to our business, operations, and financial conditions, and include, but are not limited to, express or implied statements regarding our current beliefs, expectations and assumptions regarding: our business, future plans and strategies for our CAAR T and CARTA technologies; our ability to grow our autoimmune-focused pipeline; the ability to capitalize on and potential benefits resulting from our research and translational insights; including those related to any similarly-designed constructs or dosing regimens, the anticipated market opportunities for CABA-201 in patients with autoimmune diseases; the Company's business plans and objectives; our expectations around the potential success and therapeutic benefits of CABA-201, including our belief that CABA-201 may enable an "immune system reset"; Cabaletta's belief that it is developing the first CD19-CAR T therapy specifically designed for patients with autoimmune disease and that it has an efficient path to initiation of registrational studies; our plans for Phase 1/2 clinical trials of CABA-201 in patients with systemic lupus erythematosus (SLE), myositis, SSc, and generalized myasthenia gravis (gMG), including our anticipated progress, timing of enrollment, clinical trial design, and ability to leverage our experience in autoimmune cell therapy; our planned initial clinical data read-out in the first half of 2024 for patients with myositis and SLE treated with CABA-201; our planned initial clinical data read-out in the second half of 2024 for patients with SSc and gMG treated with CABA-201; our ability to enroll the requisite number of patients, dose each dosing cohort in the intended manner, and advance the trial as planned in our Phase 1/2 clinical trials of CABA-201; the timing any planned regulatory filings for our development programs, including IND applications; the progress and results of our DesCAARTes™ Phase 1 trial, including the significance and impact around reported safety and clinical and translational data of cohorts from our DesCAARTes™ and MusCAARTes™ Phase 1 trials; the therapeutic potential and clinical benefits of our product candidates; the expectation that Cabaletta may improve outcomes for patients suffering from SLE, SSc, myositis, gMG, mucosal pemphigus vulgaris, MuSK myasthenia gravis, or other autoimmune diseases; the ability of our clinical strategy to reduce risk, maximize reach and accelerate timelines of our Phase 1/2 clinical trials of CABA-201; our ability to improve and scale the patient and provider experience; our ability to successfully complete our preclinical and clinical studies for our product candidates, including our ability to enroll the requisite number of patients, dose each dosing cohort in the intended manner, and progress the trial; our ability to obtain and maintain regulatory approval of our product candidates, including our expectations regarding the intended incentives conferred by and ability to retain Orphan Drug Designation and Fast Track Designations for our product candidates, as applicable; our ability to accelerate our pipeline and to develop meaningful therapies for patients, including in collaboration with academic and industry partners and the ability to optimize such collaborations on our development programs; our ability to contract with third-party suppliers and manufacturers and retain such manufacturers, whether due to legislative action or otherwise; to implement an enhanced manufacturing process and further develop our internal manufacturing strategy, capabilities and facilities; our potential commercial opportunities, including value and addressable market, for our product candidates; and our expectations regarding our use of capital and other financial results, including our ability to fund operations into the first half of 2026. Words such as, but not limited to, "look forward to," "believe," "expect," "anticipate," "estimate," "intend," "plan," "would," "should" and "could," and similar expressions or words, identify forward-looking statements.

Various risks, uncertainties and assumptions could cause actual results to differ materially from those anticipated or implied in our forward-looking statements. Such risks and uncertainties include, but are not limited to, risks related to the success, cost, and timing of our product candidate development activities and preclinical studies and clinical trials, risks related to our ability to demonstrate sufficient evidence of safety, efficacy and tolerability in our preclinical studies and clinical trials of CABA-201, DSG3-CAART and MuSK-CAART, the risk that the results observed with the similarly-designed construct, including, but not limited to, due to dosing regimen, are not indicative of the results we seek to achieve with CABA-201, our plans to evaluate additional cohorts in the DesCAARTes™ trial, including a cohort implementing a pre-treatment regimen, the risk that signs of biologic activity or persistence may not inform long-term results, the risk that persistence observed with effective CART-19 oncology studies in combination with lymphodepletion is not indicative of, or applicable to, clinical responses in patients with mPV, risks related to clinical trial site activation or enrollment rates that are lower than expected, our ability to protect and maintain our intellectual property position, risks related to our relationships with third parties, uncertainties related to regulatory agencies' evaluation of regulatory filings and other information related to our product candidates, our ability to retain and recognize the intended incentives conferred by any Orphan Drug Designations and Fast Track Designations, risks related to regulatory filings and potential clearance, the risk that any one or more of our product candidates will not be successfully developed and commercialized, the risk that the results of preclinical studies or clinical studies will not be predictive of future results in connection with future studies, and risks related to volatile market and economic conditions and public health crises. New risks and uncertainties may emerge from time to time, and it is not possible to predict all risks and uncertainties. Except as required by applicable law, we do not plan to publicly update or revise any forward-looking statements contained herein, whether as a result of any new information, future events, changed circumstances or otherwise. Although we believe the expectations reflected in such forward-looking statements are reasonable, we can give no assurance that such expectations will prove to be correct. Accordingly, you are cautioned not to place undue reliance on these forward-looking statements. No representations or warranties (expressed or implied) are made about the accuracy of any such forward-looking statements. For a discussion of these and other risks and uncertainties, and other important factors, any of which could cause our actual results to differ materially from those contained in the forward-looking statements, see the section entitled "Risk Factors" in our most recent annual report on Form 10-K, as well as discussions of potential risks, uncertainties, and other important factors in our other and subsequent filings with the Securities and Exchange Commission. Certain information contained in this Presentation relates to or is based on studies, publications, surveys and other data obtained from third-party sources and the Company's own internal estimates and research. While the Company believes these third-party sources to be reliable as of the date of this Presentation, it has not independently verified, and makes no representation as to the adequacy, fairness, accuracy or completeness of, any information obtained from third-party sources. The Company is the owner of various trademarks, trade names and service marks. Certain other trademarks, trade names and service marks appearing in this Presentation are the property of third parties. Solely for convenience, the trademarks and trade names in this Presentation are referred to without the ® and TM symbols, but such references should not be construed as any indicator that their respective owners will not assert, to the fullest extent under applicable law, their rights thereto.

Develop and launch the first curative
targeted cellular therapies for patients
with autoimmune diseases

Cabaletta Bio[®]

Realizing the vision to transform autoimmune disease treatment



SLE – Systemic lupus erythematosus; SSc – Systemic sclerosis; gMG – Generalized myasthenia gravis

1. Müller, Fabian, et al. "CD19 CAR T-Cell Therapy in Autoimmune Disease—A Case Series with Follow-up." *New England Journal of Medicine* 390.8 (2024): 687-700. The construct utilized in these studies has a similar design to CABA-201, sharing the 4-1BB costimulatory domain, but is a different construct.

Pipeline targeting autoimmune diseases with high unmet need

Innovative and scalable clinical strategy with potential for accelerated development path

Program	Trial	Preclinical	Phase 1/2	Pivotal
CABA-201 ^{FTD} 4-1BB CD19-CAR T	RESET-Myositis TM	<i>Dermatomyositis</i>		
		<i>Anti-synthetase syndrome</i>		
		<i>IMNM</i>		
	RESET-SLE TM	<i>Lupus Nephritis</i>		
		<i>Non-Renal SLE</i>		
	RESET-SSc TM	<i>Skin + Organ Cohort</i>	} <i>IND cleared</i>	
		<i>Skin Cohort</i>		
	RESET-MG TM	<i>AChR-Ab pos. gMG</i>	} <i>IND cleared</i>	
		<i>AChR-Ab neg. gMG</i>		
	CAART ^{FTD} Chimeric AutoAntibody Receptor T cells	DesCAARTes TM	<i>Mucosal pemphigus vulgaris</i> ¹	
MusCAARTes TM		<i>MuSK-Ab positive MG</i> ¹		

- Rheumatology
- Neurology
- Dermatology

Expanding the potential application of CABA-201 to multiple additional indications in 2024

RESETTM – REstoring SElf-Tolerance; IMNM – Immune-mediated necrotizing myopathy; SLE – Systemic lupus erythematosus; Ab – Antibody; AChR – Acetylcholine receptor; gMG – Generalized myasthenia gravis

1. Currently being evaluated in a Phase 1 trial.

● FDA Fast Track Designation received in dermatomyositis, SLE and lupus nephritis, systemic sclerosis, mucosal pemphigus vulgaris, and MuSK-Ab positive MG.



Chimeric Antigen Receptor T Cells for Autoimmunity
CABA-201

Cabaletta Bio[®]

Academic data: Immune system reset in autoimmune patients

Promising clinical responses in 15 patients across several autoimmune diseases with 4-1BB CD19-CAR T^{1,2}

100%

Objective clinical response rate in SLE, myositis, SSc

T cell expansion & B cell depletion within 1st month enabled robust clinical improvement by 3 months

<7%

Rate of CRS more severe than fever (1/15)

11/15 patients reported by Erlangen group with CRS, 10/11 with fever*

Single grade 1 ICANS event reported (transient dizziness)

*One grade 2 CRS (increased oxygen requirement in patient with pre-existing lung disease³)

2+

Years of SLE durable drug-free remission

Up to 29 months of follow-up with no relapses in any of the 15 patients reported by Erlangen group, off immunosuppressive agents

3-7

Months to naïve B cell repopulation

In patients with ≥5 months of follow-up, complete B cell elimination followed by return of healthy naïve B cells within median of ~3 months

CRS – Cytokine release syndrome; ICANS – Immune effector cell-associated neurotoxicity syndrome

1. Müller, Fabian, et al. "CD19 CAR T-Cell Therapy in Autoimmune Disease—A Case Series with Follow-up." *New England Journal of Medicine* 390.8 (2024): 687-700.

2. The construct utilized in these studies has a similar design to CABA-201, sharing the 4-1BB costimulatory domain, but is a different construct.

3. Taubmann J, et al. Efficacy and Safety of CAR-T-Cell Treatment in Refractory Antisynthetase Syndrome – Data of the First Three Patients [ACR abstract; Nov 14, 2023].

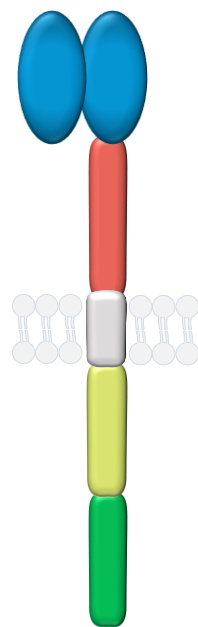
CABA-201: CD19-CAR T specifically designed for autoimmunity

Cabaletta's CD19 binder with similar *in vitro* & *in vivo* activity to FMC63^{1,2} (binder used in academic report³)

Fully human anti-CD19 binder
Similar binding affinity & biologic activity to FMC63,
with binding to the same epitope^{1,2}

4-1BB costimulatory domain
Same co-stim. domain as used in academic studies

CD3-Zeta signaling domain



CABA-201⁵

Clinical data reported by IASO using licensed CD19 binder in oncology⁴

▶ Fully human binder

Evaluated as dual-CAR combined with CD22 binder with standard Flu/Cy preconditioning

▶ Data reported in ~20 patients to date

B cell leukemia and lymphoma in IIT in China

▶ Safety data supports autoimmune development

IIT – Investigator-initiated trial; Flu/Cy – Fludarabine/Cyclophosphamide

1. Peng, Binghao J, et al. "Preclinical specificity and activity of CABA-201, a fully human 4-1BB containing CD19 CAR T therapy for treatment-resistant autoimmune disease." Poster presented at: American Society Gene and Cell Therapy 26th Annual Meeting; 2023 May 19; Los Angeles, CA.
2. Dai, Zhenyu, et al. "Development and functional characterization of novel fully human anti-CD19 chimeric antigen receptors for T-cell therapy." *Journal of Cellular Physiology* 236.8 (2021): 5832-5847.
3. Müller, Fabian, et al. "CD19 CAR T-Cell Therapy in Autoimmune Disease—A Case Series with Follow-up." *New England Journal of Medicine* 390.8 (2024): 687-700.
4. Evaluated as part of CT120, a dual-CD19xCD22 CAR T product candidate under development by Nanjing IASO Biotherapeutics, Co., Ltd. (IASO Bio).
5. Transmembrane domain in CABA-201 is CD8 α vs. TNFRSF19 (Troy) utilized in the academic construct. The two transmembrane domains have not been shown to have a significant difference in function or IFN- γ production in preclinical studies. The CD8 α transmembrane domain is employed in tisagenlecleucel.

REstoring SELF-Tolerance (RESET™) Phase 1/2 trials advancing

SLE & myositis trials currently enrolling, with a broadening portfolio to realize the potential of CABA-201

Phase 1/2 Trials

Preclinical

■ Rheum

■ Neuro

■ Undiscl.

Myositis



Typical onset middle age
Only FDA-approved therapy is IVIg in DM
High mortality due to lung & cardiac involvement

~66k

SLE



Affects young women & people of color
~40% with lupus nephritis, which carries ~25% risk of death or ESRD within 10y

~160-320k

SSc



Middle age onset common
Progressive skin & organ fibrosis with lung, cardiac, renal damage
Average survival of 12y

~88k

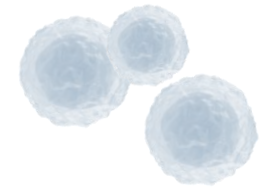
gMG



Bimodal age of onset
Profound weakness that can be disabling
Risk for myasthenic crises, with respiratory failure

~55k

2024



Autoimmune diseases in which B cells play a key role

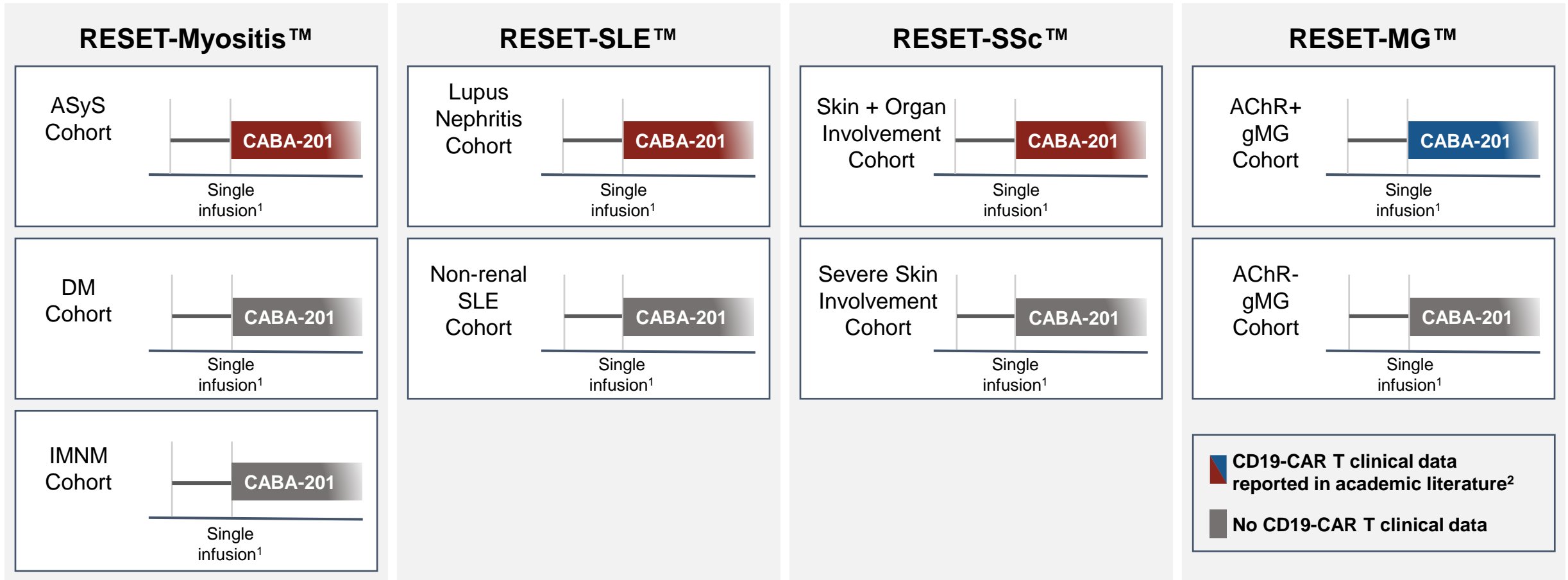
Over 1 million

U.S.
Prevalence

Current therapies offer modest efficacy & often result in chronic and broad immunosuppression

Clinical strategy to reduce risk, maximize reach & accelerate timelines

Broad investigation of CABA-201 in well-defined patient populations with the same dose & similar design



Each cohort to include 6 patients treated with an identical dose – without dose escalation requirement – and designed to inform discussions with FDA on registrational path for each indication

SLE – Systemic lupus erythematosus; SSc – Systemic sclerosis; gMG – Generalized myasthenia gravis; ASyS – Anti-synthetase syndrome; DM – Dermatomyositis; IMNM – Immune-mediated necrotizing myopathy

1. Subjects will be treated with a standard preconditioning regimen consisting of fludarabine and cyclophosphamide prior to a single dose CABA-201, followed by short inpatient stay.

2. The data reported in the academic literature does not employ CABA-201.

RESET-Myositis™: Phase 1/2 study design for CABA-201

Patient dosing commenced; enrolling patients with active myositis with DM, ASyS or IMNM subtypes

Screening



Adults 18-65y

Key inclusion criteria

Clinical IIM diagnosis

Subtype based on serology

Disease activity despite standard of care

Recommended vaccines

Key exclusion criteria

Cancer associated myositis

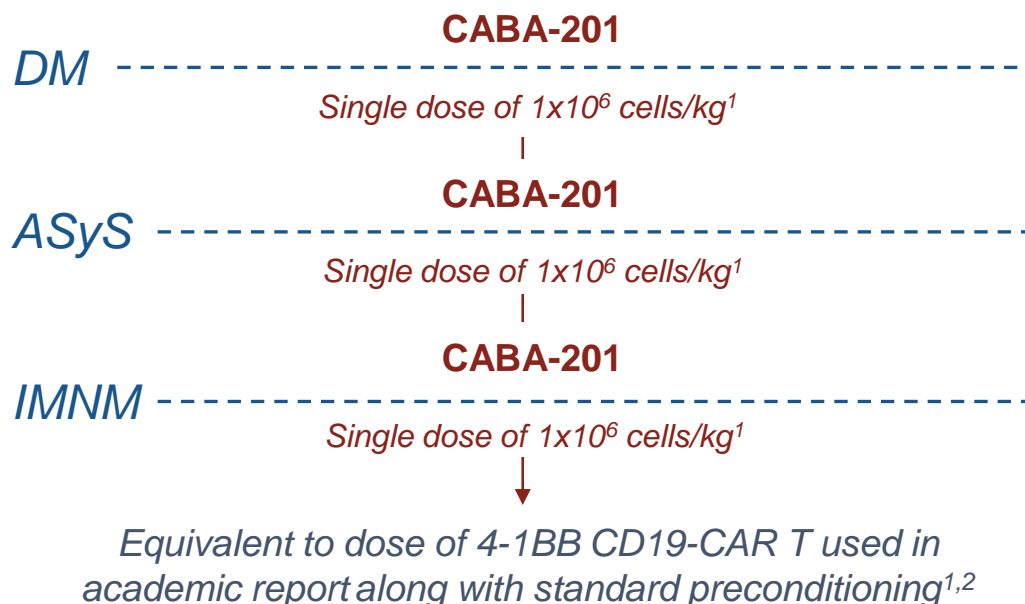
Significant lung or cardiac impairment

Treatment with anti-B cell agent within prior ~6 months

Treatment with biologic agent within prior ~3 months

Phase 1/2 Study Design

Open-label trial with parallel 6-subject cohorts



Study Objectives

Primary objective

Safety & tolerability within 28 days of infusion

Categories of key secondary objectives

- Myositis clinical activity – Total Improvement Score
- Functional & radiographic evidence of disease
- Myositis serology
- Pharmacokinetics / pharmacodynamics

IIM – Idiopathic inflammatory myopathy; DM – Dermatomyositis; ASyS – Anti-synthetase syndrome; IMNM – Immune-mediated necrotizing myopathy

1. Subjects will be treated with a standard preconditioning regimen consisting of fludarabine and cyclophosphamide prior to a single dose CABA-201, followed by short inpatient stay.

2. Müller, Fabian, et al. "CD19 CAR T-Cell Therapy in Autoimmune Disease—A Case Series with Follow-up." *New England Journal of Medicine* 390.8 (2024): 687-700.

RESET-SLE™: Phase 1/2 study design for CABA-201

Currently enrolling patients with active SLE with or without renal involvement

Screening



Adults 18-65y

Clinical SLE diagnosis

Confirmatory serology

Disease activity despite standard of care

Recommended vaccines

Key inclusion criteria

Treatment with anti-B cell agent within prior ~6 months

Treatment with biologic agent within prior ~3 months

Key exclusion criteria

Phase 1/2 Study Design

Open-label trial with parallel 6-subject cohorts

*SLE with lupus
nephritis*

CABA-201

Single dose of 1×10^6 cells/kg¹

*SLE without
renal disease*

CABA-201

Single dose of 1×10^6 cells/kg¹

Equivalent to dose of 4-1BB CD19-CAR T used in academic report along with standard preconditioning^{1,2}

Study Objectives

Primary objective

Safety & tolerability within 28 days of infusion

Categories of key secondary objectives

- SLE clinical activity
- SLE serology
- Pharmacokinetics / pharmacodynamics

Similarly designed Phase 1/2 trials – RESET-SSc™ & RESET-MG™ – advancing in SSc & gMG

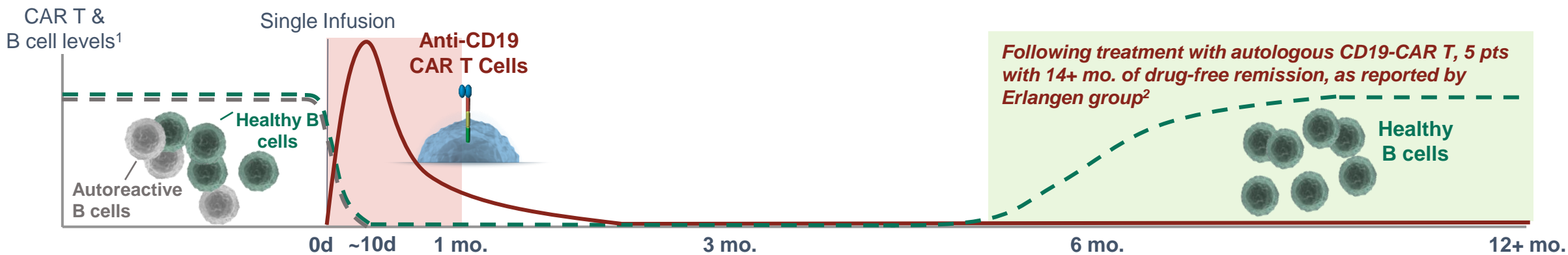
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Evaluation metrics to assess outcomes of CAR T in autoimmunity

For CABA-201, translational effects in 1st month may inform clinical outcomes at 3 months



Metrics of evaluation

Translational measures

- Within 1 month**
- CAR T expansion: Magnitude & timing
 - B cell depletion: Timing & depth

- ~3 months**
- Autoantibody changes
 - Vaccine titer changes
 - Inflammatory marker changes

- 5-12+ months**
- Time to B cell repopulation
 - Autoantibody changes
 - Vaccine titer changes

Clinical data

- Rate of CRS more severe than fever
- Rate & grade of ICANS
- Rate & severity of infection

- Early efficacy signals
- Rate & severity of infection

- Durability of clinical activity
- Rate & severity of infection

Patient experience

- Hospitalization requirements
- Preconditioning & infusion regimen

- Concomitant medications, if any

- Concomitant medications, if any

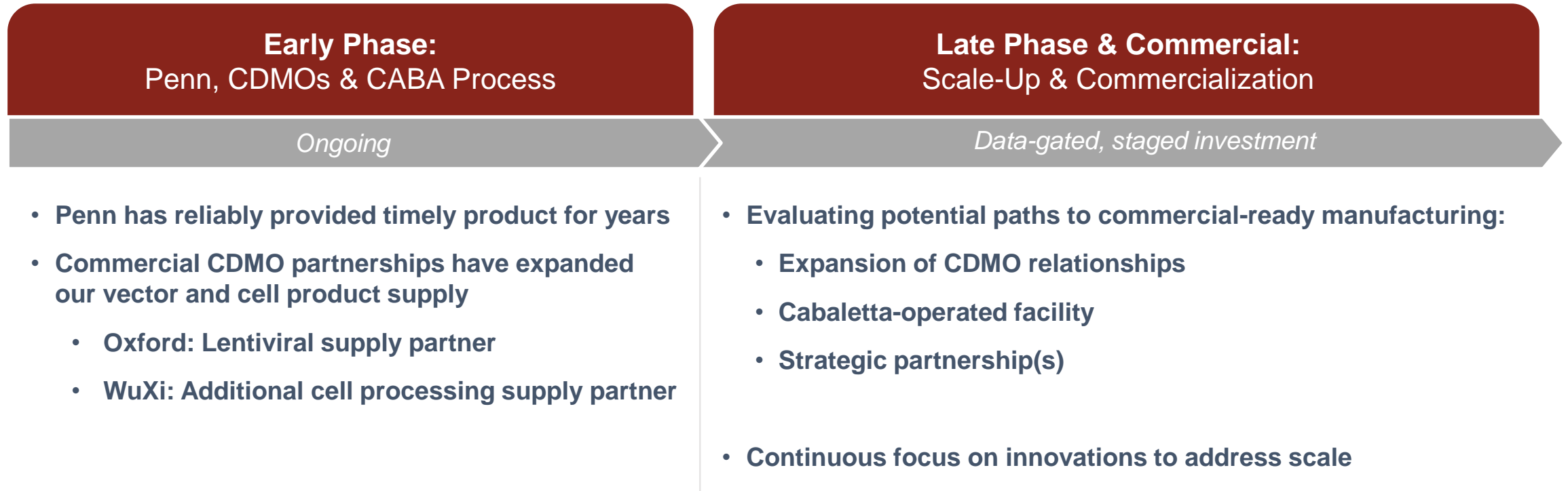
SLE – Systemic lupus erythematosus; SSc – Systemic sclerosis; gMG – Generalized myasthenia gravis

1. Illustrative graphic, adapted from Taubmann, J., et al. "OP0141 Long Term Safety and Efficacy Of CAR-T Cell Treatment in Refractory SLE-Data from the First Seven Patients." (2023): 93-94.

2. Müller, Fabian, et al. "CD19 CAR T-Cell Therapy in Autoimmune Disease—A Case Series with Follow-up." *New England Journal of Medicine* 390.8 (2024): 687-700.

Manufacturing strategy

Staged approach allows for efficient allocation of capital while leveraging experienced partners



Preparations ongoing to implement commercial-ready process in advance of pivotal studies

Securing & expanding our leadership in autoimmune cell therapy

Rapidly advancing to address patient need

Advancing the RESET™ clinical trials with the goal of delivering on our commitment to patients



Myositis
Systemic lupus erythematosus
Systemic sclerosis
Generalized myasthenia gravis

- Minimizing the requirement for inpatient stay
- Optimizing the preconditioning regimen
- Reducing the burden of apheresis
- Innovating to address scale in autoimmune disease

Broadening potential to serve patients

Biologic opportunity for potential cure or paradigm-shifting treatment may be possible in dozens of autoimmune diseases

Rheumatology

- Rheumatoid arthritis
- ANCA-associated vasculitis
- Sjogren's syndrome

Neurology

- Multiple sclerosis
- Neuromyelitis optica
- CIDP

Nephrology

- Membranous nephropathy
- Goodpasture's syndrome

Dermatology

- Pemphigus vulgaris
- Pemphigus foliaceus
- Epidermolysis bullosa acquisita
- Bullous pemphigoid

Hematology

- Immune thrombocytopenic purpura
- Thrombotic thrombocytopenic purpura
- Antiphospholipid syndrome
- Autoimmune hemolytic anemia

Endocrinology

- Type 1 diabetes
- Graves' disease
- Hashimoto's disease



Corporate Summary

Cabaletta Bio[®]

Cabaletta Bio leadership

Track record of operational success evaluating novel cell therapy candidates in autoimmunity

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President, CEO & Chairman



Samik Basu, M.D.
Chief Scientific Officer



Gwendolyn Binder, Ph.D.
President, Science & Technology



David J. Chang, M.D., M.P.H., FACR
Chief Medical Officer



Arun Das, M.D.
Chief Business Officer



Michael Gerard
General Counsel



Heather Harte-Hall
Chief Compliance Officer



Anup Marda
Chief Financial Officer



Martha O'Connor
Chief HR Officer



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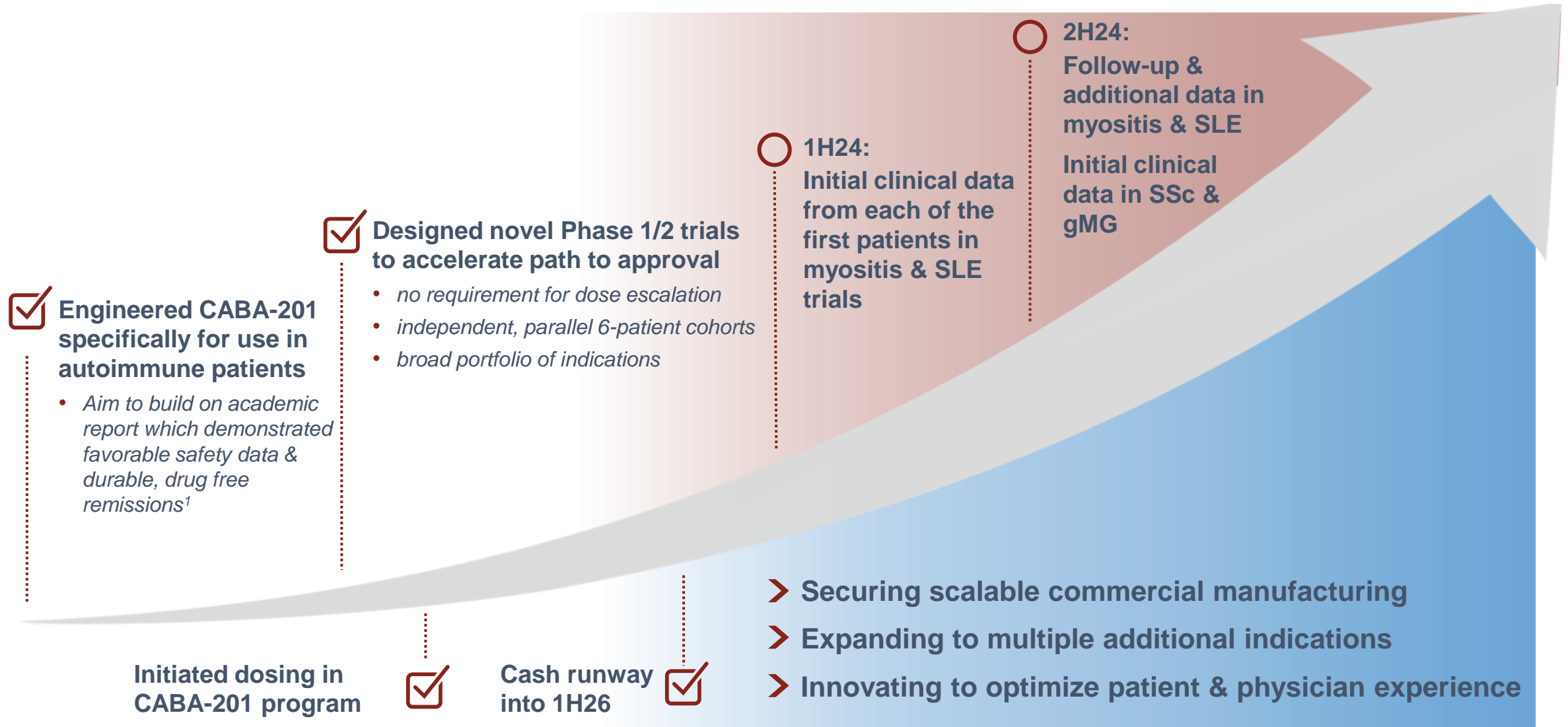
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Realizing the vision to transform autoimmune disease treatment



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