



Corporate Presentation

April 2024

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Mustang Bio is Pioneering Innovative CAR-T Therapies for Cancer and Gene Therapies for Primary Immunodeficiencies

Milestones over next 12 months

- Expect additional disclosure of data from MB-106 indolent lymphoma Arm of Mustang-sponsored trial, with start of first pivotal trial in Waldenstrom macroglobulinemia in second half of 2024
- Expect to treat 1st pt on groundbreaking combination Ph 1 trial of CAR-T + oncolytic virus in malignant brain tumors
- Expect to publish proof-of-concept data in a murine cancer model for *in vivo* CAR-T program

Key Programs

MB-106



- First-in-class CD20-targeted **CAR-T** for non-Hodgkin lymphoma & chronic lymphocytic leukemia
 - First multicenter Mustang data presented at ASH in December 2023 provide early confirmation of Phase 1 Fred Hutch trial across multiple institutions & multiple indolent histologies
 - Expect to treat 1st pt in pivotal Ph 2 trial for Waldenstrom macroglobulinemia 2H 2024; top-line data 2H 2026

MB-101 +
MB-108



- First-in-class combination of **CAR-T** therapy + an **oncolytic virus** for malignant brain tumors
- FDA granted safe-to-proceed for phase 1 trial October 2023; expect to treat first patient in 2024

In vivo
CAR-T



- Novel platform to make **CAR-Ts** in the patient's own body – i.e., **not** in a manufacturing facility
- Expect to publish first proof-of-concept data in 2024

MB-117 /
MB-217







- Transformational **gene therapies** for XSCID* (rare genetic disease)
- Phase 1 investigator IND trials with modified lentiviral vector expected to start in 2024



* XSCID = X-linked severe combined immunodeficiency

Robust Pipeline of Therapies Addressing Highly Challenging Diseases

Therapeutic Modality	Product (Target)	Pre-IND	Phase 1	Registrational Phase 2
Hematologic CAR-T	MB-106 for NHL (including WM) & CLL (CD20)	Expect to start pivotal Waldenstrom macroglobulinemia (WM) trial in 2024		
Combination CAR-T + oncolytic virus (OV)	MB-101 CAR-T for GBM (IL13Rα2)	COH first-in-human (FIH) MB-101 Phase 1 complete		
	MB-108 OV for GBM	Expect to treat first patient in 2024 UAB FIH MB-108 Phase 1 ongoing*		
In vivo CAR-Ts	TBD	Publication expected 2024		
Ex-vivo Gene Therapy	MB-117 (modified vector) for newborn XSCID (IL2RG)	Investigator IND trials expected to start 2024		
	MB-217 (modified vector) for previously transplanted XSCID (IL2RG)			

CLL = Chronic lymphocytic leukemia
COH = City of Hope National Medical Center
FIH = First-in-human
GBM = Glioblastoma
NIH = National Institutes of Health
NHL = Non-Hodgkin lymphoma

OV = Oncolytic virus
UAB = University of Alabama at Birmingham
WM = Waldenstrom macroglobulinemia
XSCID = X-linked severe combined immunodeficiency
** Partially or totally supported by grants`*

Leadership Team with Extensive Cell, Gene & Rare Disease Therapy Experience



Lynn E. Bayless, MS
*VP & Head,
 Regulatory Affairs*



Kerry Biron, BBA
*VP & Head,
 Clinical Operations*



Richard Bodmer, MS
*Head of CMC
 Development*



Bruce Dezube, MD
Chief Medical Officer



James Edinger, PhD
*Chief Scientific
 Officer*



**Greg Furrow, MS,
 FRQA**
Chief Quality Officer



Manuel Litchman, MD
*President & Chief
 Executive Officer*



Debra Manning, SPHR
*Senior VP & Head,
 Human Resources*



James Murphy, BA
*Ad interim Chief
 Financial Officer*



**Robert Sexton, MS,
 MBA**
*VP & Head, Program &
 Alliance Leadership*



R&D Collaborators: World Class Team of Scientific Experts

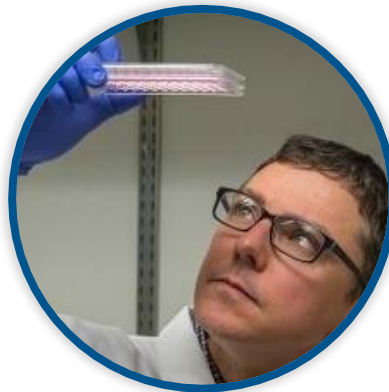
- Technology licensed from City of Hope (COH), Fred Hutch Cancer Center (FHCC), Nationwide Children's Hospital, St. Jude Children's Research Hospital, & Mayo Clinic
- Research based on pioneering work by:



Dr. Stephen Forman
City of Hope



Dr. Christine Brown
City of Hope



Dr. Brian Till
FHCC



Dr. Kevin Cassidy
Nationwide



Dr. Brian Sorrentino
St. Jude (1958-2018)



Dr. Larry Pease
Mayo Clinic



MB-101



MB-106



MB-108



MB-117, MB-217



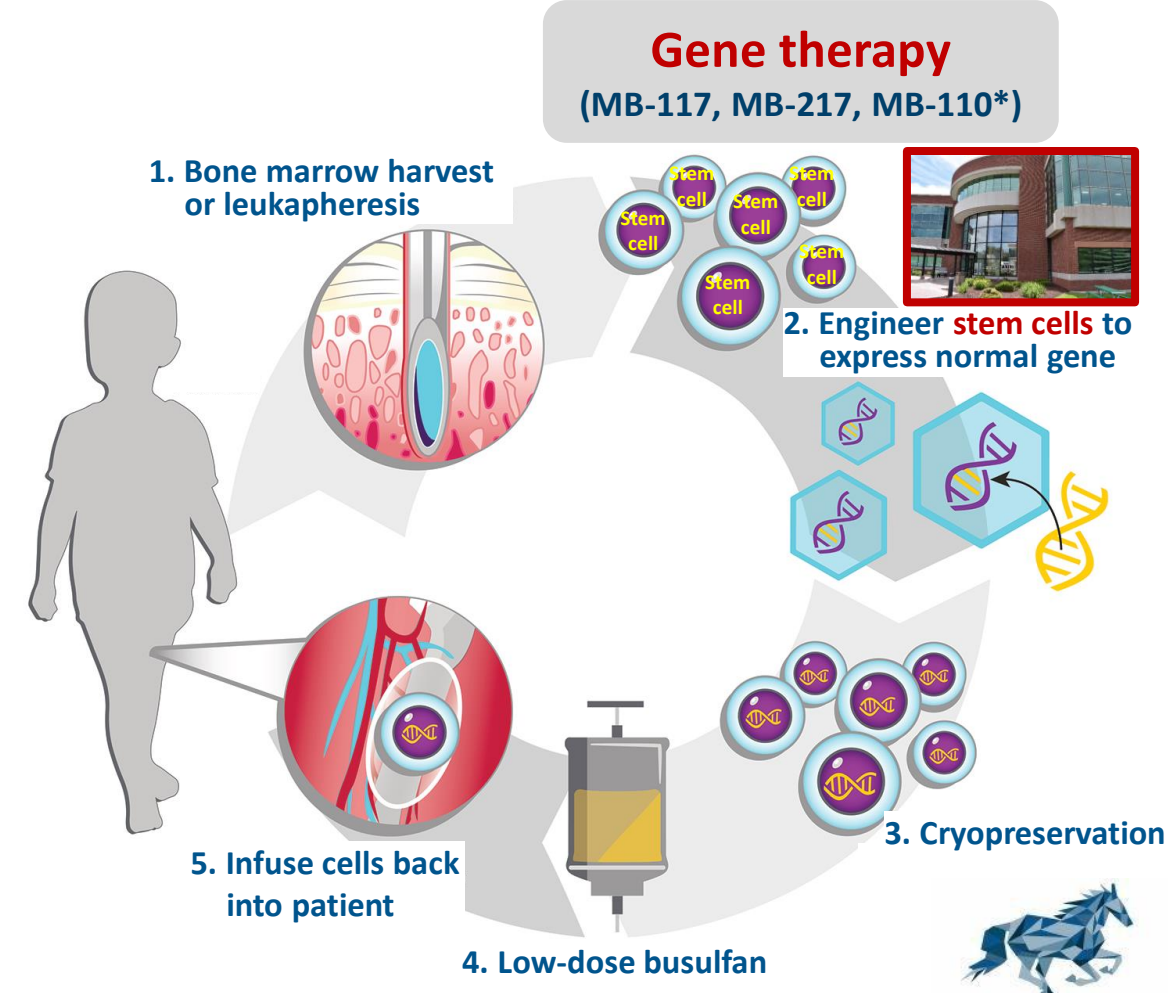
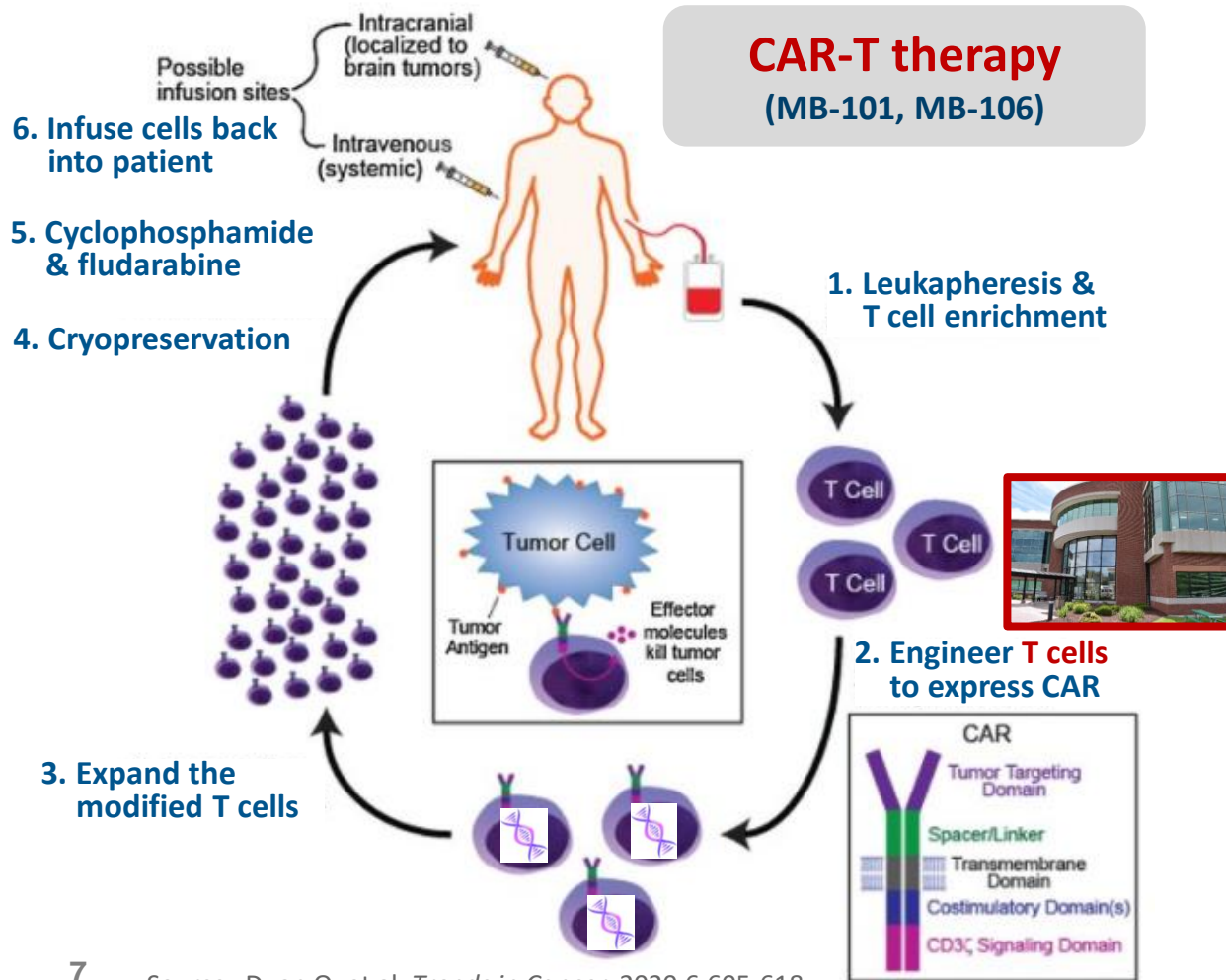
In vivo CAR-Ts



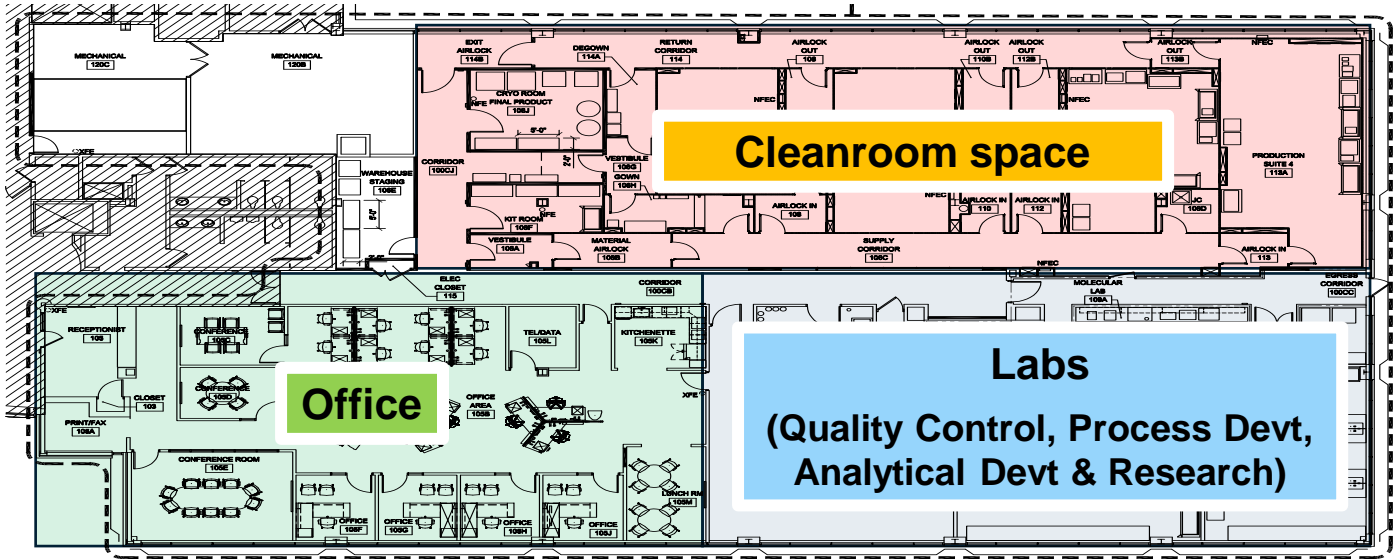
We Engineer Patients' Cells with Goal of Long-Term Benefit

Editing **T cells** harnesses the immune system for precise targeting of the patient's tumor

Editing **blood stem cells** restores the patient's immune system crippled by genetic defect

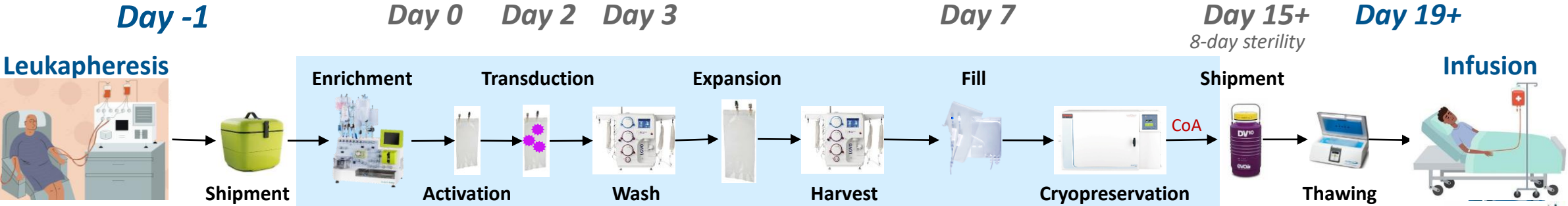


Asset Purchase Agreement Closed July 28, 2023, with uBriGene – US Division of Highly Experienced Chinese CDMO*; Cell Processing Has Continued Seamlessly



- 27,000 square foot potential commercial launch site currently owned by Mustang – will retain Mustang personnel & support our clinical trials
- Comprehensive cell processing capabilities, including sterility testing of final product
- Lentiviral vectors to carry genetic payload are produced at academic partners & CDMOs
- **Successful manufacturing of MB-106 product for all pts enrolled to date on Mustang-sponsored trial**

Mustang has developed a universal platform process for autologous CAR-Ts



* Details of this Agreement may be found in our SEC filings



MB-106 Overview

MB-106: CAR-T for Non-Hodgkin Lymphoma (NHL) & Chronic Lymphocytic Leukemia (CLL)

MB-106



MB-106

First-in-class CD20-targeted CAR-T cell therapy for treatment of relapsed/refractory NHL & CLL

- Competitive safety & efficacy profile vis-à-vis approved & investigational cell therapies & bispecific antibodies
- Clear regulatory pathway for autologous CAR-Ts based on FDA approval to date of 6 autologous CAR-Ts
- Currently enrolling multicenter Phase 1 Mustang-sponsored trial
- BLA strategy is to pursue indications where there are no approved CAR-Ts:
 - (1) Waldenstrom macroglobulinemia (WM)
 - (2) DLBCL relapsed from CD19 CAR-Ts
 - (3) CLL

Clinical development: 2 trials in progress

- Ongoing Fred Hutch IND study:** Plan to continue enrollment; expect publication of follicular lymphoma data in 2024



- Mustang IND 6-center Phase 1/2 trial:** Currently enrolling*
 - 3-arm study targeting relapsed/refractory disease
 - Aggressive NHL
 - Indolent NHL
 - CLL
 - Relapses from CD19 CAR-Ts eligible in all arms
 - Indolent NHL arm includes Waldenstrom (fast-to-market strategy)**
 - Since Mustang IND trial is using same lentiviral vector as Fred Hutch trial, FDA has allowed dose escalation to start higher than initial FHCC dose
 - Additional data disclosures from indolent NHL arm expected in 2024; expect to start pivotal WM Ph 2 trial in the second half of 2024

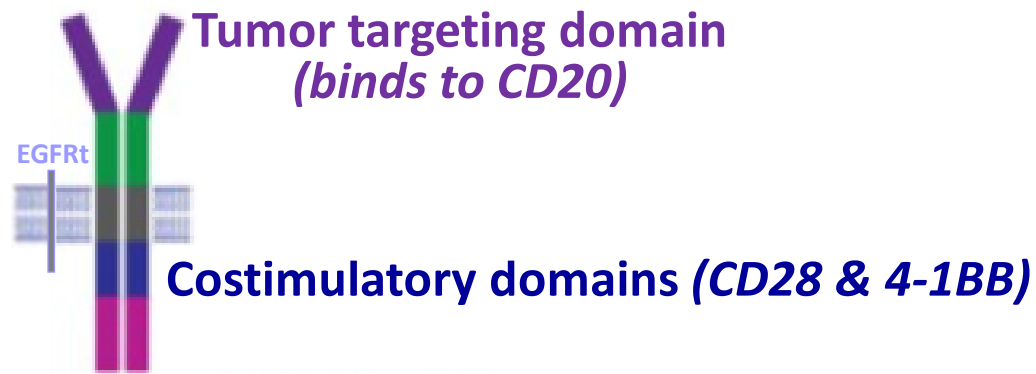


* <https://clinicaltrials.gov/ct2/show/NCT05360238>

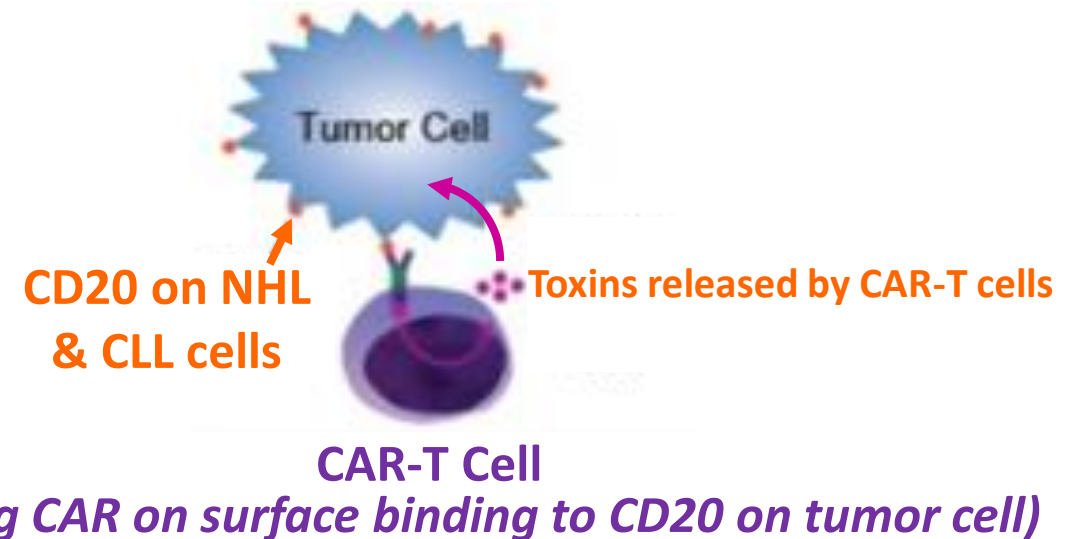
MB-106: Potent Cell Killing; Limited Cell Therapy Competition for Target

- While approved CAR-Ts for NHL target CD19, CD20 has been validated as a clinically relevant target by decades of commercial experience with CD20 antibodies¹

CD20-targeting CAR molecule on surface of T cell, ready to bind to tumor cell



Binding of CAR to CD20 causes CAR-T cells to release toxins that kill tumor cells



Limited cell therapy competition for CD20

- Major competition for target is in bispecific antibody space
- CBMG, Adicet Bio, ImmPACT Bio & Miltenyi have disclosed early phase 1 data^{2,3,4,5}, Poseida IND cleared⁶
- Cargo Therapeutics phase 1 data also relevant, as target (CD22) is also differentiated from CD19⁷

- <https://www.onclive.com/view/cd20-targeting-antibodies-are-shaping-a-new-landscape-for-b-cell-cancers>
- https://ascopubs.org/doi/10.1200/JCO.2021.39.15_suppl.2507; https://ascopubs.org/doi/10.1200/JCO.2021.39.15_suppl.2508
- [PowerPoint Presentation \(adicetbio.com\)](#)
- <https://pubmed.ncbi.nlm.nih.gov/36416874/>
- <https://tandem.confex.com/tandem/2023/meetingapp.cgi/Paper/21672>
- [Poseida Therapeutics Announces FDA Clearance of Investigational New Drug Application for P-CD19CD20-ALLO1, an Allogeneic Dual CAR-T Cell Therapy for B-Cell Malignancies](#)
- <https://cargo-tx.com/cargo-therapeutics-raises-200-million-in-oversubscribed-upsize-series-a-financing-to-advance-its-pipeline-of-next-generation-car-t-cell-therapies/>

MB-106: Dose Escalation Complete in Fred Hutch Trial

6-Center Mustang-sponsored Phase 1 trial also now enrolling all 3 arms

- Single institution phase 1/2 study at Fred Hutch Cancer Center (NCT03277729)*
- Relapsed/refractory CD20⁺ B-cell NHL & CLL
- Prior to infusion of MB-106, all patients receive lymphodepleting chemotherapy: Cyclophosphamide & fludarabine (Cy-Flu)
- Dose escalation is complete:
 - Dose level 0: 1 x 10⁵ cells/kg
 - Dose level 1: 3.3 x 10⁵ cells/kg
 - Dose level 2: 1 x 10⁶ cells/kg
 - **Dose level 3: 3.3 x 10⁶ cells/kg**
 - **Dose level 4: 1 x 10⁷ cells/kg**
- **3 FHCC data sets available:**
 - Follicular lymphoma & Waldenstrom: Last updated June 2023 (ICML & EHA[†])
 - All patients: Last updated October 2022 (IWWM11[‡])

* <https://clinicaltrials.gov/ct2/show/NCT03277729>

† <https://www.icml.ch/icml/home.html>; <https://ehaweb.org/congress/eha2023-hybrid-congress/eha2023>

‡ <http://www.waldenstromworkshop.org/>

MB-106: Follicular Lymphoma (FL) Updated at ICML* June 2023

Patient Characteristics

N = 20	
Age, median (range)	63 (44-81)
> 65, n(%)	9 (45%)
> 80, n(%)	3 (15%)
Female sex, n(%)	11 (55%)
Stage at initial diagnosis	
1-2	2 (11%)
3-4	16 (89%)
Histologic grade at diagnosis	
1-2	11 (61%)
3A	5 (28%)
Prior lines of treatment (range)	4 (1-12)
History of transformation	4 (20%)
POD24*	15 (75%)
Prior CD19 CAR-T	1 (5%)

- Median time between leukapheresis and lymphodepletion was 15 days (range: 10-28)
- 5 patients received bridging therapy

* **POD24:** Progressive disease within 24 months of first-line chemoimmunotherapy (poor prognostic indicator for FL)

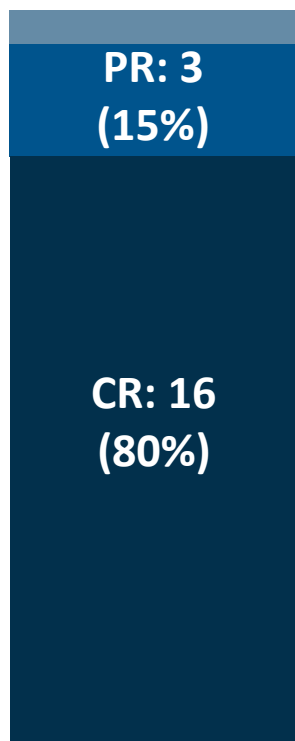


MB-106: FL Efficacy Updated at ICML June 15, 2023

Best responses by PET scan

Best Responses

N=20



Overall response rate (ORR): 19 (95%)

■ CR ■ PR ■ PD

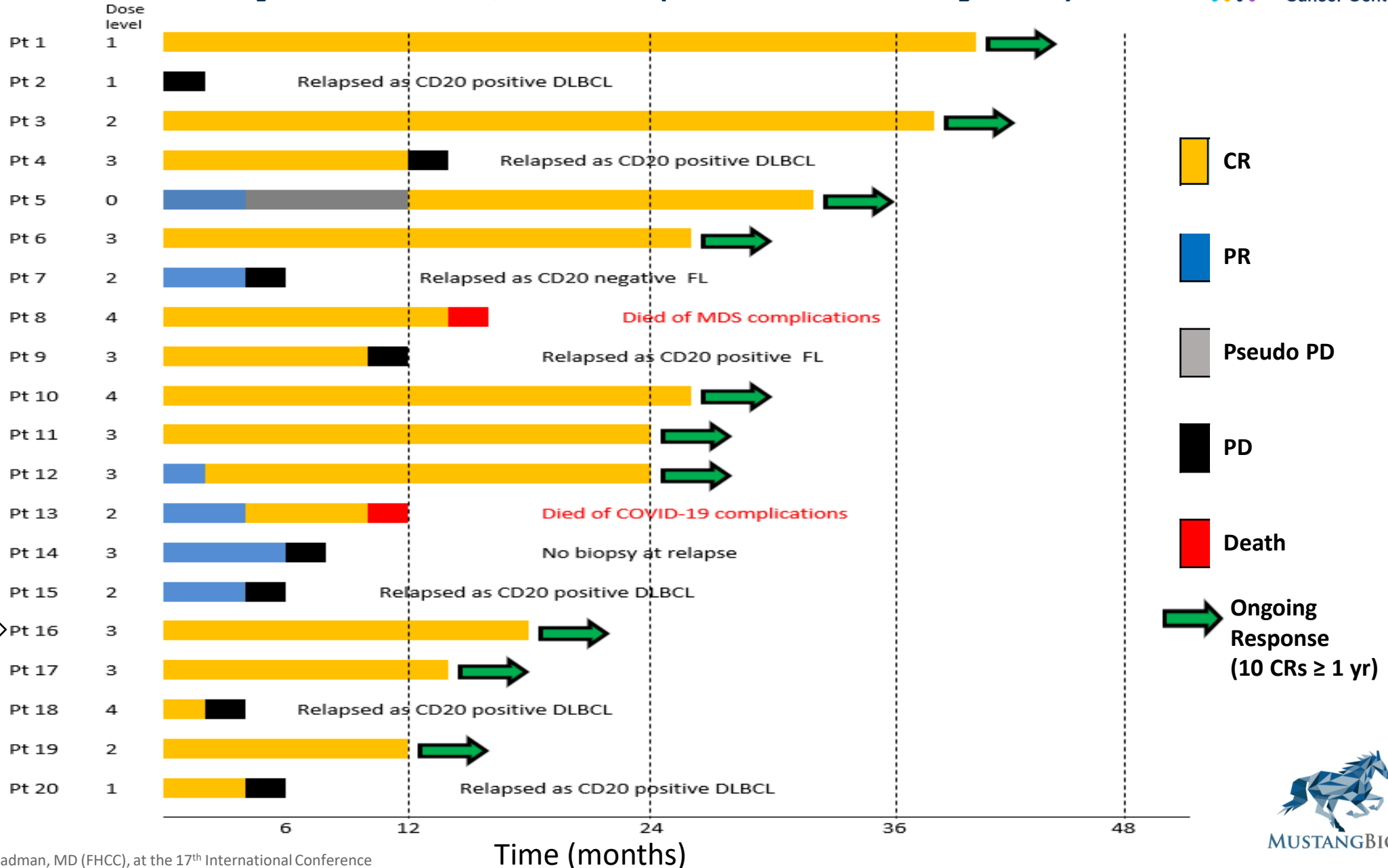
Histology	Best Response by Lugano PET criteria †	All dose levels	Dose level 0 (n=1)	Dose level 1 (n=3)	Dose level 2 (n=5)	Dose level 3 (n=8)	Dose level 4 (n=3)
			1 x 10 ⁵ cells/kg	3.3 x 10 ⁵ cells/kg	1 x 10 ⁶ cells/kg	3.3 x 10 ⁶ cells/kg	1 x 10 ⁷ cells/kg
FL (n=20)	ORR, n(%)	19/20 (95 %)	1	2	5	8	3
	CR, n(%)	16/20 (80 %)	1	2	3	7	3
	PR, n (%)	3/20 (15%)	-	-	2	1	-
	SD, n (%)	-	-	-	-	-	-
	PD, n (%)	1/20 (5%)	-	1	-	-	-

† Cheson BD, et al. *J Clin Oncol*. 2014; 32(27):3059-68. doi: 10.1200/JCO.2013.54.8800. 2014.

CR = Complete response
 PR = Partial response
 SD = Stable disease
 PD = Progressive disease



MB-106: FL Durability June 15, 2023 (10 CRs > 1 year)



Prior CD19 CAR-T



MB-106: FL Safety Data Updated June 15, 2023

Cytokine release syndrome (CRS) & Immune effector cell-associated neurotoxicity syndrome (ICANS)

	G1	G2	G3	G4	All grades
CRS*	5 (25%)	1 (5%)	0	0	6 (30%)
ICANS*	0	0	0	0	0

- No dexamethasone prophylaxis
- All CRS events were grade 1 or 2
- No ICANS of any grade
- Median time to CRS, post CAR-T day (range): 7 (1-8)
- Median duration of CRS, days (range): 2 (1-3)
- Tocilizumab use: 1 patient
- Dexamethasone use: 1 patient

* Lee DW, et al. *BBMT*. 2019;25(4):625-628. <https://doi.org/10.1016/j.bbmt.2018.12.758>



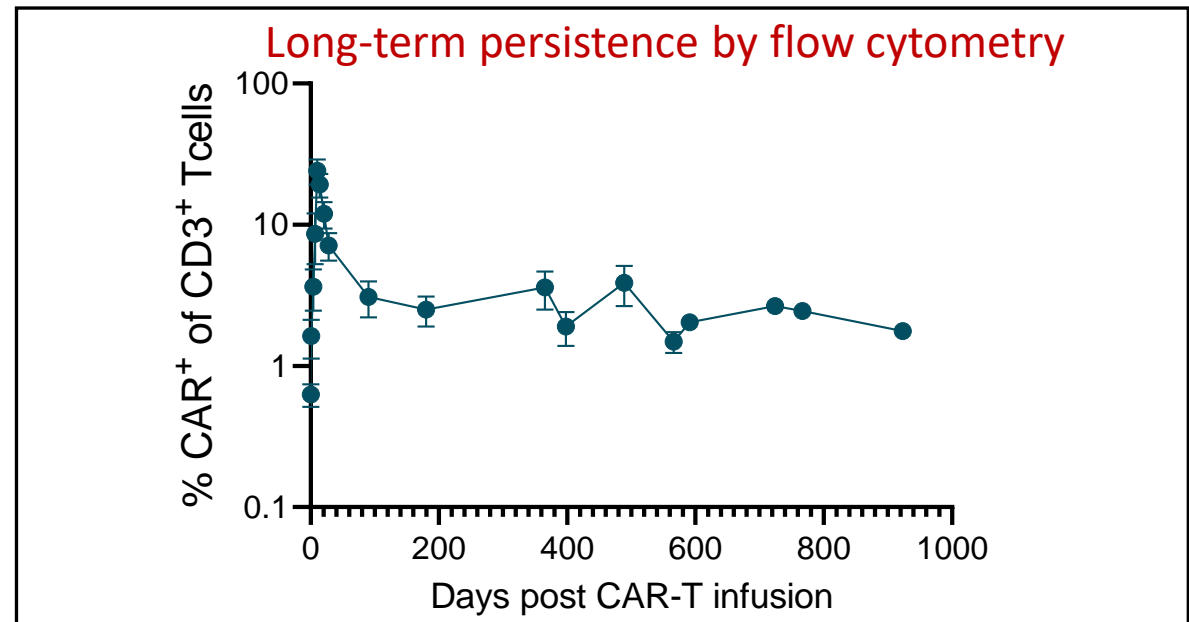
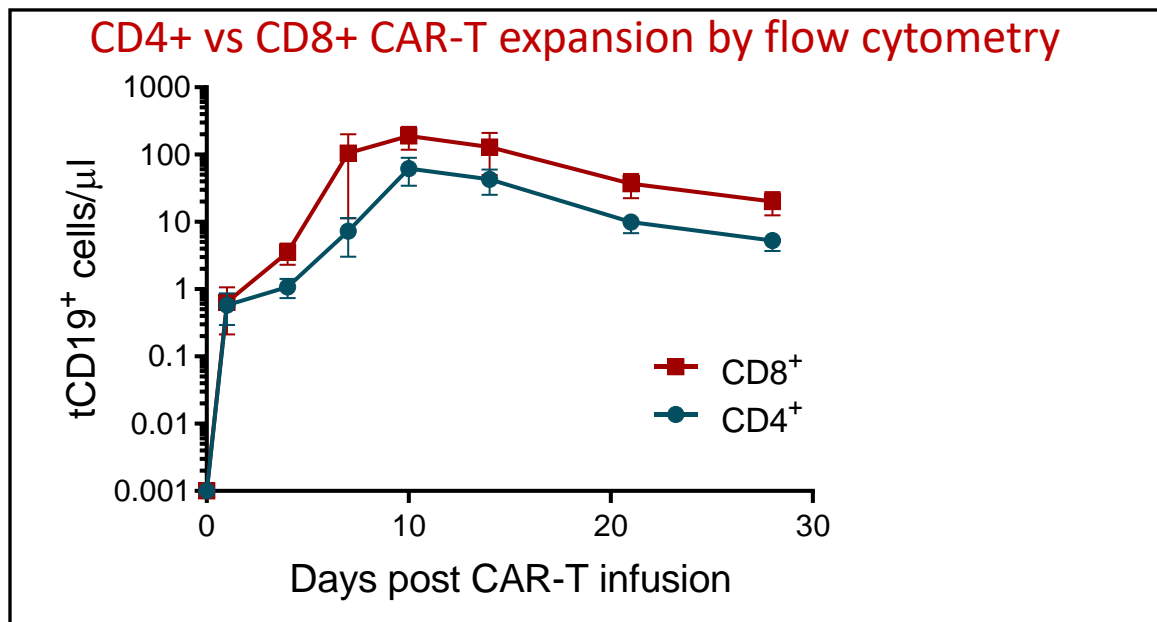
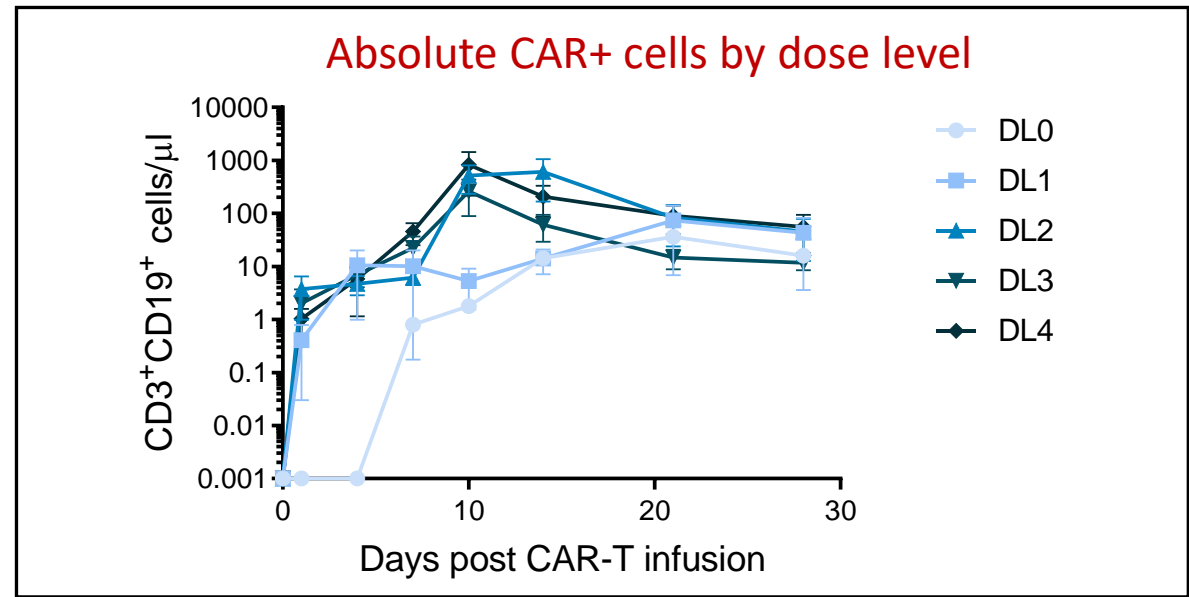
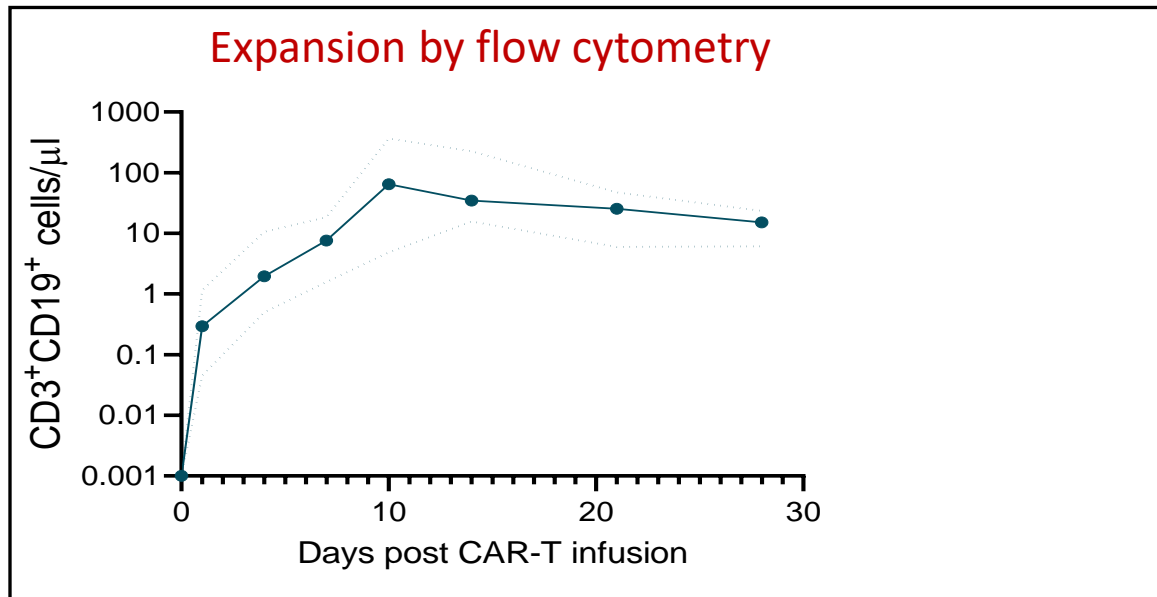
MB-106: FL Safety Data Updated June 15, 2023

Safety: Other Events (*first 28 days*)

N=20	Grade 3	Grade 4	Grade 3-4
Leukopenia	7 (35%)	9 (45%)	16 (80%)
Lymphopenia	4 (20%)	15 (75%)	19 (95%)
Neutropenia	4 (20%)	15 (75%)	19 (95%)
Thrombocytopenia	1 (5%)	2 (10%)	3 (15%)
Anemia	4 (20%)	1 (5%)	5 (25%)
Febrile neutropenia	2 (10%)	-	2 (10%)
Rash	2 (10%)	-	2 (10%)
VTE	2 (10%)	-	2 (10%)
MSK pain	2 (10%)	-	2 (10%)
Pneumonia	2 (10%)	-	2 (10%)
Bacteremia	2 (10%)	-	2 (10%)
CMV reactivation	2 (10%)	-	2 (10%)



MB-106: FL CAR-T Cell Expansion & Persistence



MB-106: Waldenstrom Data Updated at EHA June 9, 2023

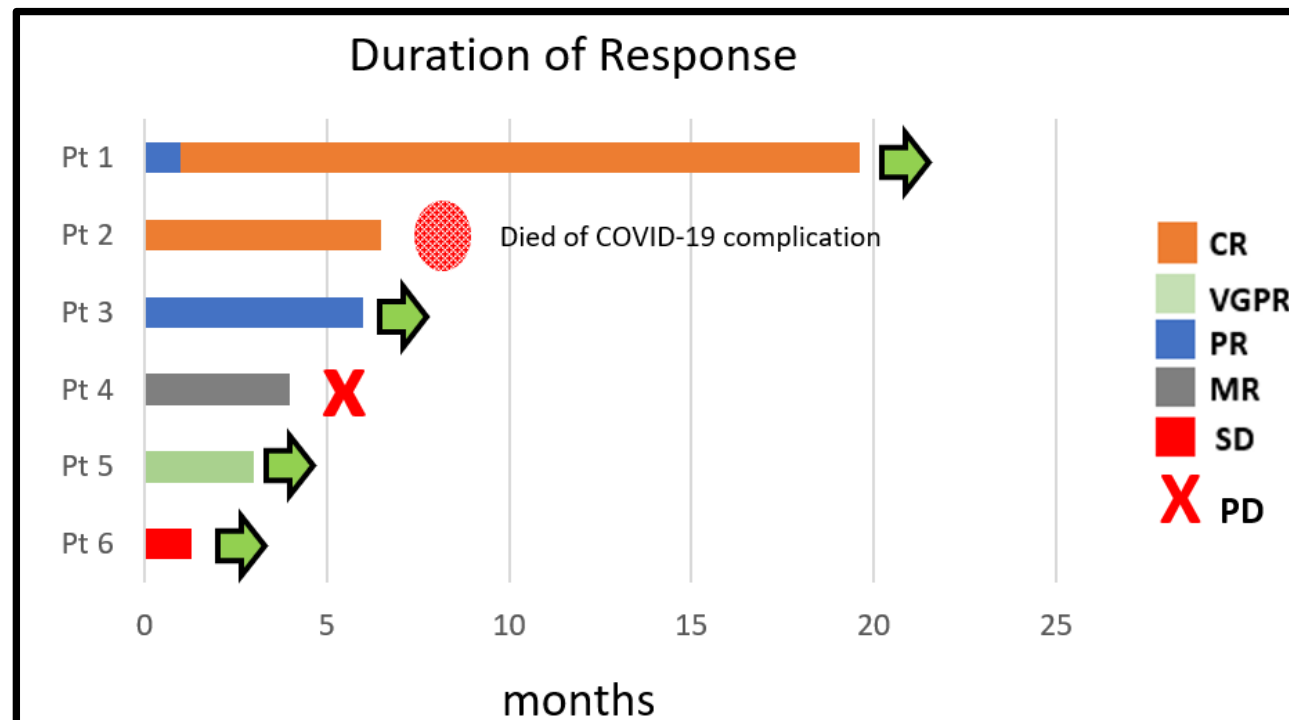
Patient characteristics (N = 6)	
Age, median (range)	69 (51-79)
Female sex, n (%)	2 (33%)
Prior lines of therapy, median (range)	7.5 (2-12)
Prior Bruton tyrosine kinase inhibitor	6 (100%)

Best response by IWWM-7*	
CR	2 (33%)
VGPR	1 (16.7%)
PR	1 (16.7%)
MR	1 (16.7%)
SD	1 (16.7%)

Response rate:
67%

VGPR = Very good partial response
MR = Minor response

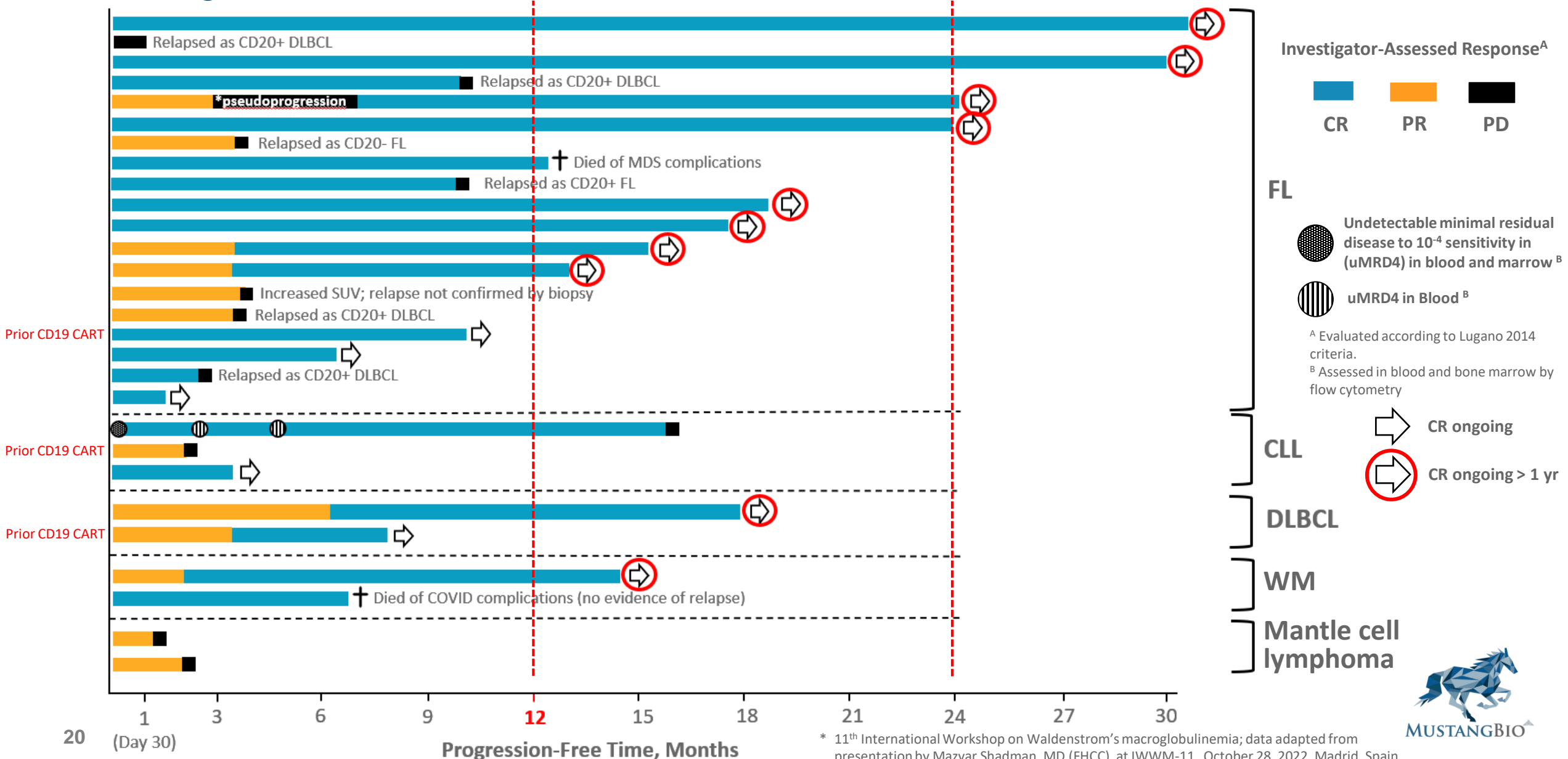
* Dimopoulos MA, et al. *Blood*. 2014;124(9):1404-1411.



	G1	G2	G3	G4
CRS	2 (33%)	3 (50%)	0	0
ICANS	1 (16%)	0	0	0

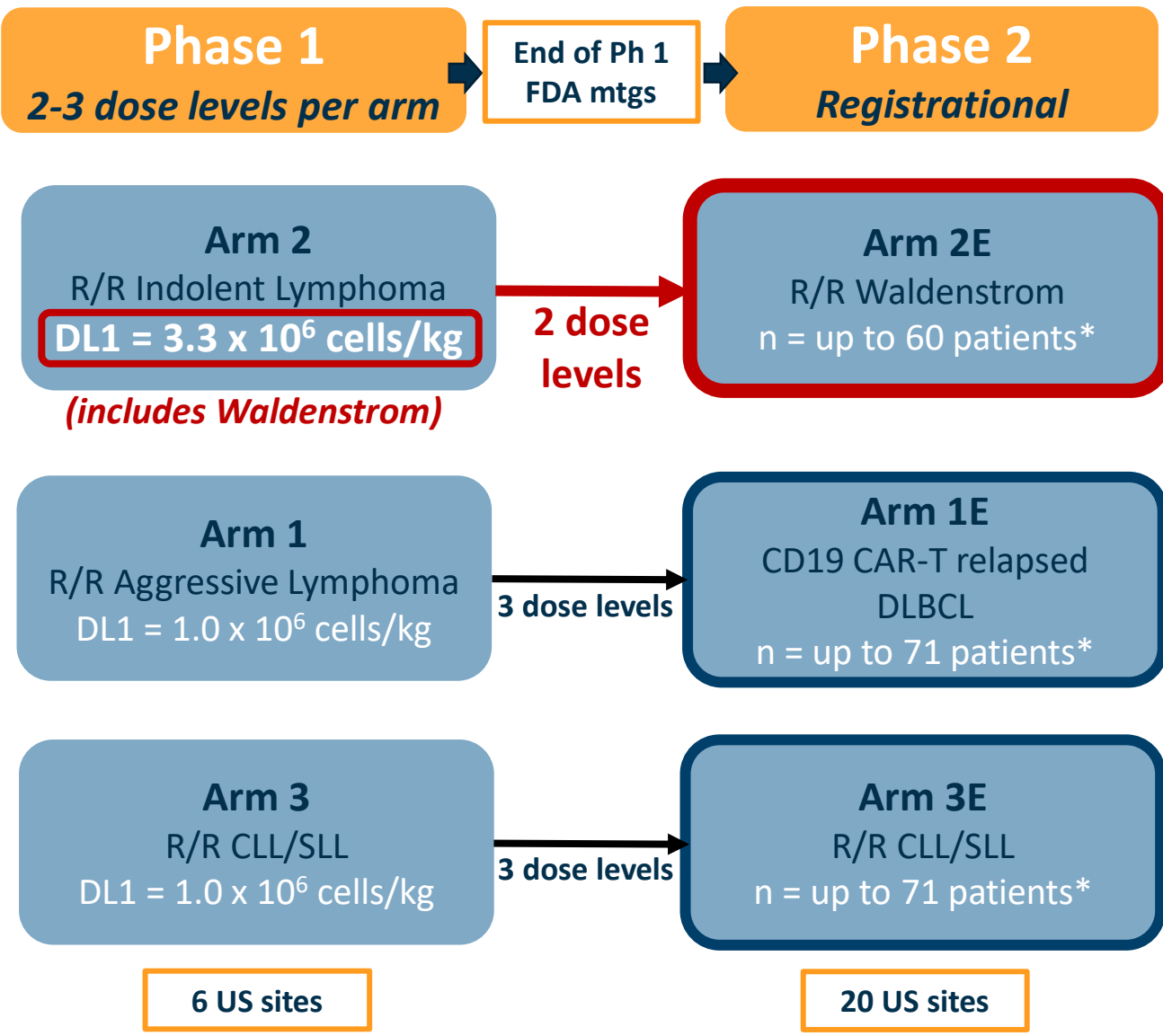


MB-106: Durable Responses ($10\text{ CRs} \geq 1\text{ year}$) Across All Histologies at IWWM-11*, October 2022 (no CRS or ICANS \geq grade 3)





MB-106 Priorities: Indications Where CAR-Ts Not Yet Approved



Priority #1:
Waldenstrom (WM)

- 1,400 new US cases per year
- Orphan Drug Designation granted
- Expect Fast Track filing
- Topline data expected 1H26



Priority #2:
CD19 CAR-T Relapsed DLBCL

>60% patients do not experience long-term remissions after CD19 CAR-T therapy



Priority #3:
CLL/SLL

Most common adult leukemia; >21,000 new cases per year in the US

CLL Chronic lymphocytic leukemia
DL1 Dose level 1
DLBCL Diffuse large B cell lymphoma
R/R Relapsed/refractory
SLL Small lymphocytic lymphoma
WM Waldenstrom macroglobulinemia



* Subject to FDA review at End of Ph 1 meeting

MB-106: Mustang Trial Enrolling in All 3 Arms at 6 Centers*

Expect 6 centers by year end



Study Progress and Milestones

Active sites Fred Hutch, Mass General, UC Irvine, Cleveland Clinic, Univ. of Rochester, Memorial Sloan Kettering

Dose escalation Safety Review Committee unanimously approved dose escalation to 1.0×10^7 cells/kg in Arm 2

	Starting Dose Level, cells/kg	Dose Level 2, cells/kg	Dose Level 3, cells/kg
Arm 2 (Indolent B-cell NHL, including WM)	3.3×10^6	** 1.0×10^7	N/A, only 2 dose levels
Arm 1 (Aggressive B-cell NHL)	** 1.0×10^6	3.3×10^6	1.0×10^7
Arm 3 (CLL/SLL)	** 1.0×10^6	3.3×10^6	1.0×10^7

Arm 2 patients presented at ASH on December 9, 2023

* <https://clinicaltrials.gov/ct2/show/NCT05360238>

** Current dose level



Arm 2: Baseline Patient Characteristics

Number of patients enrolled	9*
Age, median (range)	56 (39-79)
Sex, male (%)	7 (78%)
Histology	
• Follicular lymphoma (FL)	5
• Waldenström macroglobulinemia (WM)	3
• Hairy cell leukemia – variant (HCL-v)	1
Prior lines of therapy, median (range)	4 (1-9)
Prior CD19 CAR T-cell therapy	2
Prior autologous stem cell transplant	1
POD24 [§]	1

* One patient received non-conforming material (drug product that did not meet release criteria), following FDA authorization.

§ POD24: Progression of disease within 24 months of front-line chemoimmunotherapy. POD24 is a clinically significant endpoint to identify FL patients with a high risk of death.

Arm 2 / Indolent Lymphoma: Compelling Responses Seen in Heavily Pre-Treated Population at **DL1** (3.3×10^6 cells/kg)



Site	Age/Gender	Indication	Prior Lines of Therapy	Infusion	Status	CRS/ICANS
Fred Hutch	79/Male	Hairy Cell Leukemia	5	November 2022	Ongoing SD at Month 6 with transfusion independence	Grade 1 CRS (Day 13)
Fred Hutch	39/Male	FL	1 (POD24*)	December 2022	Ongoing CR	Grade 1 CRS (Day 6)
Mass General	56/Male	WM	9, including ASCT	March 2023	Ongoing Very Good Partial Response	Grade 1 CRS (Day 0 & 9)
Cleveland Clinic	50/Male	FL	6, including CD19 CAR-T (Breyanzi®)	April 2023	Ongoing CR	Grade 1 CRS (Day 6)

*POD24: Disease progression within 24 months of frontline therapy

Indolent lymphoma data indicate strong responses in patients with extremely poor prognoses

Arm 2 – Efficacy [Combined Results for **DL1** (N=4) and **DL2** (N=5)]



Best Responses to Date‡	FL, N=5	WM, N=3
Overall response rate (ORR)†	100% (5/5)	3 (100%)
Complete response (CR)	5 (100%)	0
Very good partial response (VGPR)#	N/A	1 (33%)
Partial response (PR)	0	2 (67%)
Minor response#	N/A	0
Stable disease (SD)	0	0

- A 9th patient (heavily transfusion-dependent hairy cell leukemia – variant) treated at DL1 achieved transfusion independence & maintained stable disease
- Prior lines of therapy: median = 4 (range, 1-9)
- Complete responses are rare in WM*; ibrutinib and zanubrutinib were both approved as single agents for the treatment of WM despite the absence of complete responses

* Castillo JJ, et al. Am J Hemtaol, 2018. doi: 10.1002/ajh.25142

‡ In WM patients, responses are evaluated using the 11th International Workshop on WM (IWWM) criteria (Treon, 2023). In all other patients, PET-CT-based responses are evaluated using the Lugano Classification (Cheson, 2014).

† ORR is the rate of PR or better in FL. ORR is the rate of minor response or better in WM.

VGPR and minor response are WM-specific response categories.

N/A = Not applicable



Arm 2 – Safety [Combined Results for **DL1** (N=4) and **DL2** (N=5)]



CRS & ICANS

	Grade 1	Grade 2	Grade 3	Grade 4
CRS	5 (56%)	0	0	0
ICANS	0	0	0	0

- Numbers in tables are individual patients, not number of events.
- For each individual event, highest grade is reported per patient.

- No related SAEs reported, apart from Grade 1 CRS
- No prophylactic tocilizumab or dexamethasone was administered
- No prolonged (>28 days post-lymphodepletion) neutropenia to date, despite not using prophylactic G-CSF

Grade ≥3 Adverse Events (First 28 Days), Regardless of Causality

	Grade 3	Grade 4
Neutrophil count decreased	1	5
Febrile Neutropenia	0	0
Anemia	1	0
Appendicitis	1	0
Worsening Pain (Extremity Knees)	1	0
Blood bilirubin increased*	0	1

* Transient increase in bilirubin attributed to hemolysis related to underlying lymphoma; not study drug related.



All NHL Patients from *Both* Trials Who **Relapsed from Prior CD19 CAR-T Therapy** Achieved CR with MB-106

Indication	Age/Gender	Prior Lines of Therapy	Dose of MB-106	Status
Diffuse Large B-Cell Lymphoma	63/Male	Unknown	1×10^7 cells/kg (FHCC Trial)	Ongoing CR at Month 20+
Mantle Cell Lymphoma	59/Male	5	1×10^6 cells/kg (MBIO Trial)	Ongoing CR at Month 4+
Follicular Lymphoma	50/Male	6	3.3×10^6 cells/kg (MBIO Trial)	Ongoing CR at Month 4+
Follicular Lymphoma	67/Female	6	3.3×10^6 cells/kg (FHCC Trial)	Ongoing CR at Month 22+
Follicular Lymphoma	58/Male	5	1×10^7 cells/kg (MBIO Trial)	Ongoing CR at Month 3+

FHCC Trial: Single Institution, Investigator-Sponsored Trial
 MBIO Trial: Multi-Institutional, Mustang-Sponsored Trial

Summary: Multicenter Arm 2 Data Provide Early Confirmation of Single-Center Indolent Lymphoma Patients



- Compelling efficacy in 2 lead subsets of indolent lymphoma: FL & WM
 - Notable for the FL patients are CRs despite poor prognostic indicators
 - VGPR** in WM provides additional strong support for the planned pivotal Phase 2 WM trial
- Significant & durable patient benefit in an unusual & especially challenging histology: Hairy cell leukemia – variant (*additional patients with this histology not expected on the trial*)
- Excellent expansion & persistence of CAR-T cells in all patients
- No CRS > grade 1; no ICANS of any grade
- Accrual continues, with successful manufacturing at the 2nd & final dose level: **1x10⁷ cells/kg**
- Expect End-of-Phase 1 meeting with FDA in 1Q 2024, first WM patient treated in pivotal Ph 2 trial 2H 2024

**VGPR: Very good partial response (*generally the best expected response for WM patients*)



MB-106 Initial Addressable Populations, With Opportunity To Expand To Earlier Lines Of Therapy

MB-106 U.S. addressable markets^{1, 2}

Indication	Initial Addressable Patients (line of therapy) ³	Expanded Addressable Patients (line of therapy) ⁴
DLBCL	~1,200 (CD19 CAR-T Relapsed 3L+) <i>no approved CAR-T</i>	7,000-8,000 (2L+)
Waldenstrom macroglobulinemia (WM)	~500 (3L+) ⁵ <i>no approved CAR-T</i>	800-1,200 (2L+)
CLL / SLL	~6,000 (2L+) <i>no approved CAR-T</i>	8,000-12,000 (1L+)
FL	~4,000 (POD24*, 3L+)	6,000-7,000 (2L+)
Total U.S.	~7,700 addressable patients	22K – 28K addressable patients
Total Ex-U.S.^{6, 7}	~43,000 addressable patients	120K – 160K addressable patients

*poor prognostic indicator; *no approved CAR-T*

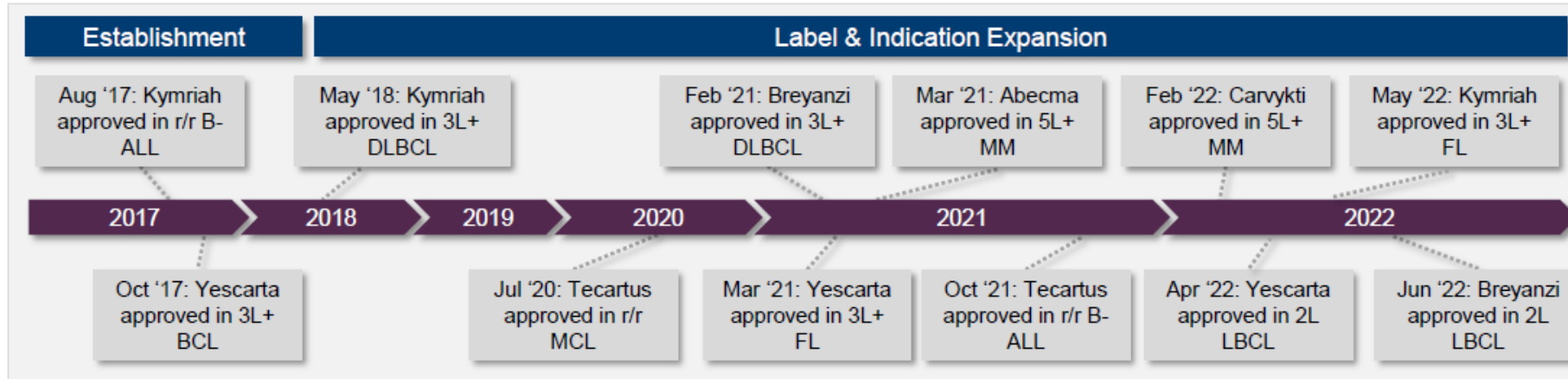
Expand into new lines of therapy

- Important Disclaimer:** Our estimates of market potential for MB-106 are subject to important limitations and qualifications and should be read together with the “Background and Limitations Regarding Our Estimated Market Potential for MB-106” in the Annex to these slides.
- Source: SEER, EuroStat, OECD, Statcan.ga.ca, and Ipss.go.jp.
- Represents our estimate of the annual number of patients in the U.S. who may be eligible to receive MB-106 as a third-line or later (“3L+”) or second-line or later (“2L+”) line of therapy for the listed indication if MB-106 is approved by the FDA based on our current clinical trials and plans for submissions to the FDA.
- Represents our estimate of the annual number of patients in the U.S. who may be eligible to receive MB-106 as a 3L+, 2L+ or first-line or later (“1L+”) line of therapy for the listed indication if MB-106 is approved by the FDA for treatment in earlier lines of therapy. As of the date of this presentation we have not taken any action to seek FDA approval for such earlier lines of therapy. Please see “Background and Limitations Regarding Our Estimated Market Potential for MB-106” in the Annex to these slides.”
- First 2 lines of therapy may include, alone or in combination, alkylating agents (e.g., chlorambucil), nucleoside analogs (e.g., fludarabine & cladribine), CD20 targeted antibodies (e.g., rituximab), & BTK inhibitors (e.g., ibrutinib, zanubrutinib)
- As of the date of this presentation, we have not taken any action, or begun to take any action, to seek approval for MB-106 to treat indications in markets outside the U.S. Please see “Background and Limitations Regarding Our Estimated Market Potential for MB-106” in the Annex to these slides.”
- Ex-U.S. includes EU15 + Norway, Switzerland, Canada, China, & Japan.

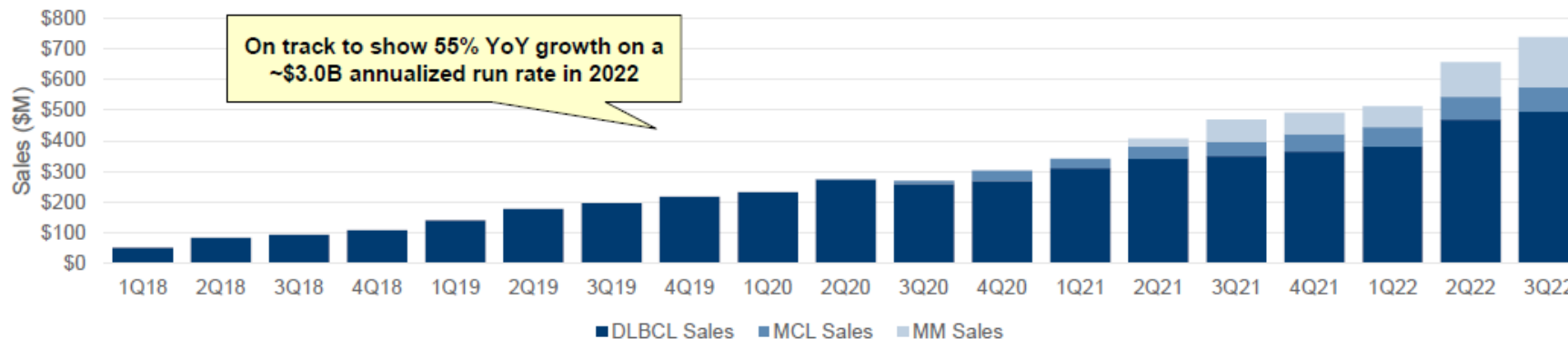


Autologous CAR-Ts Experiencing Accelerating Revenue Growth¹

Reflects increasing acceptance among prescribers, patients & payors



Global Autologous CAR-T Sales



Source: Guggenheim Securities, LLC; BMY (Breyanzi, Abecma), GILD (Yescarta), JNJ (Carvykti), LEGN (Carvykti), NVS (Kymriah), TSVT (Abecma) company presentations

1. The revenue growth depicted below represents aggregate worldwide sales of the drugs identified for the periods indicated. All of such drugs approved to treat B-cell malignancies are CD19-directed autologous CAR-T cell immunotherapies, which is a more commercially established CAR-T therapy than CD20-directed CAR-T therapies such as MB-106. Because MB-106 remains in an early stage of development, it is impossible to predict whether MB-106, if approved by the FDA for certain indications, will be accepted by prescribers, patients and payors. The growth in revenue of the drugs represented above does not imply the existence, or potential size, of any commercial market for MB-106.



Yescarta® Global Sales¹



Source: Evaluate Pharma and Gilead

1. Yescarta is a CD-19 directed CAR-T cell therapy for the treatment of (i) adult patients with LBCL that is refractory to first-line chemoimmunotherapy or that relapses within 12 months of first-line chemoimmunotherapy, (ii) adult patients with relapsed or refractory LBCL after two or more lines of systemic therapy, including DLBCL not otherwise specified, primary mediastinal LBCL, high-grade B-cell lymphoma and DLBCL arising from follicular lymphoma (“FL”), and (iii) adult patients with relapsed or refractory FL after two or more lines of systemic therapy. Yescarta is a more commercially established therapy than CD20-directed therapies such as MB-106. Because MB-106 remains in an early stage of development, it is impossible to predict whether MB-106, if approved by the FDA for certain indications, will be accepted by prescribers, patients and payors. The growth in revenue of the Yescarta represented above does not imply the existence, or potential size, of any commercial market for MB-106.



MB-109 Overview
(combination of MB-101 + MB-108)

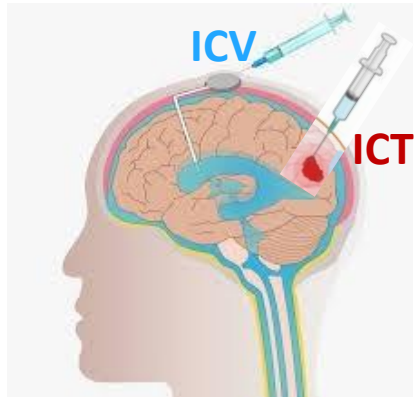
MB-101: IL13R α 2 CAR-T for Glioblastoma (GBM)

MB-101 +
MB-108



- More than 13,000 new patients diagnosed in the US annually; 7% 5-year survival
- IL13R α 2 is an attractive target: Overexpressed in >75% of GBM, not on normal brain cells
Few CAR-T programs competing for target¹
- However, GBM is a notoriously “cold” tumor – with few T cells; may explain failure of immunologic therapies
- 65-patient City of Hope Phase 1 trial completed with good safety profile²; first dual administration of CAR-T cells
 - No lymphodepleting chemotherapy; single apheresis divided into multiple aliquots for repeat dosing

Dual CAR-T Administration

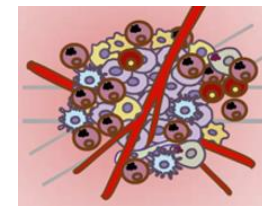


ICV = intracerebroventricular (into the cerebrospinal fluid)

ICT = Intracavitary (into the post-resection surgical cavity)

2 Complete responses

- Occurred in the only 2 “hot” tumors enrolled on trial
- Highly refractory patients
- Durable for 7.5 & 31+ months^{3,4}



“Hot” tumor is characterized by infiltration of high number of T cells



MUSTANGBIO

1. e.g., ESMO 2022, Huang Y, Shang X, Li X, abstract 300P; <https://clinicaltrials.gov/ct2/show/NCT05540873>
2. 54 patients evaluable for dose escalation, per Brown CE, First Annual Conference on CNS Clinical Trials, October 1, 2021.
3. Brown CE et al. *NEJM*. 2016;375:2561-2569.
4. Brown CE. First Annual Conference on CNS Clinical Trials, October 1, 2021, co-sponsored by SNO and ASCO.

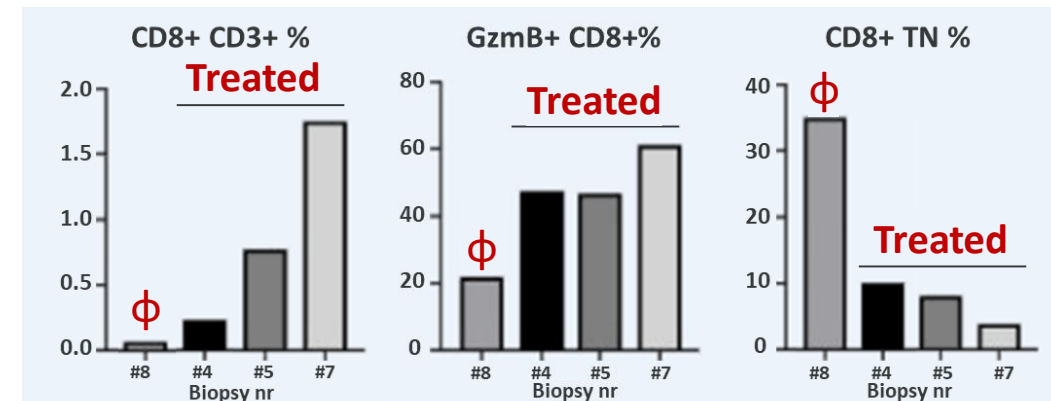
MB-108: HSV-1 Oncolytic Virus Turns Cold Glioblastoma Tumors Hot

- MB-108 was in-licensed from Nationwide Children's Hospital in 2019¹
Phase 1 investigator-sponsored trial underway at the University of Alabama at Birmingham²
- Single patient data were disclosed at the 2022 meeting of the American Association for Cancer Research³
 - Patient received single OV dosing of 1×10^6 PFU (plaque forming units) that was well-tolerated
 - **MRI showed increased enhancement suggesting progression or pseudoprogression**
 - Tumor biopsy 7 weeks post treatment revealed that OV-treated areas were necrotic
 - Immune infiltrates from the OV-treated and untreated tumor regions were evaluated by flow cytometry

• Treated tumor regions exhibited T cell immune recruitment differences when compared to untreated regions (Fig. 2)

1. Increased numbers of CD3+ CD8+ effector T cells that express granzyme B (GzmB)
2. Lower numbers of naïve T cells (TN; CCR7+ CD45RA+)

Fig 2. Quantification of CD8+ population analysis by flow cytometry

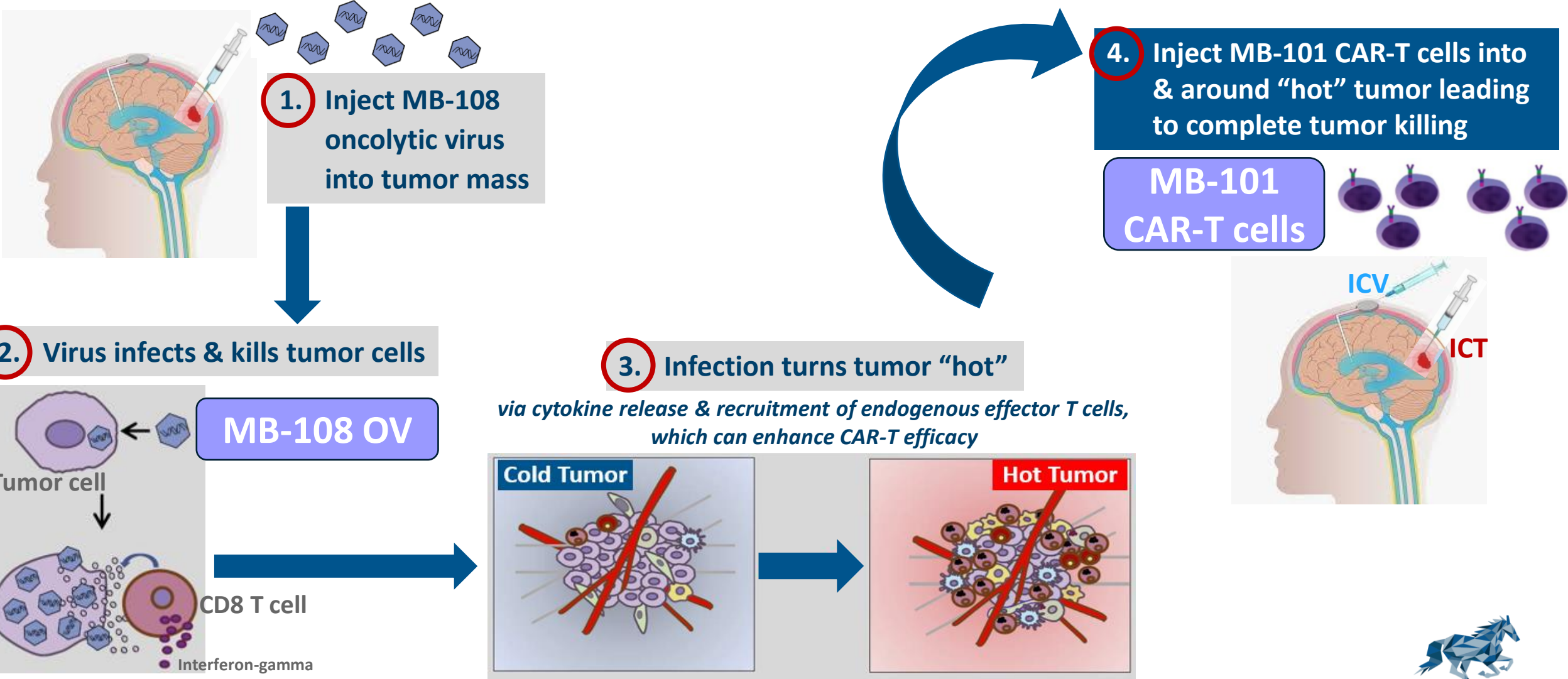


ϕ = Untreated tumor region



If We Could Turn Cold GBM Tumors Hot, Would They Respond Better?

Injecting an oncolytic virus followed by a CAR-T may be best strategy to test hypothesis



MB-101: 3 Approaches at COH to Enhancing Efficacy

MB-101 IL13R α 2-Directed CAR-T for GBM

Monotherapy Patient Selection Strategy

Combination Strategy

Leptomeningeal disease (CAR-T alone)

- Opportunity for activation of CAR-T cells as monotherapy
- COH-sponsored trial started 2H 2020¹

Combine with Oncolytic Virus (OV)

- IND for Phase 1 combination trial accepted October 2023
- First patient expected to be treated in 2024

Combine with Checkpoint Inhibitors

- Opportunity to overcome PD-L1-mediated immunosuppression due to CAR-T administration²
- COH-sponsored combination trial with nivolumab started 2H 2019³

1. <https://clinicaltrials.gov/ct2/show/NCT04661384>

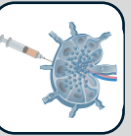
2. Shen SH et al. *Expert Opinion on Biological Therapy*. 2020 Jun;20(6):579-591. doi: 10.1080/14712598.2020.1727436

3. <https://clinicaltrials.gov/ct2/show/NCT04003649>

In vivo CAR-T Overview

Overview of *in vivo* CAR-T Platform Technology

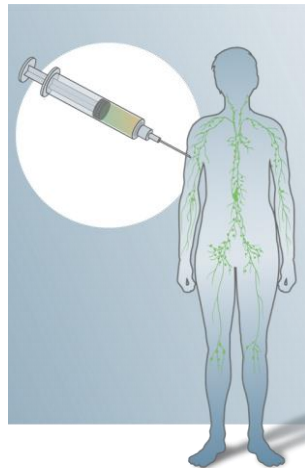
In vivo
CAR-T



In vivo CAR-T

Novel platform to make CAR-Ts in the patient's own body to treat hematologic malignancies

- Mayo Clinic collaboration announced 2H 2021, laboratory of Larry R. Pease, PhD
- Limited competition in the *in vivo* CAR-T space; 1st competitor IND filing expected 2024

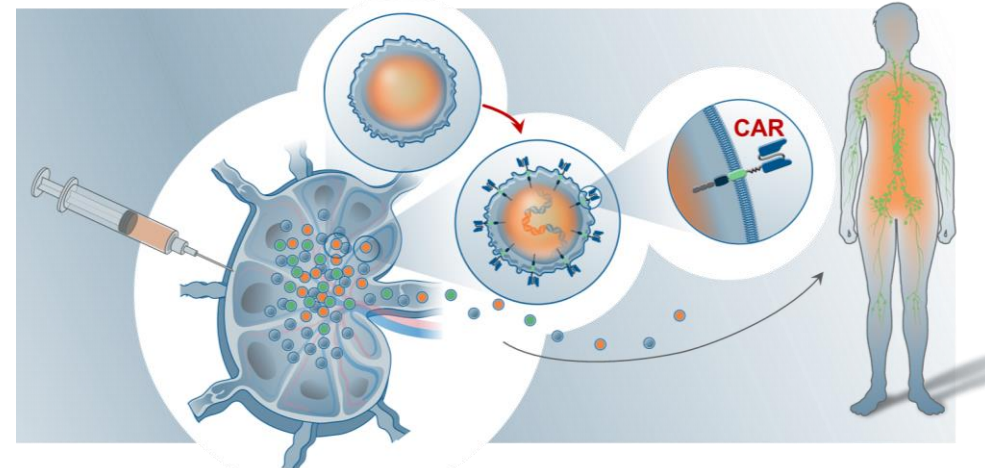


1. Inject engineered adenovirus into skin to activate T cells in local lymph nodes

Clinical development overview

- *In vivo* proof-of-concept established in mouse model of cancer via **2-step process** (unpublished)
- Following further preclinical progress at Mayo, we intend to build a Mustang Research team to enable generation of our own pipeline of novel off-the-shelf CAR-T products
- First-in-human clinical trial will be multicenter under Mustang IND
- First presentation by Dr. Pease at 2023 PEGS Boston Summit*
- **Targeting 2024 publication of *in vivo* proof-of-concept data in mouse tumor model**

* <https://www.pegsummit.com/>



2. Inject lentiviral vector encoding CAR into lymph node to transduce T cells & create CAR-T cells

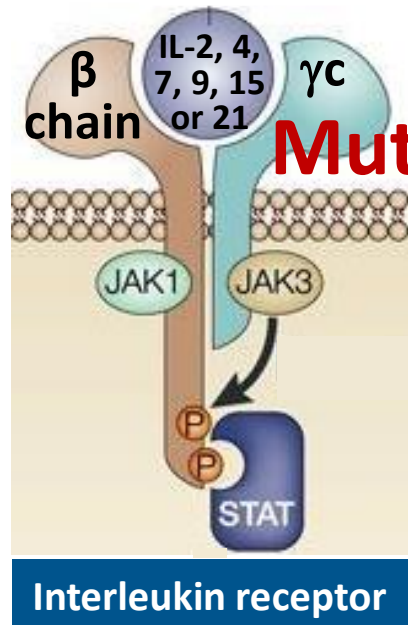
XSCID Program Overview

- Modified lentiviral vector will replace vector used to date in MB-107 (newborn XSCID) & MB-207 (previously transplanted XSCID) Phase 1 clinical trials
- Nomenclature for new products with modified vector will be MB-117 & MB-217



X-Linked Severe Combined Immunodeficiency (XSCID): Rare Genetic Disease Due to Mutations in the *IL2RG* Gene

- *IL2RG* codes for a protein (γ c) that is critical for development of normal immune cells (T cells, B cells, NK cells)
- Early diagnosis & treatment possible in areas with newborn screening or in patients with family history
- In the absence of screening, most patients are diagnosed at 3 – 6 months when maternal immunity declines
 - Recurrent bacterial, viral and fungal infections, diarrhea, protein-losing enteropathy, failure to thrive
 - Death by age 1 if untreated



Mutated γ c

XSCID



- David Vetter lived almost his entire life in a sterile plastic enclosure
- In 1983 he was one of the first patients to receive an allogeneic stem cell transplant
- He was able to survive only a few months after the procedure

XSCID & RAG1-SCID Represent a Substantial Addressable Population With High Unmet Need

MB-117 / MB-217 / MB-110 (RAG1-SCID)[†] U.S. addressable markets*

Indication	Initial Addressable Patients	Expanded Addressable Patients
XSCID	20-25 (annual newborn incident patients)	~400 [^] (pool of previously transplanted patients)
RAG1-SCID	10-15 (annual newborn incident patients)	~200 [^] (pool of previously transplanted patients)
Total U.S.	30 – 40 addressable patients	500 – 600 addressable patients
Total Ex-U.S.**	180 – 240 addressable patients	3,000 – 3,600 addressable patients

Expand into new lines of therapy

- We are working to expand the population addressable by our gene therapies
 - Ongoing R&D collaboration with Leiden University to address other rare genetic diseases

[†]MB-117 & MB-217 licensed from St. Jude Children’s Research Hospital; MB-110 licensed from Leiden University Medical Center

*Source: SEER, EuroStat, OECD, Statcan.ga.ca, and Ipss.go.jp

** Ex-U.S. includes EU15 + Norway, Switzerland, Canada, China, and Japan

[^] represents prevalent population of addressable patients, NOT annual addressable patients



MB-107: 100% Response Rate with Excellent Safety Profile in 23 Newborn Patients Treated on St. Jude-Sponsored Trial*

MB-107



- Multicenter trial: St. Jude, Seattle Children's, UCSF Benioff Children's; median follow-up of 2.6 years
- First successful use of targeted low-exposure busulfan + a lentiviral vector as first treatment for newly diagnosed infants with XSCID

- 17 of 18 patients with a follow up of >6 months have achieved robust immune reconstitution
- 18th patient achieved robust immune reconstitution after gene therapy boost
- Excellent safety profile: 100% overall survival, no insertional mutagenesis

- 15/23 (65%) off IVIG *and* 12/23 (52%) immunized
- 20 patients with a follow-up >4 months
 - have recovered from pre-existing infections
 - are off protective isolation & prophylactic antimicrobials
 - have normal growth velocity



* <https://clinicaltrials.gov/ct2/show/NCT01512888>

Data Source: <https://annualmeeting.asgct.org/abstracts/abstract-details?abstractId=3273>

MB-207: Results in Previously Transplanted Patients on NIH-Sponsored Trial¹ are Consistent with Newborn Data^{2,3}

MB-207



- Promising safety & efficacy profile, but time to recovery from chronic viral gastrointestinal (GI) infections was slow
- To address this challenge, transduction enhancers (TE), including LentiBOOST™ ([SIRION Biotech GmbH](#)) were subsequently included in cell processing

TE cell processing achieved accelerated clearance of chronic GI infections

Original Transduction (OT) Cell Processing (N=8)	TE Cell Processing (N=6)
<ul style="list-style-type: none">▪ 6/7 patients with norovirus cleared infection▪ However, patients required 1 – 3 years post therapy to cure infection▪ Patient 8 did not clear the infection	<ul style="list-style-type: none">▪ Patients 9 & 10 cured chronic norovirus infection by 6 months post therapy▪ Patients 11, 12 & re-treated 8 with norovirus infection are symptom free @ 3 – 6 months

1. <https://clinicaltrials.gov/ct2/show/NCT01306019>

2. De Ravin SS et al. *Blood* (2019) 134 (Suppl 1): 608. <https://doi.org/10.1182/blood-2019-127439>. [ASH 2019]

3. De Ravin SS et al. *Sci Transl Med*. 2016; 8(335):335ra57.



XSCID Program: Now Pivoting to Modified Lentiviral Vector

- Based on review of the data from the 2 investigator-sponsored clinical trials, the respective investigators have elected to pause enrollment to these trials
 - The NIH has posted on ClinicalTrials.gov that “Clones representing 10% or more of the subject patients’ myeloid lineage have been detected” (<https://clinicaltrials.gov/ct2/show/NCT01306019>)
 - This finding notwithstanding, no safety concerns in these trials have been noted, including no finding of insertional mutagenesis or malignancy
- New Phase 1 investigator-sponsored trials in both XSCID populations are expected to initiate in 2024 to test a modified version of the current lentiviral vector
 - As a result, and out of an abundance of caution, Mustang has made the decision to delay initiating its own sponsored trials in newborn (MB-117) and previously transplanted (MB-217) patients
 - Upon review of the emerging data in 2024 from the planned trials utilizing the modified vector, we will be able to provide more information on timelines for the start of Mustang-sponsored Phase 1/2 trials of MB-117 & MB-217
 - Delaying the start of our multicenter XSCID trials will allow us to utilize the safest known vector available in our clinical trials, while also reducing our near-term operating expense



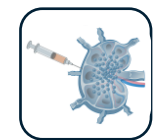
Anticipate initiating first pivotal MB-106 trial in WM in mid-2024



- **MB-106 (CD20 CAR-T): Continue to enroll patients in Mustang-sponsored multicenter trial**
 - Await enrollment of 6th & final patient to Arm 2 (indolent lymphoma), dose level 2, in 1Q 2024
 - Expect End-of-Phase 1 meeting for Arm 2 in 1Q 2024
 - Expect treatment of first WM patient in first pivotal MB-106 trial mid-2024; top-line data expected mid-2026
 - Further Arm 2 data disclosures anticipated 2Q 2024, 4Q 2024



- **MB-101 (*IL13Rα2* CAR-T) + MB-108 (*herpes simplex virus 1 oncolytic virus*) = MB-109**
 - FDA granted safe-to-proceed for phase 1 combination trial October 2023; expect to treat 1st patient in 2024



- **Mayo Clinic *in vivo* CAR-T platform**
 - Targeting 2024 publication of *in vivo* proof-of-concept data in mouse tumor model



- **Expect initiation of investigator-sponsored Phase 1 XSCID trials in 2024 using modified lentiviral vector**
 - MB-117 for newborn XSCID; MB-217 for previously transplanted XSCID



- **Continue BD&L activities**
 - Partnering opportunities to access non-dilutive capital



Annex – Background and Limitations Regarding Our Estimated Market Potential for MB-106

Background

Cancer therapies are sometimes characterized as “first line,” “second line” or “third line” or later therapies, and the FDA often approves new therapies initially only for last line use. When blood cancers are detected, they are treated with first line of therapy with the intention of curing the cancer. This generally consists of chemotherapy, radiation, antibody drugs, tumor-targeted small molecules, or a combination of these. In addition, sometimes a bone marrow transplantation can be added to the first line therapy after the combination chemotherapy is given. If the patient’s cancer relapses, then they are given a second line or third line therapy, which can consist of more chemotherapy, radiation, antibody drugs, tumor-targeted small molecules, or a combination of these, or bone marrow transplant. Generally, the higher the line of therapy, the lower the chance of a cure. With third or higher line, the goal of the therapy in the treatment of the cancer is to control the growth of the tumor and extend the life of the patient, as a cure is unlikely to occur. Patients are generally referred to clinical trials in these situations.

Limitations

Based on our current and planned clinical trials, we currently plan to seek approval of MB-106 as a 3L+ line of therapy for DLBCL and WM and as a 2L+ line of therapy for FL. Depending on results of clinical trials, we may determine to seek FDA approval of MB-106 for earlier lines of therapy for these indications, as well as for FL. There can be no guarantee that MB-106 will be approved for any such earlier lines of therapy. In addition, we may have to conduct additional randomized clinical trials (including potentially comparative trials against approved therapies) prior to or post gaining approval for the earlier line of therapy. Our projections of both the number of people who have the cancers we are targeting, as well as the size of the patient population subset of people with these cancers in a position to receive first, second, third and later line therapy and who have the potential to benefit from treatment with our product candidates, are based on our beliefs and estimates. These estimates have been derived from a variety of sources, including scientific literature, surveys of clinics, patient foundations, or market research and may prove to be incorrect. Further, new studies may change the estimated incidence or prevalence of these cancers. The number of patients may turn out to be fewer than expected. Additionally, the potentially addressable patient population for our product candidates may be limited or may not be amenable to treatment with our product candidates. In addition, even if we receive the FDA approvals that we seek, we will face significant obstacles to commercialization of MB-106, including risks associated with educating and certifying medical personnel regarding the procedures and the potential side effects, such as cytokine release syndrome and neurologic toxicities, in compliance with the Risk Evaluation and Mitigation Strategy program required by FDA, as well as competing therapies (some of which have already received FDA approval and been commercialized). We have not conducted market research to determine how treating physicians would expect to prescribe a product that is approved for multiple tumor types if there are different lines of approved therapies for each such tumor type. Even if we obtain significant market share for our product candidates in the U.S., because the potential target populations are relatively small, we may never achieve significant revenue without obtaining regulatory approval for additional indications or as part of earlier lines of therapy.

In addition, as of the date of this presentation, we have not taken any action, or begun to take any action, to seek approval for MB-106 to treat indications in markets outside the U.S. Obtaining any such approvals will require formal engagement with applicable regulatory authorities and will potentially include enrolling patients outside the U.S. in Mustang-sponsored MB-106 clinical trials. Even if we are able to obtain FDA approval of MB-106 for certain indications in the U.S. there is no guarantee we will be able to obtain similar approvals in countries outside the U.S. Moreover, there are significant risks relating to our ability to commercialize MB-106 outside the U.S. As a result, our ability to take advantage of the Ex-U.S. potential addressable markets is subject to significant uncertainty (and we may never be able to take advantage of these markets).



Corporate Presentation

April 2024