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KOL Call on MB-106 for the Treatment of Relapsed or Refractory B-Cell NHL and CLL

June 15, 2021

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This presentation may contain "forward-looking statements" within the meaning of Section 27A of the Securities Act of 1933, as amended, and Section 21E of the Securities Exchange Act of 1934, as amended. For such forward-looking statements, we claim the protection of the safe harbor for forward-looking statements contained in the Private Securities Litigation Reform Act of 1995. Such statements include, but are not limited to, any statements relating to our growth strategy, products and product development programs and any other statements that are not descriptions of fact. Forward-looking statements are based on management's current expectations and are subject to risks and uncertainties that could negatively affect our business, operating results, financial condition and stock price. Factors that could cause actual results to differ materially from those currently anticipated include the risks and uncertainties inherent in clinical trials, drug development, and commercialization, as well as other risks described in our Securities and Exchange Commission filings. We expressly disclaim any obligation or undertaking to release publicly any updates or revisions to any forward-looking statements contained herein to reflect any change in our expectations or any changes in events, conditions or circumstances on which any such statement is based, except as may be required by law. The information contained herein is intended to be reviewed in its totality, and any stipulations, conditions or provisos that apply to a given piece of information in one part of this presentation should be read as applying mutatis mutandis to every other instance of such information appearing herein. as required by law.

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Key Opinion Leader Call on MB-106 for the Treatment of Relapsed or Refractory B-Cell Non-Hodgkin Lymphoma

- Mazyar Shadman, MD MPH
- Brian Till, MD

- Fred Hutch and University of Washington

Financial Disclosures

- Mazyar Shadman
  - Consulting, Advisory Boards, steering committees or data safety monitoring committees: Abbvie, Genentech, AstraZeneca, Sound Biologics, Pharmacyclics, Beigene, Bristol Myers Squibb, Morphosys, TG Therapeutics, Innate Pharma, Kite Pharma, Adaptive Biotechnologies, Epizyme, Eli Lilly, and Atara Biotherapeutics
  - Research Funding: Mustang Bio, Celgene, Bristol Myers Squibb, Pharmacyclics, Gilead, Genentech, Abbvie, TG Therapeutics, Beigene, AstraZeneca, Sunesis, Atara Biotherapeutics, GenMab

- Brian Till
  - Patent/royalties and research funding from Mustang Bio for the CD20 CAR

Outline

1. Unmet needs in the era of immunotherapy for B-NHLs
2. EHA data for MB-106

Unmet needs in the era of immunotherapy for B-NHLs

Relapsed/Refractory Indolent Lymphomas

Approved	Areas for improvement
idelalisib, duvelisib, copanlisib, umbralisib	• Indefinite treatment • Toxicity profile
lenalidomide	• Long-term treatment • Toxicity profile
tazemetostat	• Long-term treatment • Low efficacy
axicabtagene ciloleucel (axi-cel)	• Inpatient administration • High toxicity

Investigational	Areas for improvement
Bispecific antibodies	• Treatment duration • Logistical issues (infusions, multiple visits)
Autologous CAR-T	• Limited efficacy data • Alternative target (all CD19)

- **Potential for being the preferred CAR-T option for indolent lymphomas**
- **High efficacy along with the favorable safety profile can be the differentiating factor**

Relapsed/Refractory Large Cell Lymphoma

- Goal of treatment is always cure
- Current approved and investigational options with no/low curative potential

Approved	Investigational
polatuzumab vedotin based	bispecific antibodies
loncastuximab tesirine	oral kinase inhibitors
tafasitamab-cxix based	
selinexor	

- Current approved and investigational options with a curative potential

Approved	Areas for improvement
axicabtagene ciloleucel (axi-cel)	• Cure rate 30-40% • Poor outcomes post CAR-T failure • High toxicity with axi-cel • All target CD19
tisagenlecleucel	
lisocabtagene maraleucel	

Investigational	Areas for improvement
Allogeneic CAR-T	• Durability of responses • Multiple infusions? • Infections (use of anti-CD52 antibody)? • Logistics • Cost
Allogeneic NK	

- **A curative treatment, potentially with a more favorable safety profile**
- **Potentially an option for the post CD19 CAR-T space**

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Relapsed/Refractory Chronic Lymphocytic Leukemia

A unique disease among B-NHLs given the current therapeutic options and effective treatments

Treatments are effective and the focus is on:

1. Time-limited therapy (venetoclax-based)
2. Better safety profile (next generation B-cell receptor inhibitors)
3. Improving efficacy in high-risk patients

<u>The bar is much higher for safety profile for any potential CAR-T product for CLL</u>

- A CAR-T product with a favorable safety profile
- Can potentially be used in
  - combination with B-cell receptor inhibitors
  - MRD positive setting in earlier lines of therapy

- **CAR-T is an unmet need in CLL**
- **If safety profile holds, there is a potential for utilization in early lines of treatment**

EHA presentation

Immunotherapy Using a 3RD Generation CD20 CAR T-Cell (MB-106) for B-NHL and CLL

Mazyar Shadman [1,2], Cecilia Yeung [1,2], Mary Redman [1], Sang Lee [1], Dong Lee [1], Susan Ra [1], Ajeetha Ramachandran[3], Ryan Lynch[1,2], Stephen Smith[1,2], Christina Poh[2], Ajay Gopal [1,2], Houston Warren [1,2], Aude Chapuis [1,2], Damian Green [1,2], Jordan Gauthier [1,2], Ryan Cassaday [1,2], Hans-Peter Kiem [1,2], Cameron Turtle [1,2], David Maloney [1,2], Brian Till [1,2]

1. Fred Hutchinson Cancer Research Center, Seattle WA
2. University of Washington, Seattle WA
3. Mustang Bio, Worcester, MA

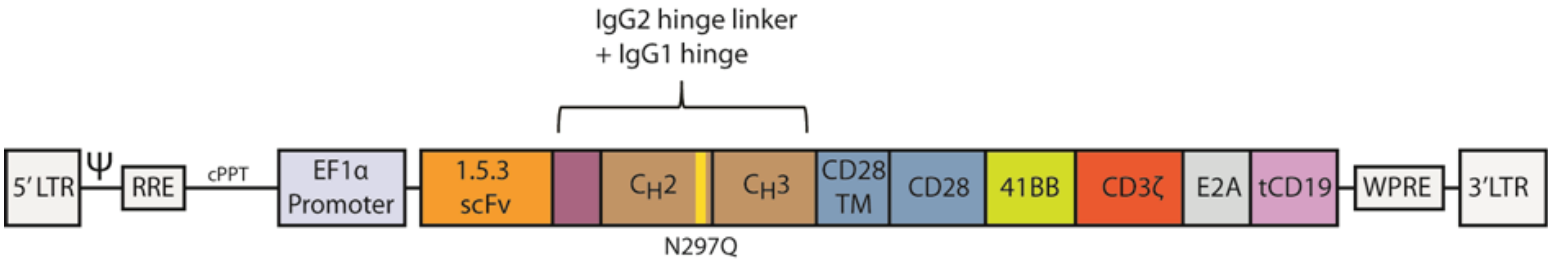
Abstract #EP731
EHA 2021

Background

- Chimeric antigen receptor (CAR) adoptive T cell therapy is effective for treatment of patients with relapsed/refractory B-NHL
- Only 30-40% of DLBCL patients have durable remissions with CD19 CARs and there is limited follow-up for MCL and FL patients treated with CD19 CARs
- CD20-targeted CAR-T is another adoptive immunotherapy option that could be potentially utilized instead of or in sequence with CD19 CAR-T
- We present interim results of our ongoing phase I/II clinical trial investigating safety and efficacy of a CD20 CAR-T for high-risk B-NHLs (NCT03277729)

CD20 CAR (MB-106)

- MB-106 is a fully human third-generation CD20 targeted CAR with both 4-1BB and CD28 costimulatory domains
- Modified IgG1 spacer eliminates FcR binding
- Truncated CD19 transduction marker
- Lentiviral vector



Dr. Brian Till's Lab – Fred Hutch

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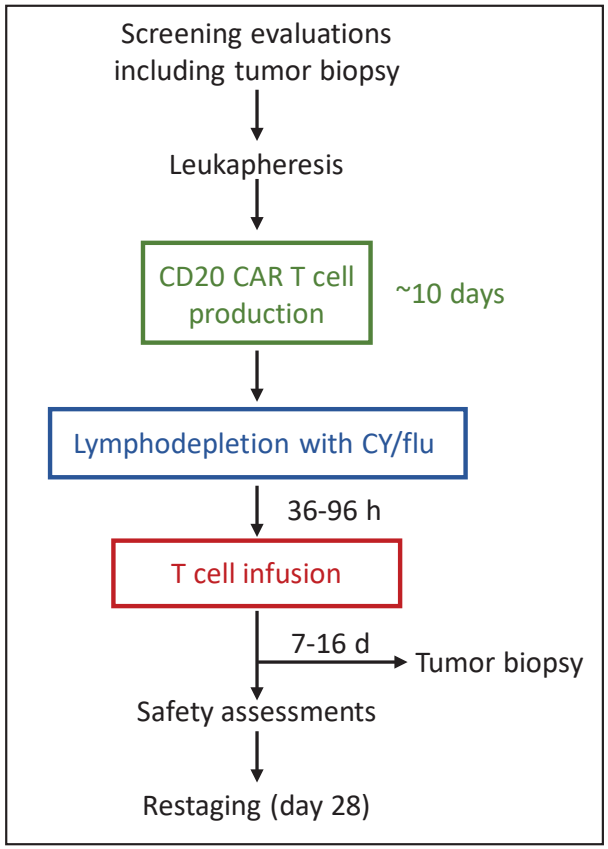
Study Design

- Single institution phase I/II study
- Eligibility: CD20^{+} B-NHLs
  - Large cell lymphoma after 2 lines of treatment
  - FL and MCL after at least 1 prior line of treatment (post BTK inhibitor for MCL)
  - CLL: prior BTK inhibitor and/or Venetoclax failure (progression or intolerance)
  - Other previously treated B-NHLs
  - Prior treatment with a CD19 CAR is allowed after recovery of normal B cells (≥ 20 B cells/µL)
- Lymphodepletion (LD):
  - Cyclophosphamide and Fludarabine (Cy-Flu)
- Dose levels (DL):
  - Dose level 0: 1×10^5 cells/kg
  - **Dose level 1: 3.3×10^5 cells/kg**
  - Dose level 2: 1×10^6 cells/kg
  - Dose level 3: 3.3×10^6 cells/kg
  - Dose level 4: 1×10^7 cells/kg



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Study Timeline

- "Original" cell manufacturing process (2017-2019):
  - Separate culturing of CD4+ and CD8+ cells and Variable lymphodepleting regimens (Cy alone or in combination with Flu)
  - 7 pts (3 FL, 3 MCL, 1 hairy cell variant) were treated with best response being stable disease (SD) 1
  - Due to challenges in meeting target cell doses, poor CAR-T expansion, and lack of clinical responses, enrollment was placed on hold and cell manufacturing process underwent a major revision

- "Modified" cell manufacturing process
  - Starting 2019 (enrollment is ongoing)
  - Manufacturing process was changed to combined culture of CD4+ and CD8+ cells
  - As of 5/28/2021, 15 patients have reached the day 28 assessment for safety and efficacy

- For this presentation, we present the safety and efficacy data from the modified process (n=15)

[1] Shadman, ASH 2020, abstract #1443

Results: Patient Characteristics

N = 15	
Age, median (range)	**59 (43-81)**
Female sex, n(%)	**9 (60%)**
FL n(%)	**11 (73%)**
POD24	8/11 (73%)
History of transformation	3/11 (27%)
Prior lines of therapy median (range)	4 (1-14)
Prior Pi3K inhibitor	4/11 (36%)
MCL n(%)	**2 (13%)**
Prior lines of therapy median (range)	6 (5-7)
Prior ASCT	2/2 (100%)
Prior BTK inhibitor	2/2 (100%)
CLL n(%)	**1 (6.5%)**
Complex karyotype	1/1 (100%)
Prior BTK inhibitor	1/1 (100%)
Prior Venetoclax	1/1 (100%)
DLBCL n(%)	**1 (6.5%)**
Transformed lymphoma	1/1 (100%)
Prior lines of therapy	5

ASCT: Autologous stem cell transplant
BTK: Bruton tyrosine kinase
Pi3K: Phosphoinositide 3-kinases
POD24: Progression of disease within 24 months after last dose of first line chemotherapy for FL

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ASCT: Autologous stem cell transplant
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Results: Efficacy

Histology	Best Response by Lugano PET criteria †	All dose levels	Dose level 0 (n=1)	Dose level 1 (n=2)	Dose level 2 (n=4)	Dose level 3 (n=6)	Dose level 4 (n=2)
			1×10^5 cells/kg	3.3×10^5 cells/kg	1×10^6 cells/kg	3.3×10^6 cells/kg	1×10^7 cells/kg
FL (n=11)	ORR, n(%)	**10/11 (91%)**	1/1	1/2	2/4	4/6	2/2
	CR, n(%)	**9/11 (82%)**	1/1	1/2	1/4	4/6	2/2
	PR,n (%)	**1/11 (9%)**	-	-	1/4	-	-
	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	**1/11 (9%)**	-	1/2	-	-	-
MCL (n=2)	ORR, n(%)	**2/2 (100%)**	-	-	2/4	-	-
	CR,n(%)		-	-	-	-	-
	PR,n (%)	**2/2 (100%)**	-	-	2/4	-	-
	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	-	-	-	-	-	-
CLL (n=1)	ORR, n(%)	**1/1 (100%)**	-	-	-	1/6	-
	CR,n(%)	**1/1 (100%)**	-	-	-	1/6	-
	PR,n (%)		-	-	-	-	-
	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	-	-	-	-	-	-
DLBCL (n=1)	ORR, n(%)	**1/1 (100%)**	-	-	-	1/6	-
	CR,n(%)		-	-	-		-
	PR,n (%)	**1/1 (100%)**	-	-	-	1/6	-
	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	-	-	-	-	-	-
All patients (n=15)	ORR, n(%)	**14/15 (93%)**	1/1 (100%)	1/2 (50%)	4/4 (100%)	6/6 (100%)	2/2 (100%)
	CR, n(%)	**10/15 (67%)**	1/1 (100%)	1/2 (50%)	1/4 (25%)	5/6 (83%)	2/2 (100%)

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†Cheson, et al. J Clin Oncol, 2014

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	CR,n(%)		-	-	-	-	-
	PR,n (%)	**2/2 (100%)**	-	-	2/4	-	-
	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	-	-	-	-	-	-
CLL (n=1)	ORR, n(%)	**1/1 (100%)**	-	-	-	1/6	-
	CR,n(%)	**1/1 (100%)**	-	-	-	1/6	-
	PR,n (%)		-	-	-	-	-
	SD,n (%)	-	-	-	-	-	-
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DLBCL (n=1)	ORR, n(%)	**1/1 (100%)**	-	-	-	1/6	-
	CR,n(%)		-	-	-		-
	PR,n (%)	**1/1 (100%)**	-	-	-	1/6	-
	SD,n (%)	-	-	-	-	-	-
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	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	**1/11 (9%)**	-	1/2	-	-	-
MCL (n=2)	ORR, n(%)	**2/2 (100%)**	-	-	2/4	-	-
	CR,n(%)		-	-	-	-	-
	PR,n (%)	**2/2 (100%)**	-	-	2/4	-	-
	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	-	-	-	-	-	-
CLL (n=1)	ORR, n(%)	**1/1 (100%)**	-	-	-	1/6	-
	CR,n(%)	**1/1 (100%)**	-	-	-	1/6	-
	PR,n (%)		-	-	-	-	-
	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	-	-	-	-	-	-
DLBCL (n=1)	ORR, n(%)	**1/1 (100%)**	-	-	-	1/6	-
	CR,n(%)		-	-	-		-
	PR,n (%)	**1/1 (100%)**	-	-	-	1/6	-
	SD,n (%)	-	-	-	-	-	-
	PD,n (%)	-	-	-	-	-	-
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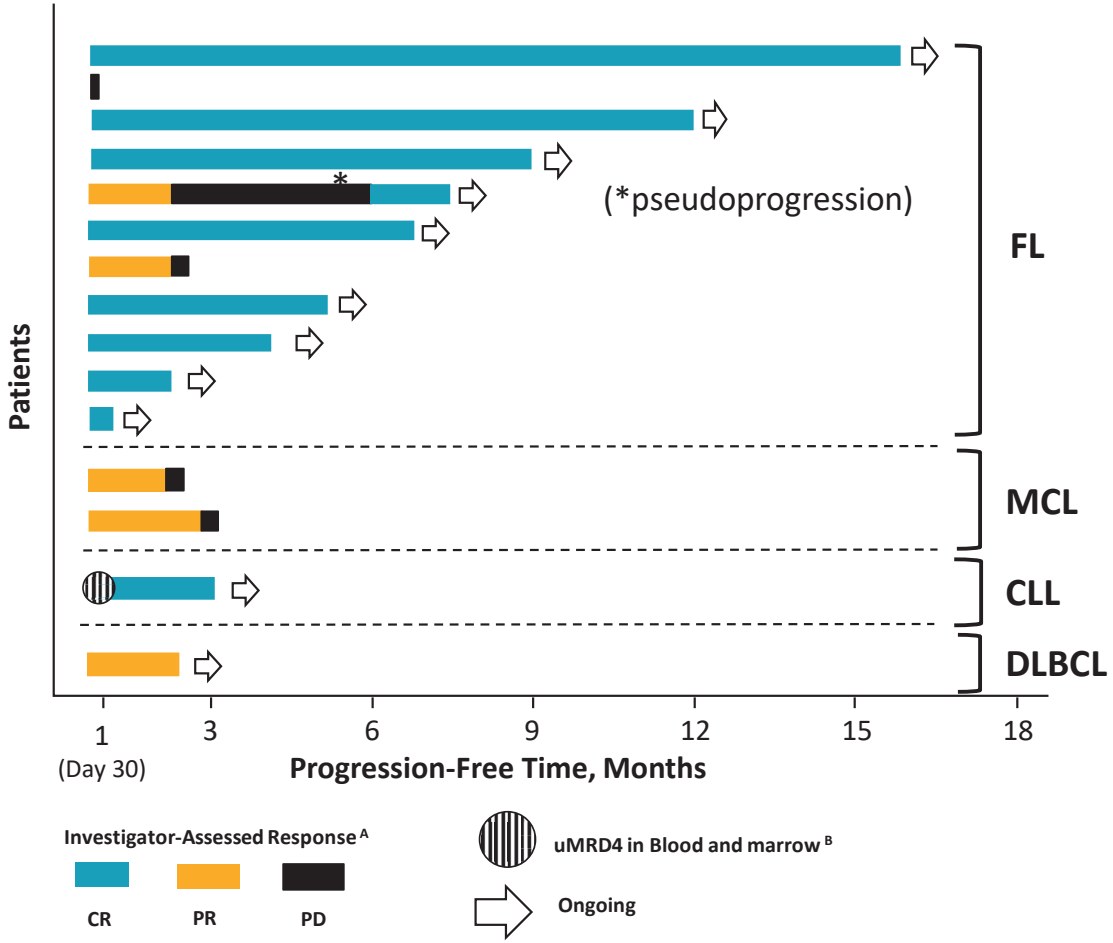
Duration of Responses



- All CR patients remain to be in CR
- One FL patient with initial PR and a later PD, had spontaneous CR and remains in remission
- First CLL patient had a CR and undetectable MRD in blood and marrow

[A] Evaluated according to Lugano 2018 criteria.
[B] Assessed in blood and bone marrow by flow cytometry (10^{-4})

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Results: Adverse Events of Interest

	FL (n=11)					Other Histologies (MCL,CLL,DLBCL) (n=4)					All patients (n=15)				
	Grade n(%)					Grade n(%)					Grade n(%)				
	1	2	3	4	Any	1	2	3	4	Any	1	2	3	4	Any
CRS *	**3 (27%)**	**1 (9%)**	-	-	**4 (36%)**	-	**2 (50%)**	-	-	**2 (50%)**	**3 (20%)**	**3 (20%)**	-	-	**6 (40%)**
ICANS *	-	-	-	-	-	-	**1 (25%)**	-	-	**1 (25%)**	-	**1 (6.5%)**	-	-	**1 (6.5%)**
Headache	3 (27%)	3 (27%)	1 (9%)	-	7 (64%)	1 (25%)	-	-	-	1 (25%)	4 (26%)	3 (20%)	1 (6.5%)	-	8 (53%)
Neuropathic pain	-	-	-	-	-	-	-	1 (25%)	-	1 (25%)	-	-	1 (6.5%)	-	1 (6.5%)
Febrile neutropenia	1 (9%)	-	2 (18%)	-	3 (27%)	-	-	-	-	-	1 (6.5%)	-	2 (13.5%)	-	3 (20%)
Fever	1 (9%)	1 (9%)	-	-	2 (18%)	-	2 (50%)	-	-	2 (50%)	1 (6.5%)	3 (19.5%)	-	-	4 (26%)
Neutropenia	-	-	4 (36%)	6 (54%)	10 (91%)	-	-	1 (25%)	3 (75%)	4 (100%)	-	-	5 (33%)	9 (60%)	14 (93%)
Thrombocytopenia	-	2 (18%)	-	1 (9%)	3 (27%)	-	2 (50%)	-	1 (25%)	3 (75%)	-	4 (26%)	-	2 (13%)	6 (40%)

- **Median time to CRS: 6.5 (0-12) days**
- **Time to ICANS: 12 days**

- **CRS: No grade 3 or 4**
- **ICANS: Only one patient with grade 2 (6.5%)**
- **No ICANS (any grade) in FL patients**

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* Lee, et al, BBMT, 2019 (ASTCT guidelines)

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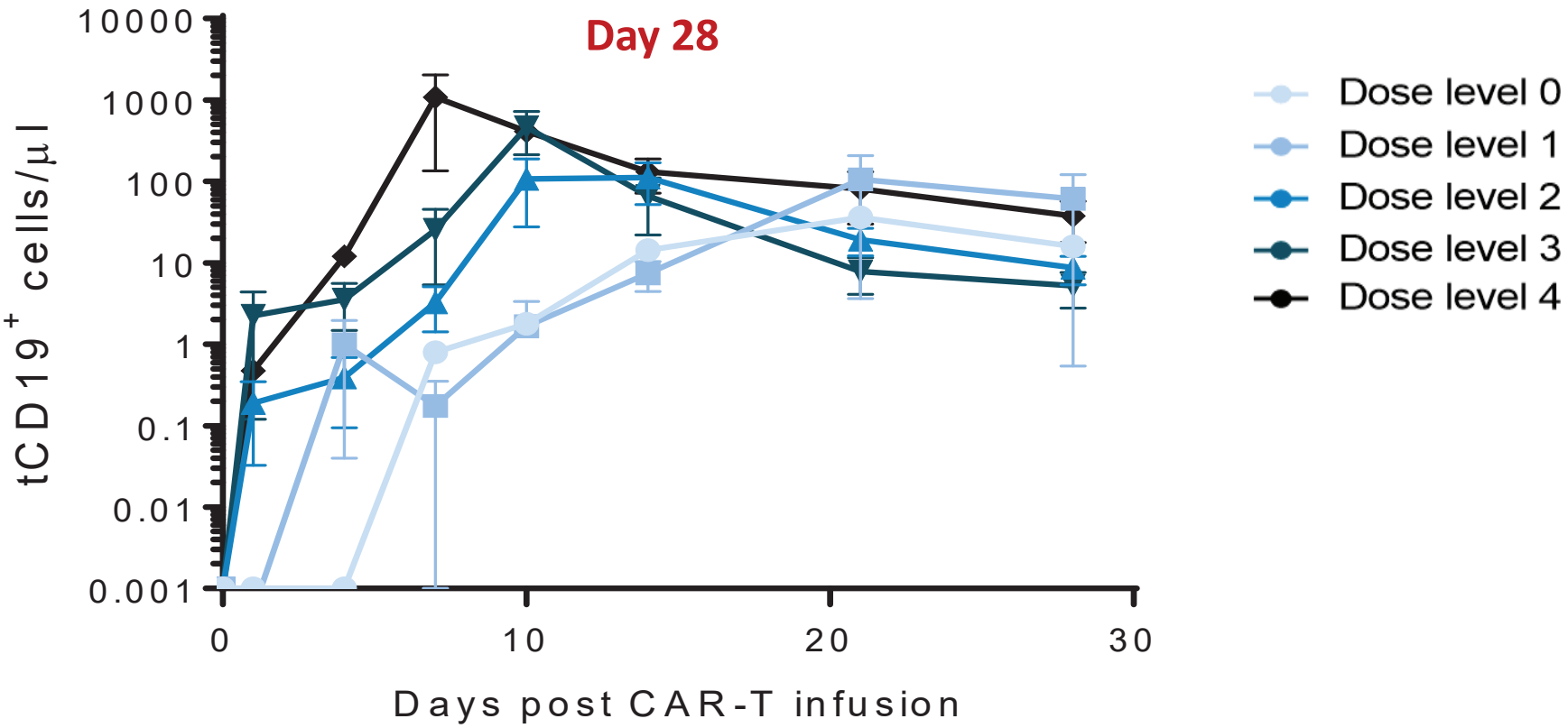
Results: CAR-T Expansion/Persistence



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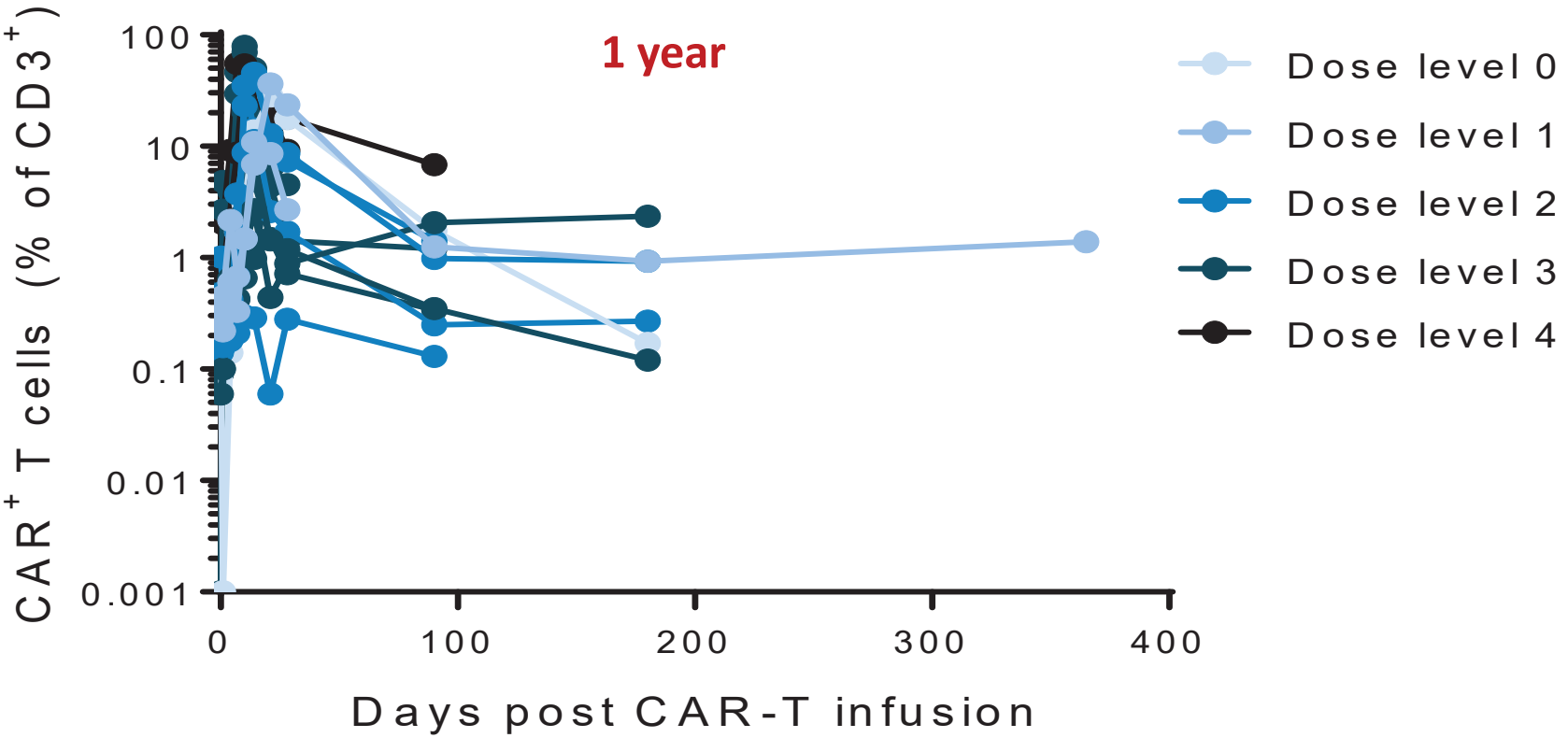

- Faster expansion with higher dose levels, but comparable levels after 100 days between all dose levels

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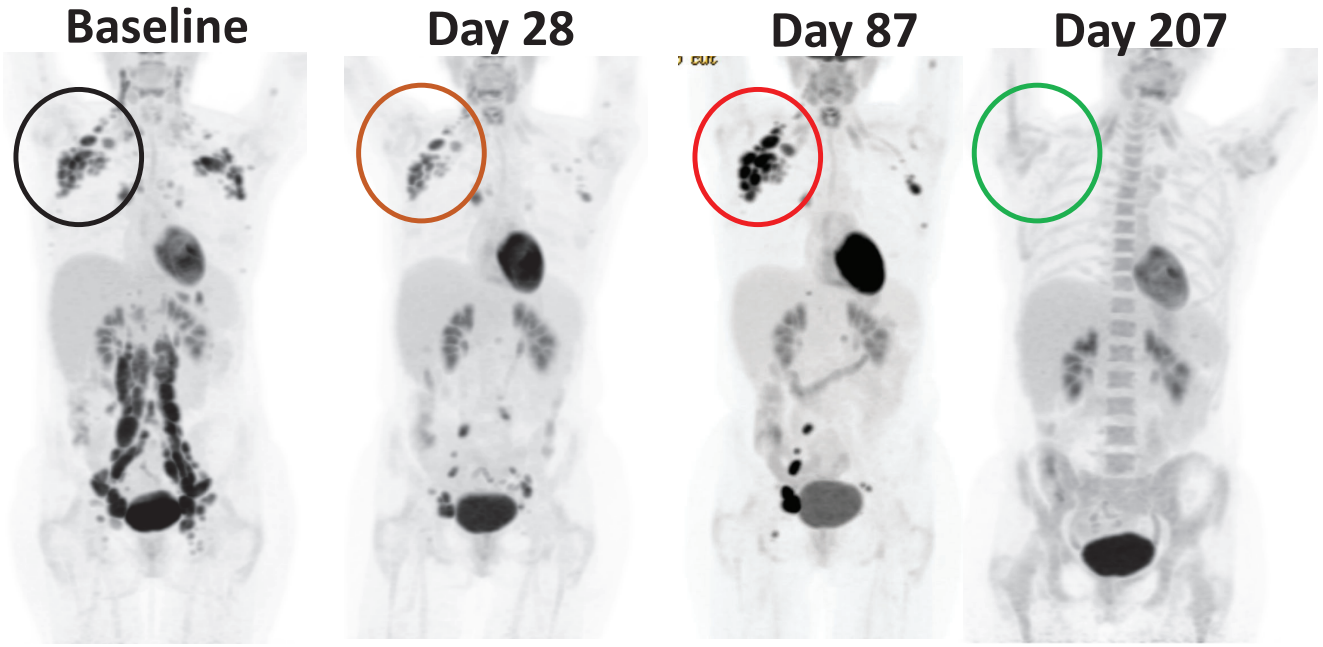
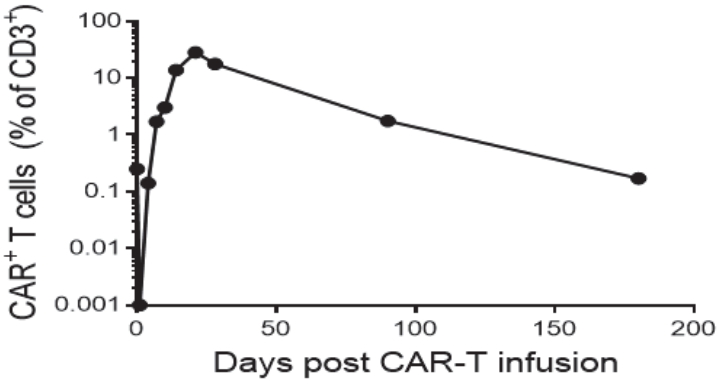
Spontaneous Complete Remission in a FL patient with initial (Pseudo)progression





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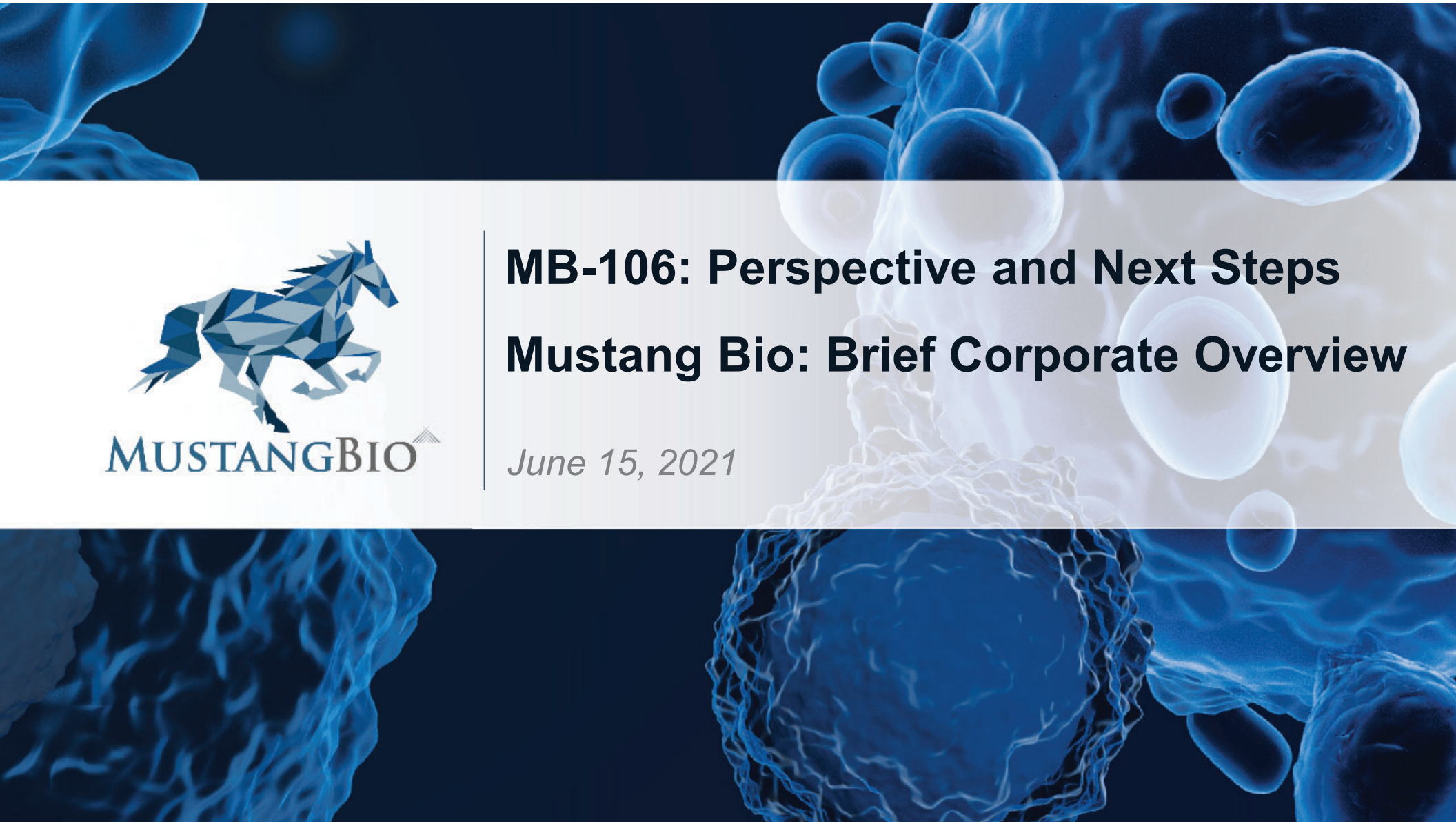
Summary

- MB-106 is a third generation fully human CD20 targeted CAR-T cell therapy for treatment of B-NHLs
- Safety: Very favorable safety profile has been observed:
  - CRS: only grade 1-2
  - ICANS: only 1 grade 2
- Efficacy: High overall and complete responses with “modified process”:
  - FL patients : ORR 91% ; CR 82%
  - All patients: ORR 93% ; CR 67%
  - Robust CAR-T expansion and persistence
- Enrollment continues for the current study. All CD20+ NHL are eligible. (NCT03277729)
- A multicenter phase 1/2 study will be launched later this year
- As the leading site, Fred Hutch will prioritize the multicenter study, although a significant overlap between the 2 studies is not expected



MB-106: Perspective and Next Steps

Mustang Bio: Brief Corporate Overview

June 15, 2021

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MB-106: Competitive Considerations

- Emerging from EHA 2020, we see exciting momentum for MB-106 – including visibility into multicenter trial
  - **Efficacy:** MB-106 is potentially a highly active CAR-T even at low doses
    - ORR & CR so far are in the range of other cell therapies & bispecifics – allowing for small patient numbers
    - Efficacy may be greater at 2 highest dose levels
  - **Safety:** MB-106 has shown a safety profile that may potentially prove superior to bispecifics & all other cell therapies
  - **Regulatory risk:** As an autologous CAR-T, the manufacturing & regulatory risks of MB-106 are potentially lower than the risks associated with allogeneic CAR-Ts, NK cells, & other adoptive cell therapies
  - **COGs**: Cost of goods is highly competitive vis-à-vis bispecifics & all other adoptive cell therapies
  - **Potential commercial advantages:** As a result of its superior safety profile, we believe
    - MB-106 will be able to be administered in an outpatient setting at a far wider range of centers than currently approved CAR-Ts
    - The total burden to the health care system will be substantially lower than for bispecifics & other cell therapies
- With continued dose escalation in 2021, we hope to build an even more competitive profile for MB-106
  - Sustain compelling activity at the 2 highest dose levels, where we have observed 8/8 responses, 7/8 CRs
  - Demonstrate best-in-class duration of response
  - Maintain superior safety
  - Replicate results in the multicenter phase 1 trial under Mustang IND
  - Develop strategies for moving to earlier lines of therapy & combining with other immune therapies

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MB-106: Early Profile is Competitive vis-à-vis Approved CAR-Ts

- Favorable early safety profile compared with other autologous CAR-T products: No CRS ≥ gr3, no ICANS ≥ gr3
- Early dose-response relationship, with 7/8 CRs at highest 2 dose levels, including 1 MRD-negative CLL patient
- Safety & efficacy profile also competitive vis-à-vis CD20 bispecifics
- *Challenge:* Approved CAR-Ts in 3 of the 4 major B-cell malignancies
- *Opportunity:* No CAR-T approved or near approval for CLL

Therapeutic Class	Therapy (Company)	Eff. eval *(safety)*	CR (%)	PR	ORR	Duration of Response	Safety	Comments
Autologous CD20 CAR-T (phase 1)	**MB-106 (MBIO)**	**15 *(15)***	**10 (67%)**	**4**	**93%**	**All CRs ongoing**	**0% CRS ≥gr3; 0% ICANS ≥gr3**	**1 institution, 5 dose levels**
Autologous CD19 CAR-T (pre-BLA)	Tiso-cel (NVS)	94 *(97)*	62 (66%)	18	86%	NR after med 11.0 mo	0% CRS ≥gr3; 1% ICANS ≥gr3	Pivotal ELARA – FL
Autologous CD19 CAR-T (approved)	Axi-cel (GILD)	81 *(146)*	49 (60%)	25	91%	NR after med 14.5 mo	8% CRS ≥gr3; 21% ICANS ≥gr3	Pivotal ZUMA-5 – FL
Autologous CD19 CAR-T (approved)	Liso-Cel (BMS)	192 *(268)*	104 (54%)	37	73%	Median 16.7 mo	4% CRS ≥ gr3; 12% ICANS ≥ gr3	Pivotal TRANSCEND – DLBCL
Autologous CD19 CAR-T (approved)	Brexu-cel (GILD)	60 *(74)*	37 (62%)	15	87%	NR after med 8.6 mo	18% CRS ≥gr3; 37% ICANS ≥gr3	Pivotal ZUMA-2 – MCL
Autologous CD19 CAR-T (approved)	Axi-cel (GILD)	101 *(108)*	52 (51%)	21	72%	Median 9.2 mo	13% CRS ≥gr3; 31% ICANS ≥gr3	Pivotal ZUMA-1 – DLBCL
Autologous CD19 CAR-T (approved)	Tiso-cel (NVS)	68 *(106)*	22 (32%)	12	50%	NR after med 9.4 mo	23% CRS ≥gr3; 18% ICANS ≥gr3	Pivotal JULIET – DLBCL

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MB-106: Key CLL Competitor – BMS' Liso-cel

Also enrolling (no results yet): Gilead's brexu-cel[1] & Novartis' YTB323 + ibrutinib[2]

	Liso-cel monotherapy [3]	Liso-cel with ibrutinib [4]
N	23	19
All CRS	17 (74%)	14 (74%)
Grade ≥ 3 CRS	2 (9%)	1 (5%)
All neurologic events	9 (39%)	6 (32%)
Grade ≥ 3 neurologic events	5 (22%)	3 (16%)
ORR	19 (82%)	18 (95%)
CR	11 (46%)	12 (63%)
uMRD4[5] peripheral blood	17 (75%)	17 (89%)
uMRD4[5] bone marrow	15 (65%)	15 (79%)

Sources:

1. https://clinicaltrials.gov/ct2/show/NCT03624036
2. https://clinicaltrials.gov/ct2/show/NCT03960840 (autologous CD19 CAR-T manufactured with a new process)
3. Siddiqi T et al. ASH 2020. (https://ash.confex.com/ash/2020/webprogram/Paper140491.html)
4. Wierda WG et al. ASH, 2020. (https://ash.confex.com/ash/2020/webprogram/Paper140622.html)
5. Undetectable minimal residual disease assessed in blood by flow cytometry and/or in bone marrow by next-generation sequencing, both with a sensitivity of $\leq 10^{-4}$

MB-106: Next Steps

- FHCRC
  - As the leading site, Fred Hutch will prioritize the multicenter study, although a significant overlap between the 2 studies is not expected
- Mustang: Expect first patient to be enrolled towards end of 3Q2021
  - FDA accepted the IND for the multicenter phase 1/2 trial on April 29th – within 28 days of submission
  - FDA accepted Mustang proposal to reference FHCRC safety data – despite the fact that our product will be slightly different (same lentiviral vector, but minor cell processing changes, new facility) ⇒ **3-arm ph 1**
    - Indolent NHL: Starting at 3.3 x 10^6 CAR-T cells/kg
    - Aggressive NHL: Starting at 1.0 x 10^6 CAR-T cells/kg
    - CLL: Starting at 1.0 x 10^6 CAR-T cells/kg
  - FDA required cautious spacing of patients
    - 28 days between 1st & 2nd patients of each dose level (DL) – within each arm (also between 2nd & 3rd pts @ 1st DL)
    - 28 days between last patient in a dose level and 1st patient in next dose level – within each arm
  - Participating phase 1 centers – in addition to FHCRC *(qualification & study initiation visits are in progress)*
    - Jeremy Abramson (Mass General), Brian Hill (Cleveland Clinic), Susan O'Brien (UC Irvine), Patrick Reagan (Univ of Rochester) + 1 additional center to be confirmed

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Mustang Bio:
Building a *Fully Integrated* Gene & Cell Therapy Company

- **Mustang (NASDAQ:MBIO) is focused on developing next-generation therapies for patients with cancer and rare genetic diseases**
- Transformational *ex vivo* lentiviral gene therapy for XSCID licensed from St. Jude
  - Highly compelling results in 2 ongoing phase 1 clinical trials led by St. Jude & NIH
  - Near-term milestones for pivotal phase 2 trials: Accrual of first patient to newborn trial (MB-107) & IND filing for previously transplanted trial (MB-207)
- In addition to MB-106, 5 CAR-Ts licensed from City of Hope also in phase 1 trials
  - MB-102: Targets CD123 for acute myelogenous leukemia (AML) & related diseases
    - Encouraging phase 1 results in AML & blastic plasmacytoid dendritic cell neoplasm (BPDCN)
    - First Mustang IND trial now enrolling & processing cells in our facility for BPDCN
  - MB-101: Targets IL13Rα2 for glioblastoma multiforme (GBM)
    - Encouraging phase 1 results in GBM
    - 3 trials now ongoing or planned at COH to build on these results, including innovative combination with oncolytic virus
- 27,000 square foot cell processing & translational research facility on UMass Medical School campus with capacity to launch at commercial scale
- 73 Associates, with extensive gene & cell therapy industry experience

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Robust Pipeline of Therapies Addressing Highly Challenging Diseases

Therapeutic Modality	Target (Partner)	2020	2021	2022	2023
Ex-vivo Gene Therapy	IL2RG (St. Jude)	Ph 1 ★	Pivotal Phase 2 XSCID newborns (Mustang IND) ★		
		Ph 1 at NIH ★		Pivotal Phase 2 XSCID previously transplanted (Mustang IND) ★	
Hematologic CAR-Ts	CD123 (COH)	★ *(2019)*	Pivotal Phase 1/2 Blastic plasmacytoid dendritic cell neoplasm (Mustang IND) *[AML & hrMDS may be added at higher dose levels]*		
	CD20 (FHCRC)	Phase 1 NHL at FHCRC ★		Pivotal Ph 1/2 NHL & chronic lymphocytic leukemia (CLL) (Mustang IND)	
Solid Tumor CAR-Ts	IL13Rα2 (COH)	Phase 1 Glioblastoma multiforme: CAR-T + nivolumab ± pretreatment with nivolumab and ipilimumab at COH*			
	IL13Rα2 (COH)	★	Phase 1 GBM: CAR-T for leptomeningeal disease at COH		
	C134 OV (Nationwide)	Phase 1 GBM at UAB* ★		Phase 1/2 GBM: IL13Rα2 CAR-T + oncolytic virus (Mustang IND)	
	PSCA (COH)	Phase 1 Prostate cancer at COH* ★		Phase 1/2 Prostate & pancreatic cancer (Mustang IND)	

St. Jude = St. Jude Children's Research Hospital
NIH = National Institutes of Health
COH = City of Hope National Medical Center
FHCRC = Fred Hutchinson Cancer Research Center
Nationwide = Nationwide Children's Hospital
UAB = University of Alabama at Birmingham

XSCID = X-linked severe combined immunodeficiency
AML = Acute myelogenous leukemia
hrMDS = High-risk myelodysplastic syndrome
NHL = Non-Hodgkin lymphoma
GBM = Glioblastoma multiforme
OV = Oncolytic virus

★ Mustang files new IND
★ COH files new IND
★ Topline data available

** Partially or totally supported by grants*

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Financial Summary

- $130.4M cash, cash equivalents and restricted cash as of 3/31/21
  - Net loss of $15.0M for 1Q2021
- 87.3M shares outstanding as of 5/13/2021, per the 1Q2021 10-Q filing
- No debt

Mustang Target Goals in 2021: 4 Open Mustang INDs

Anticipate initiating pivotal XSCID trials & building on early indications of CAR-T activity

- ***Anticipated near-term XSCID program milestones:***
  - Accrual of first patient to pivotal trial in newborns (MB-107)
  - IND filing for pivotal trial in previously transplanted patients (MB-207)
- **CD20 CAR-T (MB-106):** Expect to enroll 1st patient in Mustang IND multicenter phase 1/2 trial 3Q2021
- **IL13Rα2 CAR-T (MB-101)**
  - Expect to file Mustang IND for multicenter phase 1/2 combo trial in GBM 4Q2021 (CAR-T + MB-108 oncolytic virus)
  - COH to continue accrual on leptomeningeal & checkpoint combination trials
- **Possible data disclosures from collaboration partners' trials in 2021**
  - Follow-up data from FHCRC MB-106 trial 4Q2021
  - Follow-up data from COH CD123 (MB-102) & PSCA (MB-105) CAR-T trials
  - First data from Nationwide OV (MB-108) trial in anticipation of starting combination trial with MB-101
- **Continue BD&L activities**
  - In-licensing opportunities to expand our pipeline
  - Partnering opportunities to access non-dilutive capital

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Questions?

June 15, 2021