Bispecific antibodies in DLBCL

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• Scientific advisory boards:

· AbbVie, Celgene, Genmab, Janssen, Merck, Roche, Takeda

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Bispecific CD3/CD20 antibodies in B-NHL



Binding sites and structure of CD3xCD20 antibodies



1. Franco R, et al. Front Pharmacol 2016; 7: 1–10; 2. Klein C, et al. Mabs 2013; 5: 22–33; 3. Bacac M, et al. Clin Cancer Res 2018; 24;4785–97.

In vitro T-cell activation of CD3xCD20 antibodies



Single-agent phase 1 studies of bispecific CD3/CD20 antibodies in B-NHL

Activity of mosunetuzumab and odronextamab in r/r aggressive B-NHL

Mosunetuzumab in aggressive NHL¹



Odronextamab in DLBCL²



R/R DLBCL w/no prior CAR T

- ORR: 55% (6/11); CR: 55% (6/11)
- Median duration of CR: NR
- 83% of CRs durable (≥3 months; ≤21 months)

R/R DLBCL w/ prior CAR T

- ORR: 33% (8/24); CR: 21% (5/24)
- Median duration of CR: NR
- 100% of CRs ongoing at last assessment (≤20 months)

1. Schuster SJ, et al. ASH 2019: Abstract 6 (oral presentation) 2. Bannerji R, et al. ASH 2020: Abstract 400 (oral presentation).

Activity of glofitamab and epcoritamab in r/r aggressive B-NHL



Recent data from the DLBCL phase 2 expansion cohorts of the glofitamab and epcoritamab studies

SUBCUTANEOUS EPCORITAMAB IN PATIENTS WITH RELAPSED OR REFRACTORY LARGE B-CELL LYMPHOMA (EPCORE NHL-1): PIVOTAL RESULTS FROM A PHASE 2 STUDY

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EPCORE NHL-1: LBCL Expansion Cohort



- ✓ RP2D identified
- ✓ Manageable safety profile
- Encouraging antitumor activity
- ≥2 prior lines of antineoplastic therapy, including ≥1 anti-CD20 mAb
- FDG PET-avid and measurable disease by CT/MRI
- Prior CAR T allowed

- To ensure patient safety and better characterize CRS, inpatient monitoring was required at first full dose for 24 h in this part of the study
- Primary endpoint: ORR by independent review committee (IRC)
- Key secondary endpoints: DOR, TTR, PFS, OS, CR rate, and safety/tolerability

^aStep-up dosing (priming 0.16 mg and intermediate 0.8 mg dosing before first full dose) and corticosteroid prophylaxis were used to mitigate CRS. ^bRadiographic disease evaluation was performed every 6 wk for the first 24 wk (6, 12, 18, and 24 wk), then every 12 wk (36 and 48 wk), and every 6 mo thereafter. ^cMeasurable disease with CT or MRI scan with involvement of ≥2 lesions/nodes with a long axis >1.5 cm and short axis >1.0 cm (or 1 lesion/node with a long axis >2.0 cm and short axis ≥1.0 cm) and FDG PET scan that demonstrates positive lesion(s) compatible with CT-defined (or MRI-defined) anatomical tumor sites for FDG-avid lymphomas. ClinicalTrials.gov: NCT03625037. EudraCT: 2017-001748-36.

Patients Were Challenging to Treat and Highly Refractory

Demographics	LBCL, N=157		
Median age (range), y	64 (20–83)		
<65 y, n (%)	80 (51)		
65 to <75 y, n (%)	48 (31)		
≥75 y, n (%)	29 (18)		
ECOG PS, n (%)			
0	74 (47)		
1	78 (50)		
2	5 (3)		
Disease Characteristics ^a	LBCL, N=157		
Disease type, n (%)			
DLBCL	139 (89)		
De novo	97/139 (70)		
Transformed	40/139 (29)		
Unknown	2/139 (1)		
HGBCL	9 (6)		
PMBCL	4 (3)		
FL Gr3B	5 (3)		

Prior Treatments	LBCL, N=157
Median time from initial diagnosis to first dose, y	1.6
Median time from end of last therapy to first dose, mo	2.4
Median prior lines of therapy (range)	3 (2–11)
≥3 Lines of therapy, n (%)	111 (71)
Primary refractory ^b disease, n (%)	96 (61)
Refractory ^b to last systemic therapy, n (%)	130 (83)
Refractory ^b to ≥2 consecutive lines of therapy, n (%)	119 (76)
Prior ASCT, n (%)	31 (20)
Prior CAR T therapy, n (%)	61 (39)
Progressed within 6 mo of CAR T therapy	46/61 (75)

^aDouble/triple-hit patients included, many with responses. ^bRefractory disease is defined as disease that either progressed during therapy or progressed within <6 months of completion of therapy.

Few Discontinuations Due to AEs; 32% of Patients Remain on Treatment

Follow-up	LBCL N=157		
Median follow-up (range), mo	10.7 (0.3–17.9)		
Median number of treatment cycles (range)	5 (1–20)		
Ongoing treatment, n (%)	51 (32)		
Discontinued treatment, n (%)	106 (68)		
PD	83 (53) 11 (7)		
AE			
Related ^a	3 (2)		
Allogeneic transplant	7 (4) 4 (3)		
Withdrawal by patient			
Other	1 (1)		

^aWorsening CLIPPERS, CRS/fatigue, and ICANS.

Adverse Events Were Primarily Low Grade

Treatment-Emergent Adverse Events^a (≥15%) by Grade



^aCOVID incidence 4.5%. ^bPatient experienced ICANS after intermediate dose with multiple confounders, including extensive opioid use for Gr3 pancreatitis, hyperammonemia, multifocal cerebral infarcts in setting of possible microangiopathy, and tocilizumab administration. ^cCombined term includes neutropenia and decreased neutrophil count.

SC Administration and Step-up Dosing May Mitigate CRS



Cycle 1

Thieblemont C, et al. EHA 2022 oral presentation

High Response Rates Observed

Best Overall Response by IRC, n (%) ^a	LBCL N=157
Overall response	99 (63) [95% CI: 55–71]
Complete response	61 (39) [95% CI: 31–47]
Partial response	38 (24)
Stable disease	5 (3)
Progressive disease	37 (24)

^aBased on Lugano criteria.

Epcoritamab Induced Deep Responses in R/R LBCL



Deep Responses Consistent Across Key Subgroups



Based on IRC assessment and Lugano criteria.

PFS by Best Response per IRC



Kaplan–Meier Estimate	
Median PFS for complete responders	Not reached
Complete responders remaining in complete response at 9 mo	89%
Median PFS, mo (95% CI)	4.4 (3.0–7.9)
PFS at 6 mo, % (95% CI)	43.9 (35.7–51.7)

A correlation between depth of response and PFS was observed

MRD Negativity Correlated With Improved PFS

• Exploratory ctDNA analysis shows that MRD-negative responses were durable and correlated with PFS



Based on MRD-negative evaluable set, which included patients with ≥ 1 postbaseline MRD sample/evaluation who had detectable disease (n=104) or were not evaluated (n=3) at baseline. MRD negativity was defined as the absence of detectable clone sequences in plasma at any on-treatment time point (clonoSEQ).

Glofitamab in patients with relapsed/refractory (R/R) diffuse large B-cell lymphoma (DLBCL) and ≥2 prior therapies: pivotal Phase II expansion results

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Study overview

Pivotal Phase II expansion in patients with R/R DLBCL and ≥2 prior therapies (NP30179)

Key inclusion criteria	Glofitamab IV administration	
 DLBCL NOS, HGBCL, transformed FL or PMBCL ECOG PS 0–1 ≥2 prior therapies, including: anti-CD20 antibody anthracycline 	 Fixed-duration treatment max. 12 cycles CRS mitigation: obinutuzumab pretreatment (1 x 1000mg) C1 step-up dosing monitoring after first dose (2.5mg) 	D1: 30mg D1: 30mg D1: 30mg D3: 2.5mg D1: Gpt C1 C1 C2 C1 C2 C1 C1 C1 C1 C1 C2 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1 C1

Endpoints

- Primary: CR (best response) rate by IRC*
- Key secondary: ORR rate,[†] DoR, DoCR,[†] PFS, and OS

*by PET-CT (Lugano criteria¹); [†]by IRC and investigator. BCL, B-cell lymphoma; FL, follicular lymphoma; Gpt, obinutuzumab pretreatment; HGBCL, high-grade BCL; IRC, Independent Review Committee; NOS, not otherwise specified; PMBCL, primary mediastinal large BCL.

Baseline characteristics

n (%)*		N=154 ⁺	n (%)*	N=154
Median age, years (range	e)	66.0 (21–90)	Median no. of prior lines, n (range)	3 (2–7)
Male		100 (64.9)	0 (64.9) 2 prior lines	
ECOC DSt	0	69 (44.8)	≥3 prior lines	92 (59.7)
	1	84 (54.5)	Prior anti-CD20 Ab	154 (100.0)
	I	10 (6.5)	Prior anthracycline	149 (96.8)
Ann Arbor stage	II	25 (16.2)		
AIII AIDOI Stage	111	31 (20.1)	Prior CAR-I	51 (33.1)
	IV	85 (55.2)	85 (55.2) Prior ASCT	
DLBCI		110 (71.4)	Refractory to any prior therapy	139 (90.3)
NHL subtype	trFL	27 (17.5)	Refractory to last prior therapy	
	HGBCL	11 (7.1)	Primary refractory	90 (58 4)
	PMBCL	6 (3.9)		30 (30.4)
	>6cm	64 (41.6)	Refractory to prior CAR-T	46 (29.9)
Bulky disease	>10cm	18 (11.7)	Refractory to any prior anti-CD20	128 (83.1)

Heavily pre-treated, highly refractory population Clinical cut-off date: March 14, 2022; *unless otherwise specified; *safety-evaluable population (all treated patients);

[‡]ECOG PS 2, n=1 (0.6%); Ab, antibody; ASCT, autologous stem cell transplant; trFL, transformed follicular lymphoma.

Response rates – primary endpoint met

Efficacy endpoint ¹	Glofitamab 2.5/10/30mg (n=155)
CR rate*	61 (39.4%) [95% CI: 31.6%, 47.5%]
ORR*	80 (51.6%) [95% CI: 43.5%, 59.7%]

- Median duration of follow-up: 12.6 months (range: 0–22)
- Responses were achieved early: median time to first CR was 42 days (95% CI: 42, 44)
- At time of primary analysis, primary endpoint met in the primary efficacy population (n=108)[†]: 35.2%
 CR rate by IRC significantly greater (p<0.0001) than 20% historical control CR rate[‡]

High CR/ORR rate at RP2D

*best response by intent-to-treat population; [†]the pivotal expansion cohort population; [‡]the historical control CR rate was pre-specified based on a meta-analysis in patients with R/R DLBCL (where most [\geq 50%] had received \geq 2 prior therapies) and compared with the CR rate in the primary efficacy-evaluable population using an exact binomial test (2-sided alpha level: 5%).

Complete response rates by IRC in pre-specified subgroups

Subgroups	No. of patients	CR (95% CI) by IRC					
Overall	155 (100%)	39% (32%, 48%)		⊢•	┝ ───┤		
Age group							
<65	71 (46%)	41% (29%, 53%)		 	¦●────┤		
≥65	84 (54%)	38% (28%, 49%)		⊢●	!		
NHL subtype at study entry							
DLBCL	110 (71%)	40% (31%, 50%)		 	•		
HGBCL	11 (7%)	0%	•		I		
PMBCL	6 (4%)	50% (12%, 88%)			•		
trFL	28 (18%)	50% (31%, 69%)		 	•	———————————————————————————————————————	
Bulky disease >6cm							
Yes	64 (41%)	33% (22%, 46%)		⊢●			
No	90 (58%)	44% (34%, 55%)		⊢			
Unknown/Missing	1 (1%)	0%	•		 		
Number of prior line of therapies					 		
2	62 (40%)	32% (21%, 45%)		⊢●	<u>↓</u>		
≥3	93 (60%)	44% (34%, 55%)		⊢	↓ ●		
Prior CAR-T therapy					I I		
Yes	52 (34%)	35% (22%, 49%)		⊢●	<u>↓ </u> ↓		
No	103 (66%)	42% (32%, 52%)			¦● ───┤		
Post ASCT					1		
No	127 (82%)	33% (25%, 42%)			₽ 1		
Refractory	7 (5%)	71% (29%, 96%)			। ।	•	——
Relapsed	21 (14%)	67% (43%, 85%)			! ⊢	●	
R/R to last prior therapy					1		
Refractory	132 (85%)	34% (26%, 43%)		⊢●	+ I		
Relapsed	23 (15%)	70% (47%, 87%)			·	• · · · · · · · · · · · · · · · · · · ·	
			0	25	50	75	100

Durable responses maintained after cessation of therapy



CCOD, clinical cut-off date; mo, months; NE, not estimable.

DoCR in earlier cohorts show durable responses beyond 24 months

Supporting cohort

- Patients in earlier cohorts have extended follow up for duration of response
 - R/R DLBCL, HGBCL, trFL and PMBCL
 ≥2 prior lines (n=101)
 - Doses ≥10mg* (RP2D not included) for a fixed treatment duration of 8–12 cycles (6–9 months)
 - CR rate: 35/101 (35%)[†]



Durable responses beyond 24 months achieved after fixed-duration treatment; median: 34.2 months

*10mg, 16mg, 25mg, 10/16mg, 2.5/10/16mg; [†]intent-to-treat population; RP2D, recommended Phase II dose; [‡]DOCR: 17.9 months PD, 22.1 months PD re-treatment (remission), 24.7 months death (unknown reason), 34.2 months death (AML).

Time-to-event endpoints



Clinically significant freedom from progression at 12 months and long-term overall survival

[†]including five deaths due to COVID-19; [‡]KM estimates.

Cytokine release syndrome

n (%)	N=154	CRS by cycle and grade [†]		
CRS (any grade)*	97 (63.0)			
Grade 1 (fever)	73 (47.4)	■ Grade 1 ■ Grade 2 ■ Grade 3 ■ Grade 4		
Grade 2	18 (11.7)			
Grade 3	4 (2.6)	 № <		
Grade 4	2 (1.3)			
Median time to CRS onset from C1D8 dose, hours (range)	13.6 (6.2–51.8)	40 · 20 / 19/		
Corticosteroids for CRS management	27/97 (27.8)	20 • 26.8%		
Tocilizumab for CRS management	31/97 (32.0)	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		
		2.5mg 10mg 30mg 30mg 30mg		

CRS was mostly low grade, time of onset was predictable, and most events occurred during C1

Immune correlates of response to glofitamab: Biomarker findings from the Ph 2 expansion study in patients with R/R DLBCL



Emily Piccione, Martin Hutchings et al., Presented at EHA 2022; No. P1210

Immune correlates of response to glofitamab: Biomarker findings from the Ph 2 expansion study in patients with R/R DLBCL



Association of baseline tissue biomarkers with response to glofitamab

Association between ctDNA reduction and response to glofitamab







Key findings (N=107)

- Higher CD8+ T cells in CMR patients
- Responders have higher TME score
- Novel biomarkers identified in PB responders:
 - Higher baseline B cell
 - CD4 cell
 - CD4 EM cell
- Novel biomarkers identified in progressors:
 - PD1 expression on CD8 cells
- ctDNA in R/R DLBCL has prognostic value (consistent with Pola, CAR-T)

Combination studies

Epcoritamab + GemOx in transplant-ineligible R/R DLBCL patients: High response rate even in pts failing CAR-T therapy

Follow-Up and Patient Disposition

	Total N=26
Median follow-up, mo (range) ^a	9.2 (1–15)
Ongoing treatment, n (%)	11 (42)
Discontinued treatment, n (%)	15 (58)
PD	6 (23)
AE ^b	5 (19)
Death ^c	3 (12)
Withdrawal by patient	1 (4)

	CRS Graded by Lee et	CRS Eve	
	Criteria	¹⁰⁰]	
		Total	90 -
		N=26	80 -
	CRS, n (%)	18 (69)	70 -
	Grade 1	7 (27)	<u></u> 60 -
	Grade 2	10 (38)	st 50 -
	Grade 3	1 (4)	atier
	CRS resolution, n (%)	18 (100)	20
	Median time to resolution, d (range) ^a	2 (1–9)	20 -
	CRS leading to treatment discontinuation, n (%)	0	
	Tocilizumab use, n (%)	5 (19)	Res

Key Results (N=26)

(Gr3); one pts

No TLS events

CRS mostly low

occurrence was predictable

resolved;

(Gr3)

•



Best Overall Responses

Response, n (%)ª	Total n=25
Overall response	23 (92)
CMR	15 (60)
PMR	8 (32)
Stable disease	0
Progressive disease	0
No response assessment ^b	2 (8)

Treatment-Emergent Adverse Events (≥30%) by Grade





Joshua Brody, et al., Presented at ASCO/EHA 2022; No. 7527/181/P181

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How to get deeper and more durable responses?



NP39488: Glofitamab and Polatuzumab vedotin in DLBCL



- 49/59 patients were evaluable for interim response
- 7/49 (14.3%) patients had PD as best response and discontinued study treatment
- Encouraging ORR and CR rates in patients with:
 - trFL: ORR, 8/11 and CR, 7/11
 - HGBCL: ORR, 5/8 and CR, 4/8

• Glofit + Pola combination resulted in high response rates

BP41072: Glofitamab + CD19-targeted 4-1BBL agonist

CD19 4-1BBL plus glofitamab is superior to glofitamab single-agent in vivo

Improved tumor growth inhibition



WSU DLCL2 s.c. in humanized mice



Prevention of tumor outgrowth during glofitamab monotherapy





Hutchings M, et al. ASH 2020. Abstract 3269.

BP43131: Glofitamab + CD19-targeted CD28 agonist

Providing safe agonistic CD28 targeting w/o autonomous T cell activation

Reduce peripheral binding to CD28 w/o losing potency



Conclusions

- The CD3/CD20 bispecific antibodies show an antitumor activity which is unprecedented in heavily pretreated r/r B-NHL
- EHA 2022 data from DLBCL phase 2 expansion cohorts (35-40% with prior CAR-T):
 - Glofitamab: ORR 52%, CRR 39%
 - Epcoritamab: ORR 63%, CRR 39%
- The toxicity profile is favourable:
 - Very little CRS > grade 2
 - Very little treatment-related CNS toxicity
- CRS is highly predictable and almost always confined to the cycle 1
- The toxicity profile and mechanism of action make the bispecifics ideal for combination strategies

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