Zanidatamab in Combination With Evorpacept in HER2-Positive and HER2-Low Metastatic Breast Cancer: Results From a Phase 1b/2 Study

Alberto J. Montero,[1,]* Kari B. Wisinski,[2] Bruno Fang,[3] Kelly E. McCann,[4] Sara Hurvitz,[5] Kay T. Yeung,[6] Ritesh Parajuli,[7] Jorge Chaves,[8] Adam Brufsky,[9] Peter A. Kaufman,[10] Manish R. Patel,[11] Timothy Pluard,[12] Bob Salim,[13] Kavita V. Shah,[13] Shanhong Guan,[14] Athanasios C. Tsiatis,[14] Sophia Randolph,[14] Funda Meric-Bernstam[15]

[1]UH Cleveland Medical Center/Seidman Cancer Center Case Western Reserve University, Cleveland, OH, USA; [2]University of Wisconsin Carbone Cancer Center, Madison, Wisconsin, USA; [3]Astera Cancer Care, East Brunswick, NJ, USA; [4]David Geffen School of Medicine, University of California at Los Angeles, CA, USA; [5]Fred Hutchinson Cancer Center, University of Washington School of Medicine, Seattle, WA, USA; [6]University of California San Diego Health Moores Cancer Center, La Jolla, CA, USA; [7]University of California, Irvine, Orange, CA, USA; [8]Northwest Medical Specialties, Tacoma, WA, USA; [9]University of Pittsburgh School of Medicine, Pittsburgh, PA, USA; [10]Larner College of Medicine at the University of Vermont, Burlington, VT, USA; [11]Florida Cancer Specialists/Sarah Cannon Research Institute, Sarasota, FL, USA; [12]Saint Luke's Cancer Institute, Kansas City, MO, USA; [13]Jazz Pharmaceuticals, Palo Alto, CA, USA; [14]ALX Oncology Inc., South San Francisco, CA, USA; [15]The University of Texas MD Anderson Cancer Center, Houston, TX, USA   *Presenting author.

Background

- Amplification or overexpression of human epidermal growth factor receptor 2 (HER2) occurs in about 15% of breast cancers; in addition, approximately 55-60% are HER2-low[1,2]
- There is an ongoing need for new HER2-targeted regimens, including chemotherapy-free options and treatments post-progression on currently available therapies, such as trastuzumab, pertuzumab, and trastuzumab deruxtecan (T-DXd)[3,4]
- Zanidatamab is a dual HER2-targeted bispecific antibody that targets 2 distinct sites on HER2, promoting receptor clustering and driving multiple mechanisms of action, including facilitation of HER2 internalization and subsequent degradation, reduction of HER2 homo- and hetero-dimerization, and immune-mediated effects (complement-dependent cytotoxicity as well as antibody-dependent cellular cytotoxicity and phagocytosis)[5]
- Zanidatamab has demonstrated promising antitumor activity in patients with HER2-positive cancers, including metastatic breast cancer (mBC)[6-8]
- Evorpacept is a high-affinity CD47 blocker with an inactive human immunoglobulin Fc region designed to enhance antibody-mediated cellular phagocytosis of tumor cells with minimal toxicity[9]
- Evorpacept has demonstrated promising antitumor activity in combination with trastuzumab in patients with HER2-positive gastric or gastroesophageal junction cancer[10]
- The antitumor activity of zanidatamab may be enhanced with the addition of evorpacept by combining direct targeting of HER2-expressing cells with the phagocytic cell activation facilitated by evorpacept
- Here, we report results from a phase 1b/2 trial (NCT05027139; a 2-part, open-label, multicenter study) of zanidatamab + evorpacept in patients with previously treated inoperable, locally advanced, and/or metastatic HER2-expressing breast cancer and other cancers

Methods

Figure 1. Study Design

- **Part 1 objective:** Evaluated safety, tolerability, and recommended doses for the combination of zanidatamab and evorpacept
- **Part 2 objective:** Assessed the antitumor activity of zanidatamab and evorpacept in patients with HER2-positive mBC (cohort 1), HER2-low mBC (cohort 2), or other HER2-overexpressing cancers (cohort 3)
- Local assessment of HER2 in archived tumor samples was used for enrollment; when unavailable, patients could be enrolled based on central assessment. Data were analyzed for all patients enrolled and based on central assessment
- Fresh tumor biopsy samples, collected before the start of treatment, were required for central laboratory HER2 evaluation if feasible
- After the first 25 patients were enrolled, the protocol was amended to reverse the dosing order to zanidatamab followed by evorpacept in order to minimize the potential for infusion-related reactions (IRR)

Results

- As of March 27, 2024, enrollment was complete with a total of 52 patients; 44 at the recommended phase 2 dose (RP2D) (Part 1B dose; cohort 1, n=21; cohort 2, n=15; cohort 3, n=8)
  - Eight patients were treated on the lower dose of evorpacept (Part 1A dose)
- Median follow-up (range) was 9.6 (0.6, 29.7) months, with 6 patients on treatment at data cutoff as of August 1, 2024

Table 1. Patient Demographics and Baseline Disease Characteristics[a]

Characteristic	Cohort 1 HER2-Positive (n=21)	Cohort 2 HER2-Low (n=15)	Cohort 3 Other HER2-Overexpressing Cancers (n=8)[b]
Age, median, years (range)	58.0 (34.0-81.0)	63.0 (42.0-74.0)	48.5 (36.0-74.0)
Female, n (%)	21 (100)	15 (100)	4 (50.0)
Race, n (%)			
White	14 (66.7)	9 (60.0)	6 (75.0)
Asian	0 (0)	2 (13.3)	0 (0)
Black or African American	4 (19.0)	3 (20.0)	0 (0)
Multiple/Other	1 (4.8)	0 (0)	2 (25.0)
Unknown/Not reported	2 (9.5)	1 (6.7)	0 (0)
Baseline ECOG PS, n (%)			
0	9 (42.9)	8 (53.3)	4 (50.0)
1	12 (57.1)	7 (46.7)	4 (50.0)
HER2 status per central assessment, n (%)			
IHC 0	2 (9.5)	0 (0)	1 (12.5)
IHC 1+ or IHC 2+/FISH−	10 (47.6)	14 (93.3)	3 (37.5)
IHC 2+/FISH+ or IHC 3+	9 (42.9)	0 (0)	4 (50.0)
Unknown	0 (0)	1 (6.7)	0 (0)
Median number of prior systemic cancer therapy regimens in the metastatic setting (range)	6 (2.0-10.0)	5 (2.0-9.0)	3.5 (2.0-11.0)
Prior HER2-targeted therapies, n (%)			
T-DXd	21 (100)	5 (33.3)	5 (62.5)
Trastuzumab	21 (100)	0 (0)	8 (100)
Pertuzumab	20 (95.2)	0 (0)	3 (37.5)
T-DM1	14 (66.7)	0 (0)	1 (12.5)
Tucatinib	12 (57.1)	0 (0)	0 (0)
Neratinib	5 (23.8)	0 (0)	0 (0)
Margetuximab	4 (19.0)	0 (0)	0 (0)
Lapatinib	3 (14.3)	0 (0)	0 (0)
Prior brain metastases, n (%)	9 (42.9)	4 (26.7)	1 (12.5)
De novo metastatic disease, n (%)	7 (33.3)	4 (26.7)	3 (37.5)

[a]RP2D. [b]Includes patients with gastroesophageal adenocarcinoma (n=4), colorectal cancer (n=3), and salivary gland cancer (n=1).
ECOG PS, Eastern Cooperative Oncology Group performance status; FISH, fluorescence in situ hybridization; HER2, human epidermal growth factor receptor 2; IHC, immunohistochemistry; RP2D, recommended phase 2 dose; T-DM1, trastuzumab emtansine; T-DXd, trastuzumab deruxtecan.

- The median number of prior systemic therapies in the metastatic setting was 6 in cohort 1 and 5 in cohort 2
- Patients in cohort 1 had received multiple prior HER2-targeted therapies; notably, all patients had received prior T-DXd
- In Part 1, there were 2 dose-limiting toxicities (both grade 3 IRRs that resolved following treatment discontinuation)
- Of the 20/21 patients with local HER2 assessment in cohort 1, 8 (40%) were confirmed HER2-positive by central assessment (1 centrally HER2-positive patient did not have local assessment). For cohort 2, 14/15 (93%) patients were confirmed HER2-low by central assessment
- The RP2D was zanidatamab 1200 mg (patients <70 kg) or 1600 mg (patients ≥70 kg) intravenously (IV) and evorpacept 30 mg/kg IV Q2W

Table 2. Summary of Safety Outcomes (All Patients)

	All Patients (N=52)
Any TRAE,[a] n (%)	45 (86.5)
Grade 1-2	38 (73.1)
Grade 3	7 (13.5)
Grade 4-5	0 (0)
Serious TRAEs, n (%)	3 (5.8)[b]
TRAEs leading to treatment discontinuation, n (%)	2 (3.8)[c]
TRAEs leading to dose reductions, n (%)	0 (0)
Treatment-related AESI, n (%)	
Left ventricular dysfunction[d]	1 (1.9)
IRR	12 (23.1)
Non-infectious pulmonary toxicities	0 (0)

Most common TRAEs,[a] n (%)	Grade 1	Grade 2	Grade 3
Diarrhea	20 (38.5)	9 (17.3)	3 (5.8)
Fatigue	9 (17.3)	7 (13.5)	1 (1.9)
Nausea	11 (21.2)	3 (5.8)	0 (0)
IRR	3 (5.8)	7 (13.5)	2 (3.8)

[a]TRAEs defined as events with an onset during or after receipt of the first dose of study treatment within 30 days after the last dose and were determined as related to zanidatamab and/or evorpacept by the investigators. [b]Two additional events (diarrhea and LVEF decrease) occurred outside the 30-day window for TRAEs. [c]Both events were grade 3 IRRs that resolved following treatment discontinuation. [d]Defined as LVEF <50% with absolute decrease of ≥10 percentage points below pretreatment baseline and/or grade ≥2 heart failure. [e]Grades 1-3 occurring in >20% of patients or ≥2 patients.
AESI, adverse event of special interest; IRR, infusion-related reaction; LVEF, left ventricular ejection fraction; TRAE, treatment-related adverse event.

- Most treatment-related adverse events (TRAE; related to zanidatamab and/or evorpacept) were grade 1 or 2
- The most common grade 3 TRAEs were diarrhea (5.8%) and IRRs (3.8%); there were no grade 4 TRAEs
- Serious TRAEs included dyspnea, gamma-glutamyltransferase increased, and IRR (occurring in 1 patient each)
- TRAEs of special interest included 1 (1.9%) patient with grade 3 ejection fraction decreased and 12 (23.1%) patients with IRRs
  - All IRRs resolved; 1 patient had an IRR event after the dosing order was reversed to zanidatamab followed by evorpacept
- No non-infectious pulmonary toxicities occurred
- There were no treatment-related deaths

Table 3. Disease Response Endpoints

	Cohort 1			Cohort 2 (n=15)	Cohort 3 (n=8)[a]
	HER2-Positive by Central Assessment (n=9)	Not HER2-Positive by Central Assessment (n=12)	All (n=21)		
cORR, n (%) [95% CI]	5 (55.6) [21.2, 86.3]	2 (16.7) [2.1, 48.4]	7 (33.3) [14.6, 57.0]	3 (20.0) [4.3, 48.1]	1 (14.3) [0.4, 57.9]
CR, n (%)[b]	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
PR, n (%)	5 (55.6)	2 (16.7)	7 (33.3)	3 (20.0)	1 (14.3)[c]
SD, n (%)	2 (22.2)	6 (50.0)	8 (38.1)	3 (20.0)	2 (28.6)
PD, n (%)	1 (11.1)	4 (33.3)	5 (23.8)	7 (46.7)	4 (57.1)
NE, n (%)	1 (11.1)	0 (0)	1 (4.8)	2 (13.3)	0 (0)
DCR, n (%) [95% CI]	7 (77.8) [40.0, 97.2]	8 (66.7) [34.9, 90.1]	15 (71.4) [47.8, 88.7]	6 (40.0) [16.3, 67.7]	3 (42.9) [9.9, 81.6]
Median DOR, months (range)[d]	NE (5.6-25.9)	NE (3.6-15.0)	NE (3.6-25.9)	5.5 (3.6-11.0)	NE (14.8-14.8)
Median PFS, months (95% CI)	7.4 (0.6, NE)	3.5 (1.6, 14.6)	3.6 (1.8, 11.0)	1.9 (1.6, 3.9)	1.9 (1.1, 3.8)

[a]7 patients were response evaluable. [b]There was 1 HER2-positive mBC patient treated at the lower dose of evorpacept in Part 1 that achieved a CR (median DOR: 20.2 months). [c]Salivary gland cancer. [d]DOR was assessed in patients with a confirmed complete or partial response.
cORR, confirmed objective response rate; CI, confidence interval; CR, complete response; DCR, disease control rate; DOR, duration of response; HER2, human epidermal growth factor receptor 2; mBC, metastatic breast cancer; NE, not evaluable; PD, progressive disease; PFS, progression-free survival; PR, partial response; SD, stable disease.

- Patients in cohort 1 who were HER2-positive by central assessment (n=9) showed greater antitumor activity (cORR: 55.6%; mPFS: 7.4 months) than cohort 1 overall (cORR: 33.3%; mPFS: 3.6 months)
- Responses were also observed in cohort 2 (cORR: 20.0%; mPFS: 1.9 months)
- The median duration of response was not reached for cohort 1 patients (range: 3.6-25.9 months) and was 5.5 months for cohort 2 patients (range: 3.6-11.0 months), with responses ongoing, including the longest observed response, in each cohort

Figure 2. Target Lesion Reduction (A) and Treatment Duration and Response By Time Point (B)[a,b]

Dotted lines indicate 20% increase and 30% decrease in sum of diameters of target lesions. Treated patients without a post-baseline assessment are not shown in either panel (1/21 patient in cohort 1 and 2/15 patients in cohort 2).
[a]Boxed, bolded text indicate patients who are HER2-positive by central assessment. [b]Four patients in cohort 1, 1 patient in cohort 2, and 1 patient in cohort 3 (not shown) remained on treatment as of data cutoff.
BOR, best overall response; cPR, confirmed partial response; FISH, fluorescence in situ hybridization; HER2, human epidermal growth factor receptor 2; IHC, immunohistochemistry; PD, progressive disease; PR, partial response; SD, stable disease; T-DXd, trastuzumab deruxtecan.

- The majority of patients in cohort 1 had a reduction in target lesion size from baseline (15/21 patients; 71%)
- Eight patients in cohort 1 were on treatment for ≥6 months and 4 for ≥12 months. Two patients in cohort 2 were on treatment for ≥6 months

Conclusions

- This is the first study reporting data showing the safety and efficacy of zanidatamab, a dual HER2-targeted bispecific antibody, in combination with evorpacept, a CD47 blocker, in previously treated patients with HER2-expressing cancers
- Zanidatamab + evorpacept showed promising antitumor activity in patients with heavily pretreated HER2-positive mBC including after progression on prior T-DXd (cORR: 55.6%; mPFS: 7.4 months in patients with centrally confirmed HER2-positive mBC)
- Antitumor activity was also observed in patients with heavily pretreated HER2-low mBC (cORR: 20.0%)
- Among all patients, the combination therapy was well tolerated with a manageable safety profile that is consistent with prior experience with each agent[10,12]
- Based on the results presented here, further development of this novel chemotherapy-free regimen is warranted