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Brief Report

Bispecific antibody treatment of multiple myeloma: latest updates from the 2022 ASH annual meeting

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Abstract

Background: Effective novel therapies for multiple myeloma (MM) patients who are unresponsive to conventional treatments (triple-class refractory) are an urgent need. Bispecific antibodies (BsAbs) offer a promising new approach to stimulate T cells and induce tumor cell death by targeting molecules on the surface of malignant plasma cells and CD3 on the surface of T cells.

Objectives: Addressing the issue of improving the prognosis of triple-class refractory MM patients has become a significant clinical challenge.

Design: This is a brief report.

Methods: This article summarizes the latest updates of BsAbs treatment of MM from the 2022 ASH annual meeting.

Results: BsAbs that target B-cell maturation antigen and G protein-coupled receptor family C group 5 memberD have demonstrated remarkable clinical activity and favorable safety profiles. Many potential targets for myeloma cells are currently undergoing phase I/II clinical trials, and these off-the-shelf bispecific molecules are likely to become a critical part of the MM treatment landscape.

Conclusion: This article provides an overview of the latest advances in BsAbs immunotherapy for refractory and relapsed MM and highlights significant findings from the 2022 ASH annual meeting.

Keywords: bispecific antibody, immunotherapy, multiple myeloma

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To the editor

Due to the introduction of proteasome inhibitors, immunomodulatory drugs and anti-CD38 monoclonal antibodies, the survival rate of multiple myeloma (MM) patients has been significantly improved. However, patients who are refractory to these drugs (triple-class refractory), have very poor clinical outcomes, with an overall response rate (ORR) of only 25% and a median overall survival of 11.1 months (95% CI: 8.8–14.2). Therefore, there is a critical need for effective novel therapies. Bispecific antibodies (BsAb) represent a promising new approach to activate T cells and induce tumor cell death by targeting molecules on the surface of malignant plasma cells and CD3 on the surface of T cells. Many potential myeloma cell targets are undergoing phase I/II clinical trials, and this new immunotherapy has the potential to revolutionize the treatment of refractory and relapsed MM (RRMM) in the near future. This article provides an overview of the latest progress in BsAb immunotherapy for RRMM and highlights key findings from the 2022 ASH annual meeting.

Bcma × Cd3

Teclistamab, a BsAb targeting B-cell maturation antigen (BCMA)/CD3, is currently the most advanced in clinical development, having been

approved by the FDA and European Medicines Agency (EMA) in 2022 for the treatment of heavily pretreated MM patients. In a phase I–II study,[1] 17 patients (88% triple-class refractory) received teclistamab at dose of 1500 μg/kg every weekly (QW) ($n=15$) or every 2 weeks (Q2W) ($n=2$) (*Abstract 158801*). At data cutoff, 15 patients were evaluable, and the ORR was 60%, with 53% achieving very good partial response (VGPR) or better. The median time to first response was 1 month (range 0.4–1.8). Nine patients (53%) experienced cytokine release syndrome (CRS) (all grade 1/2), all of which were easily manageable. In the phase Ib MajesTEC-2 study,[2] two different recommended doses of teclistamab in combination with lenalidomide and daratumumab in MM patients receiving 1–3 prior lines of therapy were well tolerated, with a safety profile consistent with teclistamab or dara-len individually *(Abstract 159711)*. The ORR was 13/13 evaluable patients at 0.72 mg/kg and 13/16 evaluable patients at 1.5 mg/kg. VGPR or better was achieved in 12 patients at the 0.72 mg/kg dose and it was not mature for the 1.5 mg/kg group. Median time to first response was 1.0 month (range 0.7–2.0). The treatment was generally well tolerated, with CRS (81.3%, all low grade) as the most frequent adverse event (AE). Other common AEs included fatigue (43.8%), neutropenia (75%), diarrhea (37.5%), insomnia (31.3%), cough (28.1%), hypophosphatemia (25%) and infections (75%). Currently, a phase III trial[3] is ongoing to study teclistamab in combination with lenalidomide *versus* lenalidomide alone in patients with newly diagnosed MM as maintenance therapy following autologous stem cell transplantation (ASCT) (*Abstract 159756*).

Elranatamab, another anti-BCMA × CD3 BsAb, showed high efficacy in 55RRMM (91% triple-class refractory) treated with doses from 80 to 1000 μg/kg either weekly or every 2 weeks in the MagnetisMM-1 study (*Abstract 166494*).[4] The ORR was 64%, with 56% reaching ⩾VGPR, 38% reaching ⩾CR, and 100% evaluable patients achieving minimal residual disease (MRD) negativity. Notably, among patients with prior BCMA-directed therapy, the ORR was 54%, with 46% reaching ⩾VGPR. 67% of patients experienced CRS (all grade 1/2). A phase II MagnetisMM-3 study (*Abstract 162440*),[5] enrolling 123 RRMM (96.7% triple-class refractory) with subcutaneous 76 mg QW elranatamab, showed an ORR of 61%, median time to response was 1.2 months (range 0.9−6.9), and the maintain response after 6 months was 90.4% (range 79.8–95.6). A total of 56.3% and 3.4% of patients experienced CRS (all grade 1/2) and immune effector cell-associated neurotoxicity syndrome (ICANS) (all grade 1/2), respectively. The MagnetisMM-5 phase III trial was designed to evaluate efficacy and safety of elranatamab in combination with daratumumab (*Abstract 162738*).[6] A total of 28 RRMM (18% triple-class refractory; 71% prior ASCT) were enrolled. A promising early responses to elranatamab + daratumumab, including VGPR and sCR were observed. Median time to response was 1 (1–3) month. The most common AEs were CRS (50%; grade 1–2), fever (21%; all grade 1), and neutropenia (29%; grade 3 14%, grade 4 14%). No ICANS occurred. Furthermore, in order to reduce the risk of CRS observed during dose escalation, a study pooled and analyzed CRS of several initiation dosing regimens in four clinical studies (*Abstract 169971*).[7] It showed that the optimal initiation regimen for elranatamab was two intensive initiation regimens, 12 mg on day 1, 32 mg on day 4, and 76 mg on day 8. This schedule enables prediction and management of CRS.

REGN5458 is a promising anti-BCMA × CD3 bispecific antibody that has shown great efficacy and an acceptable safety profile in heavily pretreated RRMM patients. A phase I/II First-in-Human Study (*Abstract 159969*),[8] enrolling 167 RRMM (90% triple-class refractory), two doses of REGN5458 were administered, and an ORR of 75% and 40.8%, respectively, was observed in stage one patients with ⩾200 mg dose levels and those with <200 mg dose levels. Additionally, 37.5% patients achieving ⩾CR. The median duration of response (DOR) has not been reached. The treatment-emergent AEs were CRS (47.9%; 36.5% grade 1, 10.8% grade 2, 0.6% grade 3), fatigue (34.1%), anemia (36.5%), neutropenia (28.7%), thrombocytopenia (21%). A phase II study is currently underway to evaluate the preliminary efficacy and safety of REGN5458 monotherapy in newly diagnosed MM (NDMM) with or without high-dose therapy and ASCT eligibility (*Abstract 158396*).[9] Furthermore, a phase Ib multi-cohort study of the tolerability, safety and efficacy of REGN5458 in combination with other cancer treatments in RRMM patients is ongoing (*Abstract 157713*).[10] This study includes four cohorts, REGN5458 is combined with

daratumumab plus dexamethasone (cohort 1); carfilzomib plus dexamethasone (cohort 2); lenalidomide plus dexamethasone (cohort 3); and bortezomib plus dexamethasone (cohort 4).

ABBV-383 (TNB-383B) is a bispecific antibody that targets BCMA and CD3, featuring two BCMA-binding domains and one CD3-binding domain with low affinity. This antibody holds the potential to reduce the incidence of CRS and eliminate the need for step-up increased doses. In a phase 1 first-in-human trial, two different doses of ABBV-38 were administered to the triple-class refractory MM. The ORR was 75% and 54%, with 50% and 29% reaching ⩾CR, 75% and 40% reaching ⩾VGPR, respectively, in 40 mg aggregate dose-escalation (ESC) dose levels and 60 mg ESC and expansion (ESC + EXP) dose levels (*Abstract 167008*).[11] The median follow-up was 17.4 and 8.4 months, respectively, in 40 mg ESC and 60 mg ESC + EXP subgroups. The median DOR and progression-free survival (PFS) were not reached in any cohort. In 40 mg ESC and 60 mg ESC + EXP subgroups, the incidence of CRS was 83% (0% grade ⩾3) and 72% (2% grade ⩾3), anemia was 33% (17% grade ⩾3) and 32% (12% grade ⩾3), neutropenia was 67% (67% grade ⩾3) and 40% (35% grade ⩾3), and thrombocytopenia was 33% (0% grade ⩾3) and 25% (12% grade ⩾3), respectively. A phase Ib multicenter study is currently enrolling 270 patients with RRMM to evaluate the preliminary efficacy, tolerability and safety of the recommended phase II dose of ABBV-383 in combination with nirogacestat (Niro), lenalidomide-dexamethasone (Rd), pomalidomide-dexamethasone (Pd), or daratumumab-dexamethasone (Dd) (*Abstract 157977*).[12]

Gprc5d × Cd3

RG6234 is a novel bispecific antibody with a 2:1 structured G protein-coupled receptor family C group 5 member D (GPRC5D) × CD3 T-cell binding design that has demonstrated high activity in RRMM. When administered intravenously (IV), RG6234 has a safety profile consistent with its mechanisms of action (MOA) and target distribution. A phase I study enrolled 105 RRMM (the IV cohorts: $n = 51$, 63.3% triple-class refractory; the subcutaneous (SC) cohorts: $n = 54$; 73.1% triple-class refractory) to access the updated IV and first SC results of step-up dosing of RG6234 (*Abstract 157988*).[13] The ORR were 71.4% and 60.4% in the IV and SC cohorts, respectively. Notably, patients who had previously received BCMA-directed therapy and those with high-risk cytogenetics, the ORR was 55.6% and 64.2%, respectively. The safety of IV or SC administration of RG6234 was consistent with its MOA and target distribution, with CRS (IV: 82.4%; grade ⩾3: 2%; SC: 77.8%; grade ⩾3: 1.9%), anemia (IV 13.7%, SC 5.2%), thrombocytopenia (IV 13.8%, SC 18.5%), neutropenia (IV 11.8%, SC 16.7%), infections (IV: 56.9%; grade ⩾3: 19.6%; SC: 37.0%; grade ⩾3: 24.1%) occurring, respectively. Eckmann, Jan *et al.* evaluated the initial efficacy of RG6234 in combination with daratumumab, pomalidomide, or lenalidomide *via* relevant models *in vitro* and *in vivo* (*Abstract 157485*).[14] The results showed that the antitumor response of RG6234 was significantly improved when used in combination with other cancer therapeutics.

Talquetamab, a GPRC5D × CD3 BsAb, showed manageable safety and robust efficacy in 143 RRMM (74% triple-class refractory) treated 0.4 mg/kg QW in the phase I/II MonumenTAL-1 study (*Abstract 159707*).[15] The ORR was 73%, with 58% reaching ⩾VGPR, 29% reaching ⩾CR. The median follow-up and median DOR were 11.0 months (range 0.5+ to 26.1) and 9.3 months (95% CI: 6.6–20.2; range 1–23+), respectively. The most common AEs were CRS (79%; grade 3: 2%; grade 4: 0%), dysgeusia (48%), anemia (45%; grade 3: 31%; grade 4: 0%); infections (50%; grade ⩾3: 19%, grade 4: NA). The efficacy of 0.8 mg/kg Q2W will be presented at the meeting. In addition, the phase II MonumenTAL-1 trial defined patient-reported outcomes data on health-related quality, symptoms, and functioning of life in RRMM patients treated with 0.4 mg/kg SC QW administration of talquetamab (*Abstract 162555*).[16] The results showed that treatment with talquetamab administered with 0.4 mg/kg SC QW improved overall health-related quality of life and role function, as well as physical function by reducing pain and fatigue in RRMM patients.

Cd38 × Cd3

In a phase I study, the dose-escalation portion of ISB 1342, a novel CD38 × CD3 BsAb, is ongoing to determine recommended phase II dose (RP2D)

and/or the maximum tolerated dose (MTD) for RRMM patients (*Abstract 157525*).[17] A total of 24 patients (88% grade III refractory) with RRMM were given intravenous ISB 1342 QW at a doses ranging from 0.2/0.3 to 1.0/4.0 mg/kg and were divided into six dose-increasing groups, which were well tolerated. Most AEs were grade 1–2, including CRS (17%), infection-related reactions (42%), thrombocytopenia (17%), diarrhea (13%), and anemia (21%).

Igm-2644, another CD38 × CD3 BsAb with 10 CD38-binding domains and a single CD3-binding domain, which can irreversibly target cell binding even at low CD38 levels to overcome resistance to daratumumab and achieve lower levels of cytokine release. Li *et al.*[18] evaluated the safety and efficacy of IGM-2644 via *in vitro* immunoassays and *in vivo* models (*Abstract 159205*). It showed that compared with daratumumab and isatuximab, the complement-dependent cytotoxicity (CDC) activity of IGM-2644 against MM cell lines increased by more than 30-fold. It has a better preclinical safety profile compared to other CD38 × CD3 BsAb as it has lower cytokine release and less T cell cannibalism.

Tri-specific antibody

ISB 1442 is a tri-specific antibody (TsAb) that targets CD38/CD47 × CD3 and has a distinct CD38 epitope from daratumumab, which binds to target cells even at low CD38 levels. It can enhance antibody-dependent cytophagy, antibody-dependent cytotoxicity and complement dependent cytotoxicity activities. In preclinical studies, ISB 1442 showed higher killing capacity than daratumumab against both high and low CD38 expression tumors. Currently, a first-in-human phase I/II trial (NCT05427812) is evaluating the tolerability, safety, pharmacokinetics (PK), pharmacodynamics (PD), and efficacy of ISB 1442 in RRMM (*Abstract 157585*).[19]

ISB 2001, another CD38/BCM × CD3 TsAb, is promising for RRMM who experience tumor escape due to target down-regulation mechanisms. Pihlgren, Maria *et al.* defined that ISB 2001 have potent anti-tumor activity and low on-target off-tumor activity *in vitro* and *in vivo* relevant models, including plasma cell leukemia and MM (*Abstract 159353*).[20] Preparations are underway to initiate a phase I clinical trial of ISB 2001 in RRMM. In a related study by Keller *et al.*, RRMM patients previously treated with anti-CD38 and anti-BCMA responded well to CD38/CD28 × CD3 TsAb *in vitro* (*Abstract 169072*).[21]

Conclusion

Highlights in the treatment of RRMM, especially triple-class refractory, in the 2022 ASH annual meeting mainly focused on the use of BsAb to improve rescue regimen. The selected studies, including all the most relevant and advanced studies on BsAb for RRMM, are listed in Table 1.

Table 1. Selected studies on bispecific antibody-based treatment for MM from 2022 ASH annual meeting.

Abstract#	158801	159711	166494
Authors (Ref.)	Uttervall[1]	Searle[2]	Raje[4]
Study agents	Teclistamab	Teclistamab-Dara-Len	Elranatamab
Phase	I/II	Ib	I
NCT No.	NA	NCT04722146	NCT03269136
Study period	Data cutoff: 30 June 2022	Data cutoff: 11 July 2022	Data cutoff: 22 June 2022
Age range, years	62 (range 43–83)	62 (range 38–75)	64 (range 42–80)
No. of patients	17	32 (0.72 mg/kg, *n* = 13; 1.5 mg/kg, *n* = 19)	55 (91% triple-class refractory)
Outcome measure	ORR, VGPR	ORR, VGPR	ORR, VGPR, MRD

(Continued)

Table 1. (Continued)

Abstract#	158801	159711	166494
Survival outcome	ORR: 60%; ⩾VGPR rate: 53%	The ORR was 13/13 evaluable patients at 0.72 mg/kg and 13/16 evaluable patients at 1.5 mg/kg. VGPR or better was achieved in 12 patients at the 0.72 mg/kg dose and was not mature for the 1.5 mg/kg group. Median time to first response was 1.0 month (range 0.7–2.0)	ORR: 64%; ⩾VGPR rate: 56%; ⩾CR: 38%; MRD negativity: 100%
Safety	Grade 1–2 CRS (53%)	CRS (81.3%), fatigue (43.8%), neutropenia (75%), diarrhea (37.5%), insomnia (31.3%), cough (28.1%), hypophosphatemia (25%), infections (75%)	CRS (67%)
Structure	BCMA × CD3	BCMA × CD3	BCMA × CD3
Schedule	As per guidelines all patients were hospitalized for the initial step-up doses (60 and 300 μg/kg) and first full dose (1500 μg/kg) with a median of 7 days (range 6–29). This was followed by 1500 μg/kg QW ($n = 15$) or Q2W ($n = 2$)	Teclistamab dose: 0.72 or 1.5 mg/kg/W with step-up dosing, + dara 1800 mg + len 25 mg	Doses from 80 to 1000 μg/kg either weekly or every 2 weeks
Median follow-up, months	NA	5.78 (range 1.0–10.4)	12.0 (range 0.3–29.0)
Summary	Teclistamab is effective with manageable side effects, showing high response rates in heavily pretreated, penta-drug exposed patients with MM	Tec-dara-len was well tolerated, with a safety profile consistent with tec or dara-len individually	Elranatamab induced durable clinical and molecular responses for patients with relapsed or refractory MM

Abstract#	162738	162440	159969	167008
Authors (Ref.)	Grosicki[6]	Bahlis[5]	Bumma[8]	Voorhees[11]
Study agents	Elranatamab+ Dara	Elranatamab	REGN5458	ABBV-383
Phase	III	II	I/II	I
NCT No.	NCT05020236	NCT04649359	NCT03761108	NCT03933735
Study period	Data cutoff: 11 April 2022	Data cut-off: 17 June 2022	Data cut-off: 28 January 2022	Data cut-off: 8 January 2022
Age range, years	68 (range 46–78)	68 (range 36–89)	64 (range 41–90)	64 (range 56–76) for 40 mg ESC; 68 years (range 35–92) for 60 mg ESC + EXP
No. patients	28 (18% triple-class refractory)	123 (96.7% triple-class refractory)	167 (90% triple-class refractory)	66 (40 mg ESC: $n = 6$, $n = 4$ triple-class refractory; 60 mg ESC + EXP: $n = 60$; $n = 48$ triple-class refractory)
Outcome measure	sCR, VGPR stringent complete response (sCR)	ORR	ORR, DOR	ORR, DOR, PFS

(Continued)

Abstract#	162738	162440	159969	167008
Survival outcome	Promising early responses to elranatamab + daratumumab, including VGPR and sCR; Median time to response was 1 month (1–3)	ORR: 61.0%; median time to objective response was 1.2 months (range 0.9–6.9)	ORR: 75% for ⩾200 mg *versus* 40.8% for <200 mg; ⩾CR: 37.5%; median DOR has not been reached	In the triple-refractory subpopulation: ORR: 75% for 40 mg ESC *versus* 54% for 60 mg ESC + EXP; ⩾CR: 50% for 40 mg ESC *versus* 29% for 60 mg ESC + EXP; ⩾VGPR: 75% for 40 mg ESC *versus* 40% for 60 mg ESC + EXP
Safety	CRS (50%; all G1–2), neutropenia (29%; 14% G3, 14% G4), and pyrexia (21%; all G1)	CRS (56.3%), ICANS (3.4%), infections (61.8%), peripheral neuropathy (17.1%)	CRS (47.9%; 36.5% G1, 10.8% G2, 0.6% G3), fatigue (34.1%), anemia (36.5%), neutropenia (28.7%), thrombocytopenia (21%)	CRS (83% for 40 mg ESC; 72% for 60 mg ESC + EXP), infection (50% for 40 mg ESC; 43% for 60 mg ESC + EXP), anemia (33% for 40 mg ESC; 32% for 60 mg ESC + EXP), neutropenia (67% for 40 mg ESC; 40% for 60 mg ESC + EXP)
Structure	BCMA × CD3	BCMA × CD3	BCMA × CD3	BCMA × CD3
Schedule	Elranatamab was given with premedication and a two step-up priming regimen during the first week of cycle 1, followed by full dose once weekly beginning C1D8 and continuing through C6, then every 2 weeks beginning C7D1 if partial remission (PR) or better for ⩾2 months. Daratumumab dosing was according to the US prescribing information	Elranatamab 76 mg QW on a 28-day cycle with a 2-step-up priming dose regimen (12 and 32 mg) administered during the first week	⩾200 mg (*N* = 24), <200 mg (*N* = 49)	40 mg ESC; 60 mg ESC + EXP
Median follow-up, months	NA	6.8 (range 0.2–16.2)	NA	40 mg ESC: 17.4; 60 mg ESC + EXP: 8.4
Summary	Elranatamab + daratumumab demonstrated promising early responses with a manageable safety profile in patients with RRMM	Subcutaneous 76 mg QW elranatamab is efficacious and has a manageable safety profile in pts with triple-class- and penta-drug refractory MM and no prior BCMA-targeted treatment	REGN5458 showed promising efficacy and an acceptable safety profile in patients with heavily pretreated RRMM. Phase II portion of the study at the RP2D of 200 mg is recruiting	ABBV-383 monotherapy at 40 and 60 mg Q3W doses is well tolerated in pts with RRMM. Durable responses were observed at both doses

Abstract#	157988	162555	159707	157525
Authors (Ref.)	Carlo-Stella[13]	Touzeau[16]	Chari[15]	Mohan[17]
Study agents	RG6234	Talquetamab	Talquetamab	ISB 1342
Phase	I	II	I/II	I

(Continued)

Abstract#	157988	162555	159707	157525
NCT No.	NCT04557150	NCT04634552	NCT03399799/ NCT04634552	NCT03309111
Study period	Data cut-off: 8 June 2022	NA	Data cut-off: 16 May 2022	Data cut-off: 7 July 2022
Age range, years	The IV cohorts: 62 (range 27–78); the SC cohorts: 64 (range 46–79)	NA	67 (range 46–86)	67 (range 54–76)
No. patients	105 (the IV cohorts: $n=51$, 63.3% triple-class refractory; the SC cohorts: $n=54$; 73.1% triple-class refractory)	122	143 (74% triple-class refractory)	24 (88% triple-class refractory)
Outcome measure	ORR, VGPR	GHS, physical functioning, pain, and fatigue	ORR, VGPR, CR, Median DOR	MTD, RP2D
Survival outcome	ORR: 71.4% for IV; 60.4% for SC; ⩾VGPR: 57.1% for IV; 39.6% for SC	NA	ORR (73%); ⩾VGPR (58%); ⩾CR: (29%); median DOR: 9.3 months (95% CI: 6.6–20.2; range 1–23+)	NA
Safety	CRS (IV: 82.4%; grade ⩾3: 2%; SC: 77.8%; grade ⩾3: 1.9%), anemia (IV 13.7%, SC 5.2%), thrombocytopenia (IV 13.8%, SC 18.5%), neutropenia (IV 11.8%, SC 16.7%), infections (IV: 56.9%; grade ⩾3: 19.6%; SC: 37.0%; grade ⩾3: 24.1%)	Least squares (LS) mean change for fatigue symptoms was −8 (95% CI: −13.83, −2.26) at cycle 9 and reached a mean decrease (i.e. improvement) of 11.2 points (95% CI: −18.9, −3.53) at cycle 13. Similar results were observed in the physical [LS mean change at cycle 9: 6.5 (95% CI: 2.05, 10.93)] and role [LS mean change at cycle 9: 11.4 (95% CI: 4.55, 18.25)] functioning subscales	CRS (79%; grade 3: 2%; grade 4: 0%), dysgeusia (48%), anemia (45%; grade 3: 31%; grade 4: 0%); infections (50%; grade ⩾3: 19%)	CRS (17%), infusion related reactions (42%), anemia (21%), thrombocytopenia (17%), diarrhea (13%)
Structure	GPRC5D × CD3	GPRC5D × CD3	GPRC5D × CD3	CD38 × CD3
Schedule	IV dose range: 6–10,000 μg; SC dose range: 30–7200 μg	0.4 mg/kg SC QW	0.4 mg/kg QW	Dose-escalation of IV QW: 0.2/0.3–1.0/4.0 mg/kg
Median follow-up, months	IV: 7.1 (range 0.5–16.8) SC: 3.9 (range 1.1–10.5)	NA	11.0 (range 0.5–26.1)	NA
Summary	RG6234 is highly active in patients with heavily pretreated RRMM when administered IV or SC	With talquetamab treatment, patients in the 0.4 mg/kg SC QW cohort reported improvement in overall HRQoL and physical and role functioning and a decrease in pain and fatigue	Talquetamab demonstrated robust efficacy and manageable safety in pts with heavily pretreated RRMM	Treatment with ISB 1342 was well tolerated at the dose levels evaluated

BCMA, B-cell maturation antigen; CRS, cytokine release syndrome; ⩾CR, complete response or better; Dara, daratumumab; DOR, duration of response; ESC, aggregate dose-escalation; ESC + EXP, ESC and expansion; GPRC5D, G protein-coupled receptor family C group 5 member D; HRQoL, health-related quality of life; ICANS, immune effector cell-associated neurotoxicity syndrome; IV, Intravenous; Len, lenalidomide; MM, multiple myeloma; MRD, minimal residual disease; MTD, maximum tolerated dose; ORR, overall response rate; PFS, progression-free survival; Q2W, every 2 weeks; QW, every weekly; RP2D, recommended phase II dose; RRMM, relapsed/refractory multiple myeloma; GHS, global health status; SC, subcutaneous; Tec, Teclistamab; ⩾VGPR, very good partial response or better.

Declarations

Ethics approval and consent to participate

This study fully complied with the publication guidelines provided by 2022 ASH Annual Meeting. Participants could not be identified with personal information, so approval from the ethics committee and consent to participate were not needed.

Consent for publication

Not applicable.

Author contributions

Xuejiao Yin: Data curation; Investigation; Methodology; Resources; Software; Writing – original draft.

Yi Liu: Data curation; Validation.

Jianai Sun: Formal analysis; Supervision.

Hongyan Tong: Conceptualization; Data curation; Investigation; Resources; Supervision.

Haitao Meng: Conceptualization; Funding acquisition; Investigation; Software; Supervision.

Liangshun You: Data curation; Funding acquisition; Project administration; Supervision; Writing – original draft.

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Competing interests

The authors declare that there is no conflict of interest.

Availability of data and materials

All data generated or analyzed during this study are included in this published article and its supplementary information files.

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