

## Prevention and Management of Bispecific Antibody–Associated Adverse Events in Multiple Myeloma

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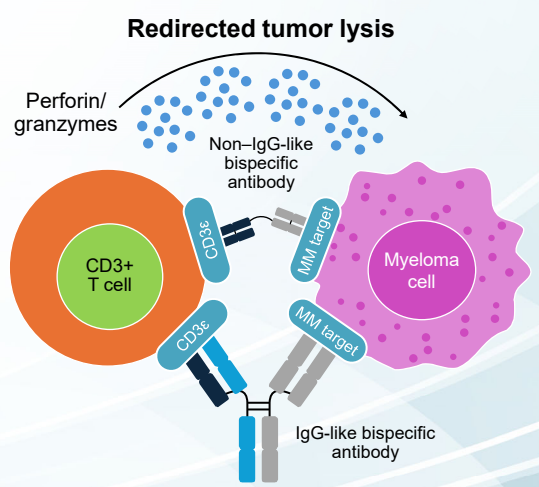
## Bispecific Antibodies

Bispecific antibodies are also referred to as *dual-specific antibodies*, *bifunctional antibodies*, or *T cell–engaging antibodies*.

Bispecific antibodies can target two cell surface molecules at the same time (one on the myeloma cell and one on a T cell).

Many different bispecific antibodies are in clinical development; three are approved for use in myeloma!

Availability is off-the-shelf, allowing for immediate treatment.



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# Myeloma Cell Targets for Bispecific Antibodies

## BCMA

- Highly expressed only on the surface of plasma cells
- Myeloma patients have significantly higher serum BCMA levels than healthy individuals
- **2 BCMA-targeted bispecific approved**
  - Teclistamab
  - Elranatamab

## GPRC5D

- High expression on myeloma cells in the bone marrow
- Low expression on hair follicles but not on other healthy cells
- Expression on myeloma cells is independent of BCMA
- **1 GPRC5D-targeted bispecific approved**
  - Talquetamab

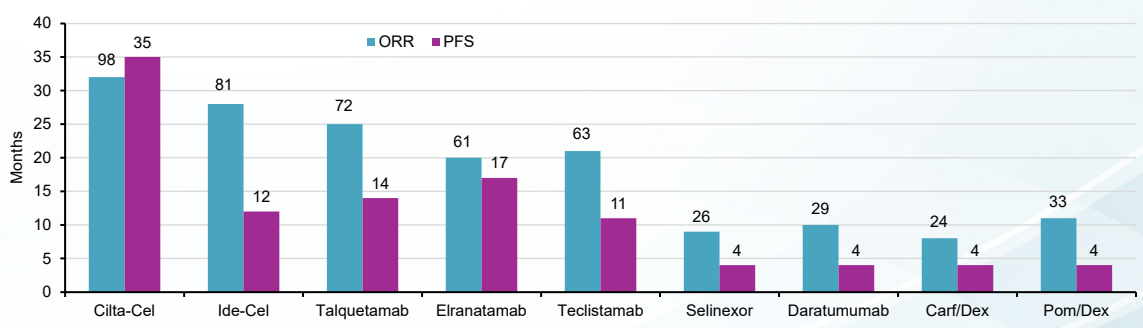
## FcRH5

- Selectively expressed on B cells and plasma cells

BCMA, B-cell maturation antigen; GPRC5D, G protein-coupled receptor family C group 5 member D; FcRH5, Fc receptor homolog 5

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# Overall Response Rate and Progression-Free Survival of Recently Approved Therapies in RRMM\*



\*This is not a head-to-head comparison; cross-trial comparisons should not be inferred from these data. Data represent two populations: PFS includes all patients; ORR includes responding patients only.

RRMM, relapsed/refractory multiple myeloma; ORR, overall response rate; PFS, progression-free survival  
 Usmani S et al. *J Clin Oncol*. 2022;40(suppl 16):8028. Anderson L et al. *ASCO* 2021; Abstract 8016. Touzeau et al. *EHA* 2023. Nooka A et al *ASCO* 2022; Abstract 8007. Lesohkin et al. *Nat Med*. 2023. Chari A et al. *N Eng J Med*. 2019;381:727. Lonial S et al. *Lancet*. 2016;387:1551. Siegel DS et al. *Blood*. 2012;120(14):2817. Richardson P et al. *Blood*. 2014;123(12):1826.

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Bispecific antibody	Teclistamab <sup>1</sup>	Elranatamab <sup>2</sup>
Structure/function	Humanized antibody	Humanized antibody
Treatment	Weekly SC	Weekly SC
Patients	n=165	n=123
Median prior lines	5	5
Triple-class refr. (TCR)	78%	100%
ORR at RP2D RP2D (n)	63% 1.5 mg/kg SC (n=165)	61% 76 mg SC (n=123)
PFS	12.5 mos (8.8–17.2)	17.2 mos (9.8–NE)
OS	21.9 mo (16.0–NE)	
DOR	24 mos (16.2–NE)	69% @ 18 mos

1. Moreau P et al. *N Engl J Med.* 2022;387:495. 2. Lesokhin A et al. *Nat Med.* 2023;29:2259.

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Bispecific antibody	Teclistamab <sup>1</sup>	Elranatamab <sup>2</sup>
Median follow-up	22 mos	17.6 mos
AEs, all (Gr 3+)		
<b>CRS</b>	72% (1%)	58% (0%)
<b>Infections</b>	80% (55%)	70% (40%)
<b>Neutropenia</b>	72% (66%)	49% (49%)
Anemia	54% (38%)	49% (37%)
Thrombocytopenia	42% (22%)	31% (24%)
Neurotoxicity	15% (1%)	4% (0%)
<b># Deaths</b>	68 (41 due to PD)	25 (11 due to PD)
Hypogammaglobulinemia/IVIG	75%/39%	75%/40%

1. Moreau P et al. *N Engl J Med.* 2022;387:495. 2. Lesokhin A et al. *Nat Med.* 2023;29:2259.

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Bispecific antibody	Talquetamab phase 1/2 MonumenTAL-1 study GPRC5D × CD3		
Treatment	0.4 mg/kg SC QW	0.8 mg/kg SC Q2W	Either dose
Patients	n=143	n=145	n=51
Median prior lines	5	5	6 (Prior CAR T therapy 75%; prior bispecific therapy 44%)
Triple-class refractory	74%	69%	
ORR at RP2D	74%	72%	65%
PFS	7.5 mos	14.2 mos	5.1 mos
DOR	9.5 mos	NR	11.3 mos

Schinke CD et al. *J Clin Oncol.* 2023;41. Abstract 8036.

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Bispecific antibody	Talquetamab phase 1/2 MonumenTAL-1 study GPRC5D × CD3		
Treatment	0.4 mg/kg SC QW	0.8 mg/kg SC Q2W	Either dose
Median follow-up	18.8 mos	12.7 mos	14.8 mos
AEs, all (Gr 3+)			
<b>CRS</b>	79% (2%)	75% (0.7%)	77% (2.0%)
<b>Infections</b>	59% (20%)	66% (15%)	73% (28%)
<b>Neutropenia</b>	35% (31%)	28% (22%)	55% (53%)
<b>Anemia</b>	45% (32%)	39% (25%)	39% (25%)
<b>Thrombocytopenia</b>	27% (20%)	30% (19%)	37% (29%)
<b>ICANS</b>	11% (1.6%)	10% (1.8%)	10% (1.8%)
<b># Deaths</b>	0 due to AEs	0 due to AEs	0 due to AEs
<b>Hypogammaglobulinemia/IVIG</b>	NR/13%	NR/10%	NR/10%
	Dysgeusia 72% (N/A) Skin 56% (0%) Nail 55% (0%)	Dysgeusia 71% (N/A) Skin 73% (1%) Nail 54% (0%)	Dysgeusia 77% (N/A) Skin 69% (0%) Nail 63% (0%)

Schinke CD et al. *J Clin Oncol.* 2023;41. Abstract 8036.

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Bispecific antibody	Talquetamab phase 1/2 MonumenTAL-1 study <sup>1</sup> GPCR5D × CD3			
	Treatment	0.4 mg/kg SC QW	0.8 mg/kg SC Q2W	Either dose
Median follow-up	18.8 mos	12.7 mos	14.8 mos	
<b>AEs, all (Gr 3+)</b>	<b>Dysgeusia 72% (N/A)</b> <b>Skin 56% (0%)</b> <b>Nail 55% (0%)</b>	<b>Dysgeusia 71% (N/A)</b> <b>Skin 73% (1%)</b> <b>Nail 54% (0%)</b>	<b>Dysgeusia 77% (N/A)</b> <b>Skin 69% (0%)</b> <b>Nail 63% (0%)</b>	

**Patients who have ≥1 GPCR5D-related oral, skin, or nail AE in the first 90 days of treatment had a 20% higher likelihood of having a response.<sup>2</sup>**

1. Schinke CD et al. *J Clin Oncol*. 2023;41:Abstract 8036. 2. Chari A et al. *Blood*. 2023;142(suppl 1):1010.

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## Key Points

- Approved bispecific antibodies offer “off-the-shelf” treatment
- Bispecific antibodies are very active even in heavily pretreated patients
- AEs such as CRS, neurotoxicity, infections, and cytopenias are common and can be managed
  - Dysgeusia and skin/nail toxicity observed with talquetamab
- Differentiating factors between bispecifics include
  - Target (BCMA or GPCR5D)
  - Step-up dosing schedule, dosing frequency

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## Case Discussion

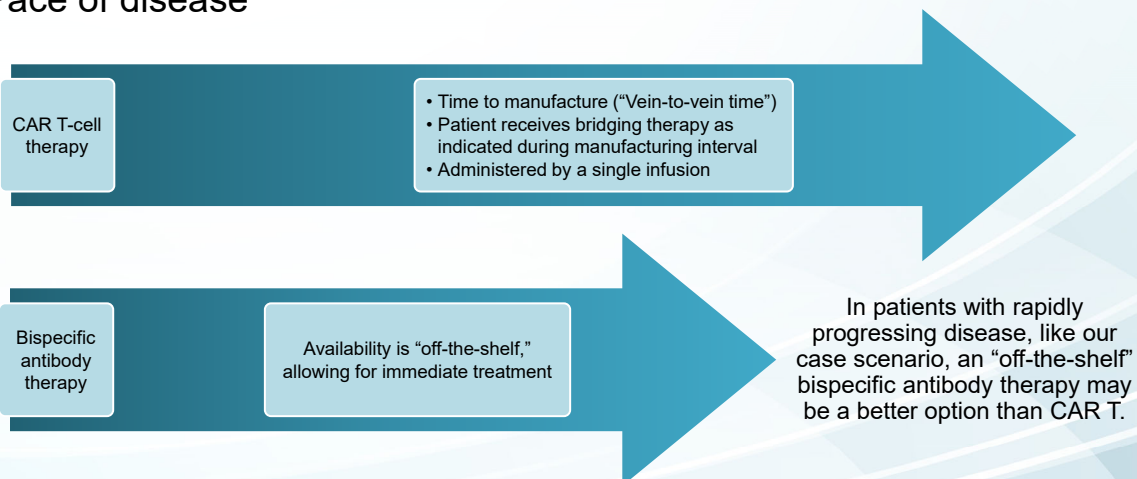
### 70-yr-old with rapidly progressive MM after 4 lines of prior therapy

- PS of 2 at most recent progression
- Standard risk cytogenetics
- Treatment history
  - Daratumumab, lenalidomide, bortezomib, dexamethasone, then ASCT; lenalidomide maintenance
  - Elotuzumab, pomalidomide, dexamethasone
  - Carfilzomib, dexamethasone (Kd)
  - Isatuximab added to Kd

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## Considerations for Selecting CAR T or Bispecific Antibody Therapy

- Pace of disease



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## Considerations for Selecting CAR T or Bispecific Antibody Therapy

- Pace of disease
- AE profile
  - Can pause or reduce dose of bispecific antibody therapy to manage challenging AEs
- Very limited data in certain patient populations
  - Frail and elderly patients
  - Patients with comorbidities such as
    - Renal failure
    - Central nervous system disorders
    - Heart failure
- Health status, not age alone, should determine CAR T eligibility
  - Refer eligible patients to a CAR T treatment center

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## Determinants of the Use of Bispecific Antibody Therapy

- Efficacy and safety
- Convenience
  - REMS program requirements
    - Step-up dosing schedule
    - Inpatient hospitalization vs outpatient monitoring for CRS
  - Access to tocilizumab (off label for bispecific), IVIG
  - Need for and number of priming doses
  - Route of administration: SQ vs IV
  - Frequency of administration
  - Treatment to progression vs fixed duration
- Targets and sequencing within bispecifics and relative to other agents: CAR Ts, etc
- Time to market

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## Early T Cell Redirection May Have Downstream Sequelae: PFS2 and OS Impact Unknown

	Ide-cel KarMMa <sup>1</sup>	Ide-cel Real World <sup>2</sup>		Cilta-cel CARTITUDE-1 <sup>3,4</sup>	Cilta-cel CARTITUDE-2 <sup>5</sup>	Teclistamab <sup>6</sup>	MajesTEC-1 Cohort C <sup>7</sup>	
N	128	50		97	20	165	40	
Age, (range)	61 (33–78)	66 (43–79)		61 (56–68)	63 (44–81)	64 (33–84)	64 (32–82)	
# of lines	6	9		6	8	5	6	
HR cytog, %	35	36		24	15	26	33	
EMD, %	39	50		13	25	17	30	
Triple refractory, %	84	90		88	90	78	85	
BCMA refractory, %	n/a			n/a	80	n/a		
Prior BCMA		CAR T	Bispecific		Bispecific		CAR T	ADC
n		5	7		7		15	29
ORR, %	81	100	86	98	57	63	53	55
CR/sCR, %	39	60	43	82	14	39	27	24
PFS, months	12.2	NR	2.8	34.9	5.3	11.3		

Elranatamab: 54% ORR (7/13) with prior BCMA<sup>8</sup>

1. Anderson L et al. 2021 ASCO. Abstract 8016. 2. Ferreri CJ et al. 2021 ASH. Abstract 766. 3. Berdeja J et al. *Lancet*. 2021;398:314. 4. Lin Y et al. 2022 EHA. Abstract P961. 5. Cohen AD et al. *Blood*. 2023;141:219-230. 6. Moreau P et al. *N Engl J Med*. 2022;387(6):495. 7. Touzeau C et al. 2022 ASCO. Abstract 8013. 8. Bahlis NJ et al. *Nat Med*. 2023;29(10):2570-2576.

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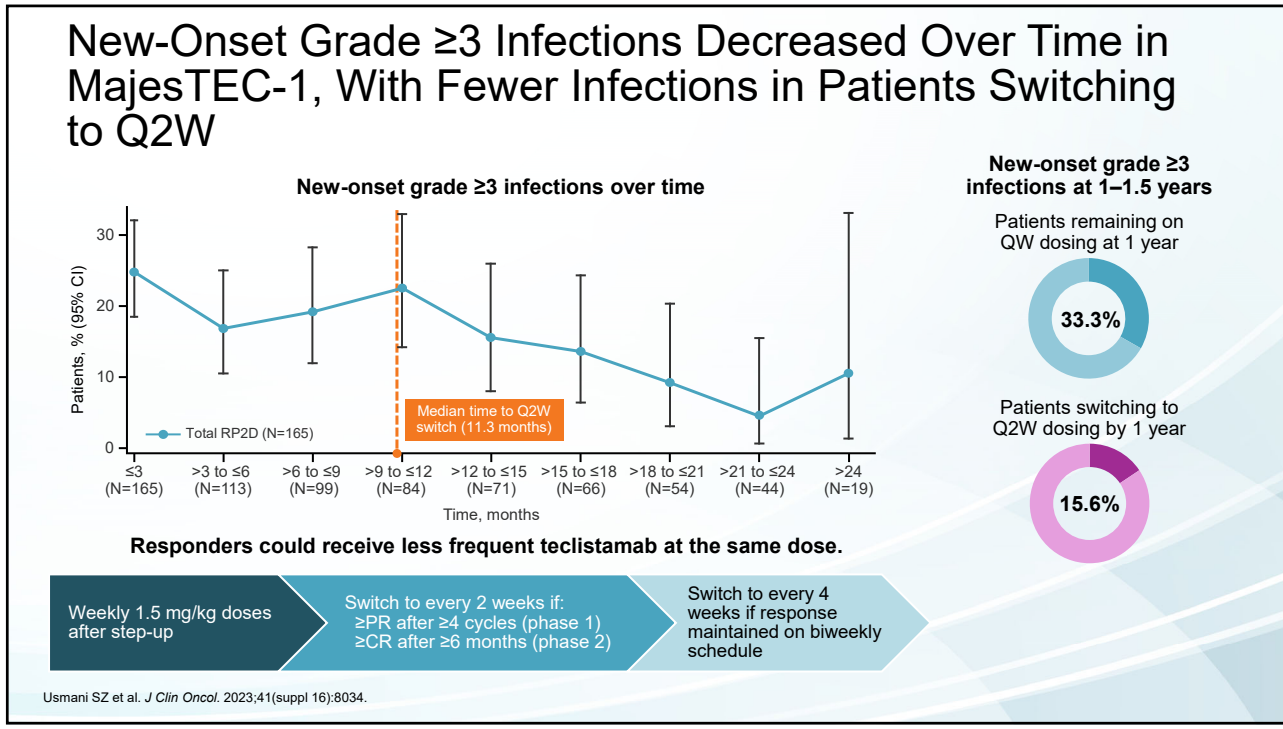
## Case Discussion

### 70-yr-old with rapidly progressive MM after 4 lines of prior therapy

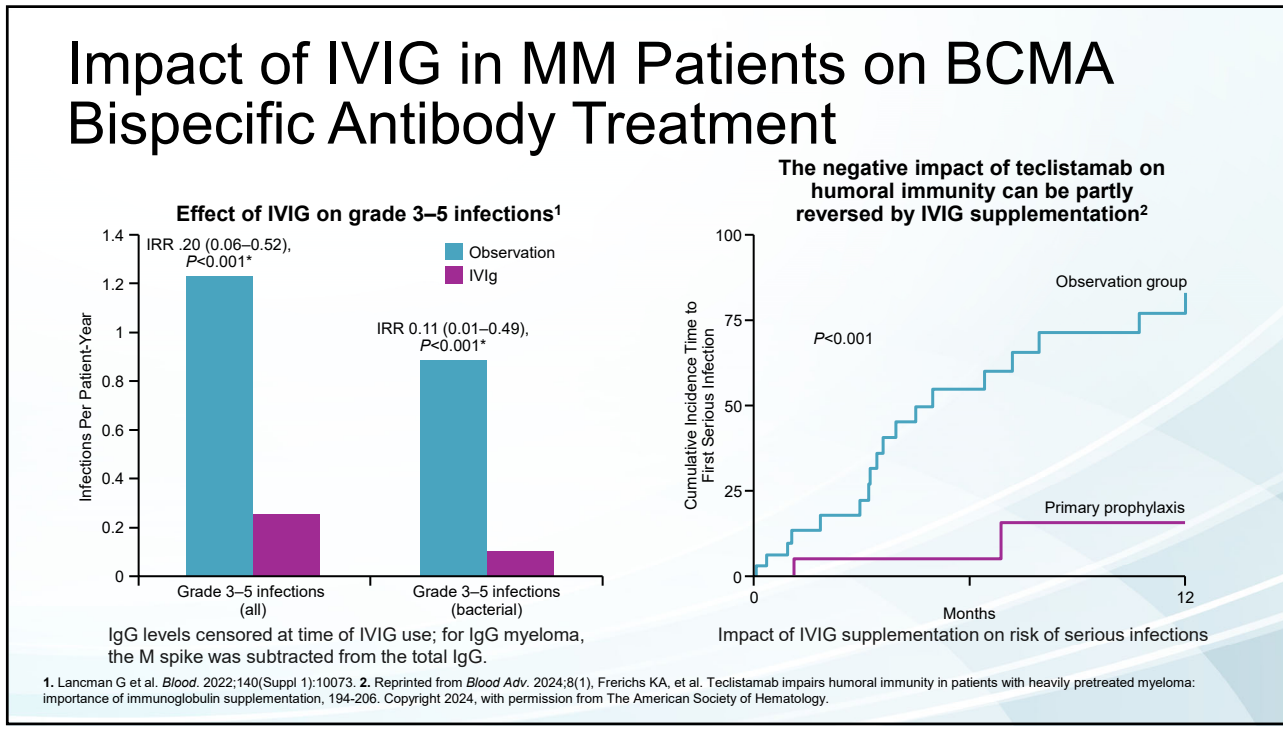
- PS of 2 at most recent progression
- Standard risk cytogenetics
- Treatment history
  - Daratumumab, lenalidomide, bortezomib, dexamethasone, then ASCT; lenalidomide maintenance
  - Elotuzumab, pomalidomide, dexamethasone
  - Carfilzomib, dexamethasone (Kd)
  - Isatuximab added to Kd
- Patient is candidate for either bispecific antibody or CAR T-cell therapy
- Consider a bispecific antibody given patient's progressive disease
- Could consider non-BCMA-targeted bispecific antibody

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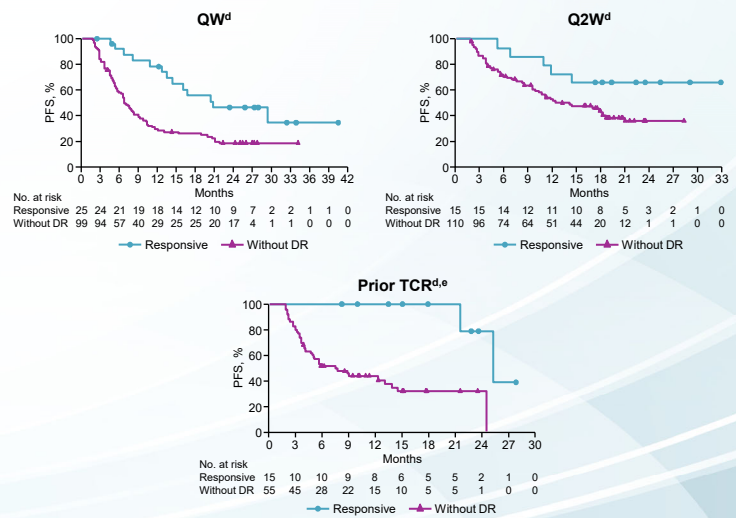
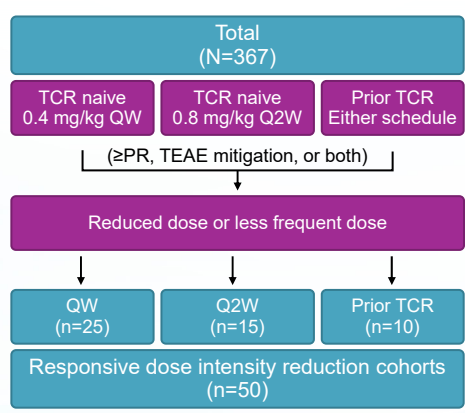


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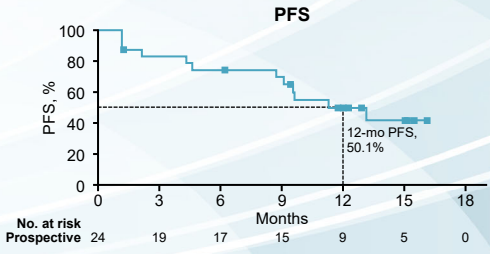
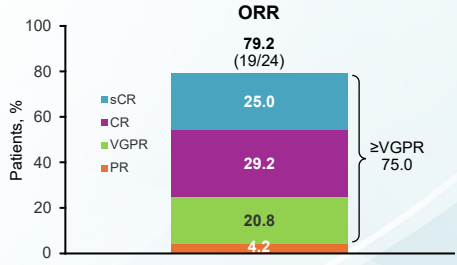
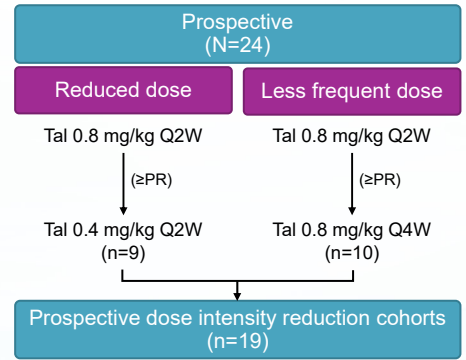
## MonumenTAL-1 Responsive Dose Intensity Reduction Cohorts: Disease Response Maintained Even With Dose Reduction



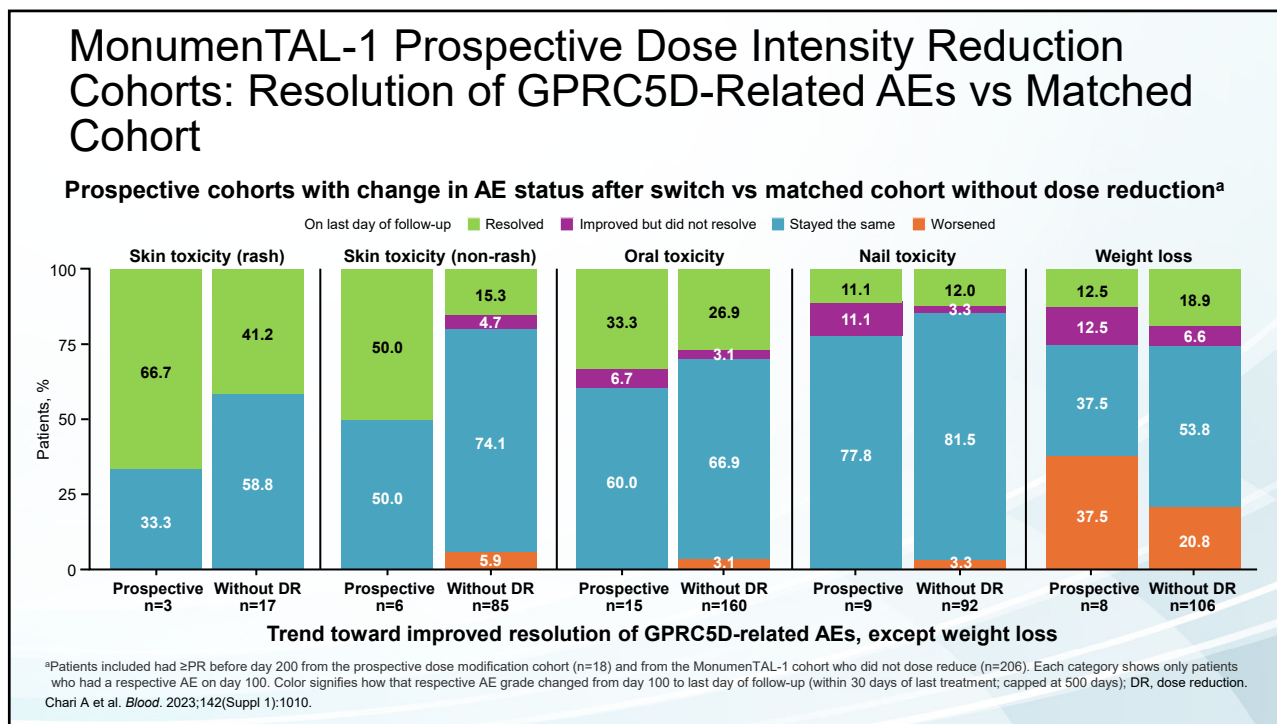
Chari A et al. *Blood*. 2023;142(Suppl 1):1010.

## MonumenTAL-1 Prospective Dose Intensity Reduction Cohorts: Disease Response Maintained Even With Dose Reduction

- Patients with dose reductions had to be in response (n=19); dose reduction occurred at a median of 3.1 mo (range, 2.3–4.2) relative to treatment start



PR, partial response; Q2W, every other week; Q4W, every 4 weeks; QW, weekly; TCR, T-cell redirection therapy; TEAE, treatment-emergent adverse event  
Chari A et al. *Blood*. 2023;142(Suppl 1):1010.



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## Key Points

- With bispecific antibodies, CRS and ICANS are likely to be low grade and managed in the short-term
- The clinician assuming care later on must be aware of
  - Infectious complications (including atypical infections like PJP, HSV, and CMV reactivation)
  - Management of off-tumor, on-target effects of talquetamab
  - Prolonged cytopenias
- Prophylactic antibiotics and antivirals are a must during the entire time of treatment
- IVIG replacement is strongly encouraged for all patients
- Optimally sequencing T cell-directed therapies is critical; however, best available therapy should be offered considering logistics, access, and availability

CRS, cytokine release syndrome; ICANS, immune effector cell-associated neurotoxicity syndrome; PJP, *Pneumocystis jirovecii* pneumonia; HSV, herpes simplex virus; CMV, cytomegalovirus

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## Role of the Advanced Practice Provider

- Patient education
  - Discuss potential side effects
  - Provide guidance on the treatment process
- Patient assessment and monitoring
  - Assess for treatment-related side effects or complications
  - Monitor patient response to bispecific antibody therapy, including evaluating laboratory results, imaging studies, and clinical symptoms to track disease progression or treatment efficacy
- Treatment planning and coordination
  - Collaborate with physicians and other health care team members to develop individualized treatment plans

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## Role of the Advanced Practice Provider

- Patient counseling
  - Discuss treatment goals and potential side effects
  - Address patient questions, concerns, and emotional needs
- Symptom management and supportive care
  - Assess and address pain, fatigue, nausea, neuropathy, and other treatment-related side effects
  - Employ pharmacologic and nonpharmacologic interventions as appropriate
  - Coordinate with other health care providers, such as oncology nurses, social workers, and palliative care specialists
  - Provide comprehensive supportive care services aimed at optimizing patient quality of life and well-being

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# Patient Experience



## Lines of therapy

- 1. VRd
- 2. KRd → ASCT → maintenance with KRd → Rd (during COVID)
- 3. Dara-Pd
- 4. Cilta-cel
- 5. Teclistamab (did not fit enrollment criteria at the time for talquetamab clinical trial)
- 6. Selinexor + Kd
- 7. Talquetamab

ASCT, autologous stem cell transplant; cilta-cel, ciltacabtagene autoleucel; d, dexamethasone; Dara, daratumumab; K, carfilzomib; P, pomalidomide; R, lenalidomide; V, bortezomib

# Infection Prevention

Avoid crowds	Ensure handwashing, hygiene	Growth factors	IVIg for hypogammaglobulinemia
Immunizations (no live vaccines)	COVID-19 prevention	Zoster and PJP prophylaxis	Monitor CD4 count

IVIg, Intravenous immunoglobulin; PJP, *Pneumocystis jirovecii* pneumonia


## GPRC5D-Associated Side Effects

Affected area	Symptoms and effects	Management
Skin	Rash, skin peeling	Relatively benign, not painful, self-limiting, and manageable with emollients
Nails	Nail thinning and loss	Mostly aesthetic but takes time to resolve
Oral	Difficulty swallowing, dry mouth, taste changes	Can lead to weight loss; have longer duration and can affect quality of life. Most successfully managed with dose modification. Supportive measures may be used (eg, NaCl mouth rinse, artificial saliva spray, diet modification)

*Myeloma patients respond well to treatment, and GPRC5D-associated side effects improve over time, becoming more tolerable; notable reduction in side effects is seen with dose modification.*

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## Bispecific and Trispecific Engagers



T-cell engagers		HPN217	Alnuctamab	Forimtamig	Abbv-383	EMB-06	JNJ-79635322
Drug name		HPN217	Alnuctamab	Forimtamig	Abbv-383	EMB-06	JNJ-79635322
Specificity		BCMA	BCMA	GPRC	BCMA	BCMA	BCMA/GPRC
Format		Albumin half-life extender	2:1 tumor: CD3 binding domain		Low CD3 affinity	Tetravalent	Trispecific

NK-cell engagers		IPH6401/SAR445514	CC-92328/DF3001
Drug name		IPH6401/SAR445514	CC-92328/DF3001
Format		ANKET	TriNKET
Specificity		BCMA/CD16/NKp46	BCMA/CD16/NKG2D

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## Emerging BCMA-Targeted Bispecific Antibodies

Bispecific antibody	Linvoseltamab <sup>1</sup>	ABBV-383 <sup>2</sup>	Alnuctamab <sup>3</sup>	HPN217 <sup>4</sup>
Structure/function	Veloci-Bi <sup>®</sup> platform fully human antibody	Low CD3 affinity fully human antibody	Humanize antibody 2 BCMA + 1 CD3	Trispecific 50kDa (albumin)
Treatment	Weekly IV	IV Q3wk	Qwk → Q4wk SC	Q2wk IV
Patients	n=252	n=220	n=68	n=97
Median prior lines	5	5	4	6
Triple-class refractory	74%	80%	63%	78%
ORR at RP2D	71%	60%	65%	63%
RP2D (n)	200 mg IV (n=117)	60 mg IV (n=61)	30 mg SQ (n=26)	12 mg IV (n=19)
Median follow-up	11 mos		4.6 mos	
AEs, All (Gr 3+)				
CRS	46% (1%)	70% (2%)	53% (0%)	16% (0%)
Infections	73% (34%)	24% (16%)	34% (9%)	59% (25%)
Neutropenia	32% (31%)	43% (34%)	37% (32%)	47% (47%)
Anemia		38% (13%)	38% (25%)	47% (32%)
Thrombocytopenia		26% (13%)	24% (9%)	32% (21%)
Neurotoxicity	8% (3%)	5% (0%)	0% (0%)	0% (0%)

ORR, overall response rate; AE, adverse event; CRS, cytokine release syndrome

1. Jagannath S et al. *Blood*. 2023;142(Suppl 1):4746. 2. Vij R et al. *Blood*. 2023;142(Suppl 1):3378. 3. Wong S et al. *Blood*. 2022;140(Suppl 1):400–402. 4. Madan S et al. *Blood*. 2023;142(Suppl 1):1012.

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## Emerging Treatment Combinations With BCMA-Targeted Bispecific Antibodies

Bispecific antibody	Teclistamab + daratumumab (MajesTEC-3) <sup>1</sup>	Teclistamab + dara + lenalidomide (MajesTEC-2) <sup>2</sup>	Elranatamab + daratumumab (MagnetisMM-5) <sup>3,4</sup>
Treatment	Dara SC 1,800 mg Tec SC 1.5–3 mg/kg Qwk or Q2wk	Dara + Len 25 + dex 40 + Tec 0.72 or 1.5 Qwk to 3 mg/kg Q2wk C3+	Dara SC 1,800 mg + Elra44 or 76 mg Qwk SC → Q2wk C7+
Patients	n=65	n=32	n=34
Median prior lines	5	2	4
Triple-class refractory	59%	N/A	18%
Median follow-up	8.6 mos	8.4 mos	
AEs, All (Gr 3+)			
CRS	78% (0%)	81% (0%)	41% (0%)
Infections	63% (22%)	91% (38%)	
Neutropenia	49% (41%)	84% (74% incl 13% FN)	47% (47%)
Anemia	52% (28%)	22% (13%)	29% (27%)
Thrombocytopenia	32% (25%)	25% (16%)	21% (15%)
Neurotoxicity	2% (0%)	0% (0%)	0% (0%)
# Deaths	4	2	15 (6 COVID)

AE, adverse event; CRS, cytokine release syndrome

1. Mateos MV et al. *J Clin Onc*. 2022;40(Suppl 16):TPS8072. 2. Searle E et al. *Blood*. 2022;140(Suppl 1):394. 3. Grosicki S et al. *Blood*. 2022;140(Suppl 1):4407. 4. Grosicki S et al. *ASH* 2022.

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## Emerging Non-BCMA Targeted \*CD3 Bispecific Antibodies

Bispecific antibody	Forimtamig <sup>1</sup> Phase 1 GPCR5D X CD3 (2:1)	Cevostamab <sup>2</sup> Phase 1 FcRH5 X CD3
Treatment	SC q 2wk *12 mos	IV q3w *12 mos
Patients	n=57	n=161
Median prior lines	5	6
Triple-class refractory	63%	85%
ORR at RP2D	<b>64%</b>	<b>57%</b>
AEs, All (Gr 3+)		<b>+/- Prophylactic tocilizumab<sup>3</sup></b>
CRS	79% (2%)	80% (2%) → <b>36% (2%)/90% (3.6%)</b>
Infections	46% (26%)	43% (19%)
Neutropenia	18% (16%)	18% (16%) → <b>Gr3+ 64% vs 39%</b>
Anemia	49% (39%)	32% (22%)
Thrombocytopenia	26% (19%)	
ICANS	2% (2%)	6% (4%)
# Deaths	2 (1 due to AEs)	
Other	Mucosal 77% (5%) Skin 86% (23%) Hair/nail 28% (0%)	Diarrhea 26% (1%)

ORR, overall response rate; AE, adverse event; CRS, cytokine release syndrome; ICANS, immune effector cell-associated neurotoxicity syndrome

1. Carlo-Stella C et al. *Blood*. 2022;140(Suppl 1):397. 2. Trudel S et al. *Blood*. 2021;138(Suppl 1):157. 3. Mateos MV et al. *Hemasphere*. 2023;7(Suppl):e75458a8.

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## Talquetamab Combinations

Bispecific antibody	Talquetamab + daratumumab Phase 1b TRIMM 2 <sup>1</sup>	Talquetamab + teclistamab Phase 1 RedirectTT-1 <sup>2</sup>	Talquetamab + pomalidomide MonumenTAL-2 <sup>3</sup>
Treatment	Dara + Tal 0.4 or 0.8 mg/kg	RP2D Tec 3 mg/kg, Tal 0.8	Tal 0.4 or 0.8 mg/kg + pom 2 mg cycle 2
Patients	n=14, n= 51	n=93, n=34	n=16, n=19
Median lines of therapy	5	4	3 vs 3
TCRefr	61% (53% prior BCMA exp)	80%	25 vs 21%
PFS	19.4 mos	20.9 mos	NR
Median follow-up	15 mos	13.4 mos	15 vs 11 mos
AEs, All (Gr 3+)			
CRS	78% (0%)	76% (3%)	74% (2%)
Infections	63% (22%)	84% (53%)	71% (23%)
Neutropenia	38% (26%)	66% (61%)	60% (49%)
Anemia	52% (26%)	51% (34%)	(26%)
Thrombocytopenia	37% (20%)	43% (29%)	(20%)
ICANS	5% (0%)	3% (1%)	6% (0%)
# Deaths	1 due to AE	NR	1
Other	Oral 90% (4%) Skin 84%(8%) Nail 67% (2%)	61% (N/A) 54% (0%) 46% (0%)	Dysgeusia 86% Skin 74% (6%) Nail 69%

AE, adverse event; CRS, cytokine release syndrome; ICANS, immune effector cell-associated neurotoxicity syndrome

1. Dholaria BR et al. *J Clin Onc*. 2023;41(Suppl 16):8003. 2. Cohen YC et al. *J Clin Onc*. 2023;41(Suppl 16):8002. 3. Mateos J et al. *Blood*. 2023;142(Suppl 1):1014.

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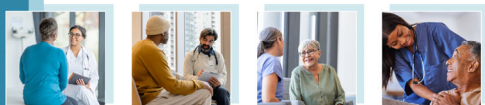


## Pending Phase 3 Studies

Disease state	Study Design	Title	NCT Number
NDMM, TIE	Elranatamb + DR vs DRd in non SCT	MagnetisMM-6	NCT05623020
NDMM, TIE	Teclistamab + DR vs talquetamab-DR vs DRd in non SCT	MajesTEC-7	NCT05552222
Post SCT	Teclistamab + R vs teclistamab vs R	MajesTEC-4	NCT05243797
Post SCT	Elranatamb vs R	MagnetisMM-7	NCT05317416
RRMM	Linvoseltamab vs elotuzumab + Pd	LINKER-MM3	NCT05730036
RRMM	Elranatamab vs elranatamab + D vs DPd	MagnetisMM-5	NCT05020236
RRMM	Teclistamab + D vs DPd vs DVd	MajesTEC-3	NCT05083169
RRMM	Teclistamab vs PVd vs Kd in 1-3 LOT CD38- and R-exposed	MajesTEC-9	NCT05572515
RRMM	Talquetamab-DP vs talquetamab-D vs DPd in >1 (R refractory) or >2 & non-CD38 refractory	MonumenTAL-3	NCT05455320

NDMM, newly diagnosed multiple myeloma; SCT, stem cell transplant; RRMM, relapsed/refractory multiple myeloma; TIE, transplant ineligible

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## Thank you for joining us!

Please complete the evaluation  
and share your feedback

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