Radiation Characteristics per Group by Subject									
Group A (No RT <1 year before apheresis), Subject ID:	**Cohort**	**RT Site**	**Total Dose (Gy)**	**Fxns**	**Modality**	**RT completed before CART infusion, days**	**RT completed before apheresis, days**	**Concurrent Systemic Therapy**	**Last systemic tx before apheresis, infusion**
1[a]	1	C1: C2 spine C2: T3-5 spine, S4 spine	30 25	10 10	3DCRT 3DCRT	3477 1872	3452 1847	-- Bort/Len/ Dex	Pom/Dex, Pom/Dex
2	1	--	--	--	--	--	--		Carfilz/Len/ Dex, Carfilz/Cyclo /Dex
7	1	--	--	--	--	--	--		Carfilz/Pano, Pom/Dex-ACE
12	2	--	--	--	--	--	--		CyBorD, CyBorD
14	2	--	--	--	--	--	--		Venetoclax, none
17	3	--	--	--	--	--	--		CPI-610 D-AC
19	3	C1: Total body	2	1	TBI	882	821	Mephalan[c]	Dara/Ixa/ Pom/Dex, Dara/Ixa/ Pom/Dex
20	3	--	--	--	--	--	--		Carfilz/Cyclo /Pom/Dex, VD-AC
21	3	C1: Right femur	30	10	3DCRT	880	853	--	Dara/Pom/ Dex, Bort/Pom/ Dex
22	2	--	--	--	--	--	--		D-ACE, none
27	3	--	--	--	--	--	--		Carfilz/Ve-netoclax/Dex , Carfilz/Ve-netoclax/Dex
32	3	--	--	--	--	--	--		Carfilz/Cyclo /Dex Carfilz/Cyclo /Dex
34	3	--	--	--	--	--	--		Carfilz/Pom/ Dex, VD-PACE
Median (range)			27.5 (2-30)	10 (1-10)		1778 (880-3477)	1743 (853-3452)		
Group B (RT <1 year before apheresis), Subject ID:									
3[a]	1	C1: Right orbit	30	10	3DCRT	112	63	Carfilz/Pom/ Dex	D-PACE, D-AC
8	1	C5: Left maxillary sinus	30	10	IMRT	206	181	Pom/Cyclo/ Dex	Carfilz/Pom/ Dex, Carfilz/Pom/ Dex

9	1	C1: Sternum	8	1	Electrons	40	15	--	Dara, Pulse Dex
10	1	C1: Right femur	30	10	3DCRT	81	53	Pom/Dex	Pom/Dex, Pom/Cyclo/ Dex + plasma exchange
11	1	C1: T10-12 spine	40	20	3DCRT	301	268	--	VDT-PACE, VDT-PACE
15[a]	1	C1: Right ribs, left ribs	20	10	Electrons	115	90	Pembro/Dex	Pembro/Pom /Dex, Pom/Dex
29	3	C2: Mandible	18	9	3DCRT	125	96	--	VDT-PACE, none
33[b]	3	C2: Right thigh	6	2	3DCRT	67	28	--	Pembro/Len/ Dex, none
Median (Range)			25 (6-40)	10 (1-10)		114 (40-301)	77 (15-268)		
Group C (Bridging RT), Subject ID:	**Cohort**	**RT Site**	**Total Dose (Gy)**	**Fxns**	**Modality**	**RT completed before CART infusion, days**	**RT started after apheresis, days**		
13	2	C1: Skull Base	20	5	3DCRT	31	22	--	Salvage ASCT, VD-CE
16	2	C2: T7-L1 spine	8	1	3DCRT	18	15	--	D-CE
23	3	C3: Bilateral hips	24	6	3DCRT	35	21	VD-PCE	Carfilz/Pom/ Dex/Nelfin, VD-PCE
25[a]	3	C3: Bilateral orbits	30	10	3DCRT	19	16	Bort/Veneto-clax/Dex	Selinexor/ Dex, Bort/Veneto-clax/Dex
Median (Range)			22 (8-30)	6 (1-10)		25 (18-35)	19 (15-22)		

Supplemental Table 1: Radiation characteristics of Group A (n=13), B (n=8), and C (n=4). Site of treatment, dose, fractions, radiation modality, and timing of radiation is listed above for each subject. Median dose, fractions, and number of days radiation is completed before CART-BCMA infusion are listed above for each group. Bridging RT is defined as radiation received after apheresis and before CART-infusion.

[a] Subjects 01, 03, 15, and 25 received only 40% of planned dose due to fevers/early CRS.

[b] Subject 33 was originally planned for 30 Gy in 10 fractions but RT course was stopped early at 6 Gy due to T cell harvest.

[c] Subject 19 underwent high dose melphalan and low-dose TBI conditioning followed by autologous stem cell transplant.

--, not applicable; Fxns, fractions; Tx, treatment; RT, radiation therapy; 3DCRT, 3D conformal radiation therapy; IMRT, intensity modulated radiotherapy; TBI, total body irradiation; Bort, bortezomib; Len, lenalidomide; Pom, pomalidomide; Carfilz, carfilzomib; Cyclo, cyclophosphamide; CPI-610, investigational BET inhibitor; CyBorD = cyclophosphamide, bortezomib, dexamethasone; D-AC = dexamethasone + doxorubicin and cyclophosphamide; D-ACE = dexamethasone + doxorubicin, cyclophosphamide, and etoposide; D-CE = dexamethasone + cyclophosphamide and etoposide; D-PACE = dexamethasone + cisplatin, doxorubicin, cyclophosphamide, and etoposide; Dara, daratumumab; Dex, dexamethasone; Nelfin, nelfinavir; Pano, panobinostat; Pembro, pembrolizumab; Pom/Dex-ACE = pomalidomide, dexamethasone + infusional doxorubicin, cyclophosphamide, and etoposide; VD-AC = bortezomib, dexamethasone + doxorubicin and cyclophosphamide; VD-CE = bortezomib, dexamethasone + cyclophosphamide and etoposide; VD-PCE = bortezomib, dexamethasone + cisplatin, cyclophosphamide, etoposide; VDT-PACE = bortezomib, dexamethasone, thalidomide + cisplatin, doxorubicin, cyclophosphamide, and etoposide.

CART Manufacturing Details										
Group:	**A (no RT <1 year before apheresis)**; n=13 Median (IQR):	**B (RT <1 year before apheresis)**; n=8 Median (IQR):	**C (Bridging RT)**; n=4 Median (IQR):	**P value**	**A+C (no RT <1 year before apheresis);** n=17 Median (IQR):	**B (RT <1 year before apheresis)**; n=8 Median (IQR):	**P value**	**No RT/RT <100 days before apheresis,** n=19 Median (IQR):	**RT <100 days before apheresis**; n=6 Median (IQR):	**P value**
ALC pre-apheresis (x10e3/μL)	0.80 (0.59-1.03)	0.65 (0.46-0.95)	1.00 (0.45-1.38)	0.46	0.95 (0.59-1.03)	0.65 (0.46-0.95)	0.26	0.80 (0.50-1.00)	0.80 (0.41-1.20)	0.72
% Lymphocytes	25.0 (19.1-32.5)	20.8 (15.0-29.1)	21.7 (10.2-30.9)	0.59	24.4 (18.3-32.5)	20.8 (15.0-29.1)	0.51	21.9 (16.5-31.9)	22.8 (17.7-32.1)	0.88
CD3% in seed culture	70 (62.9-84.0)	52.9 (23.5-86.0)	70.6 (55.5-74.0)	0.62	70.0 (62.9-81.8)	52.9 (23.5-86.0)	0.37	69.2 (52.6-80.0)	71.0 (42.9-87.8)	0.78
CD4:CD8 in seed culture	0.81 (0.46-1.35)	0.76 (0.37-2.12)	0.52 (0.44-0.93)	0.76	0.70 (0.46-1.15)	0.76 (0.37-2.12)	0.90	0.70 (0.46-1.06)	0.89 (0.45-2.58)	0.43
CD3% at harvest	97.4 (95.6-98.4)	96.3 (91.9-96.9)	97.9 (90.0-98.8)	0.18	97.6 (95.6-98.4)	96.3 (91.9-96.9)	0.068	97.4 (94.9-98.4)	96.3 (90.7-96.9)	0.14
CD4/CD8 at harvest	2.09 (1.50-2.82)	1.71 (1.26-2.69)	1.20 (0.86-1.66)	0.098	1.87 (1.35-2.31)	1.71 (1.26-2.69)	0.81	1.87 (1.31-2.40)	1.71 (1.30-2.47)	0.84
% CD45RO-CD27+ of CD8+ T cells	27.0 (15.7-34.6)	19.2 (10.4-42.3)	30.8 (22.4-34.6)	0.78	28.9 (19.4-34.4)	19.2 (10.4-42.3)	0.76	27.0 (18.7-33.5)	28.1 (7.4-46.4)	0.84
Fold Expansion	38.9 (27.2-47.6)	14.7 (9.0-22.9)	27.2 (16.4-41.5)	**0.0065**	32.3 (24.4-45.5)	14.7 (9.0-22.9)	**0.0015**	31.7 (16.8-45.1)	20.3 (11.1-25.0)	0.069
Transduction Efficiency (%)	14.7 (9.3-23.0)	20.8 (10.6-25.1)	16.5 (10.8-23.6)	0.68	14.7 (10.2-23.1)	20.8 (10.6-25.1)	0.43	15.0 (10.7-22.7)	19.4 (8.5-27.8)	0.72

Peripheral Blood at Peak Expansion								
Group:	**A (no RT <1 year before apheresis)**; n=13 Median (IQR):	**B (RT <1 year before apheresis)**; n=8 Median (IQR):	**C (Bridging RT)**; n=4 Median (IQR):	**P value**	**No RT/RT <100 days before apheresis,** n=15 Median (IQR):	**RT <100 days before apheresis**; n=6 Median (IQR):	**C (Bridging RT)**; n=4 Median (IQR):	**P value**
#CAR+ given ($x10^8$)	5.0 (1.3-5.0)[c]	4.3 (2.0-5.0)[c]	1.3 (0.5-4.3)[c]	0.29	5.0 (2.0-5.0)[c]	3.5 (1.9-5.0)[c]	1.3 (0.5-2.0)[c]	0.28
Day of Peak	10.0 (9.0-13.0)[b]	11.0 (8.5-15.5)	11.5 (10.0-13.8)	0.58	10.0 (9.0-14.3)[b]	11.0 (9.3-18.0)[a]	12 (10-14)	0.58
%CAR+ of CD3+	19.1 (5.2-41.2)[b]	18.2 (4.1-41.8)	11.1 (5.9 (38.8)	0.95	17.1 (6.9-37.9)[b]	18.7 (3.6-50.4)[a]	11.1 (5.1-47.1)	0.95
%CAR+ of CD4+	6.7 (1.9-9.1)[b]	6.3 (0.4-14.6)	5.2 (3.1-10.7)	0.99	6.7 (1.3-9.5)[b]	4.6 (0.3-17.7)[a]	5.2 (2.9-12.1)	0.91
%CAR+ of CD8+	23.7 (9.0-47.1)[b]	25.2 (15.0-51.0)	15.3 (7.7-42.1)	0.82	22.3 (9.8-46.6)[b]	31.9 (11.8-59.7)[a]	15.3 (5.9-50.3)	0.83
%HLA-DR+ of CAR+	94.5 (87.3-97.0)[b]	94.0 (77.0-96.0)	92.5 (86.8-96.8)	0.85	94.5 (87.8-97.0)[b]	93.0 (63.0-96.3)[a]	92.5 (85.0-98.0)	0.81

Supplemental Table 2: Characteristics of CART-BCMA manufacturing and CART BCMA cells in peripheral blood at peak expansion in Group A, B, and C and in those receiving radiation within 100 days preceding apheresis. The frequency of total CD3+, CD3+CD4+, CD3+CD8+ cells was assessed by flow cytometry at the beginning of manufacturing ("in seed culture") and at the end of manufacturing ("at harvest"). CART-BCMA cells were quantified by flow cytometry. The frequency of CAR+ cells within CD3+, CD4+, and CD8+ populations and activation status at peak expansion (as measured by % of CAR+ cells expressing HLA-DR) was also assessed. Median value, interquartile range (IQR), and exact p-value, derived from either Wilcoxon rank sum test or Kruskal-Wallis test, for each variable are reported.

[a] The peak expansion of subject 9 in Group B was determined by qPCR since CAR+ cells were not detectable by flow cytometry.

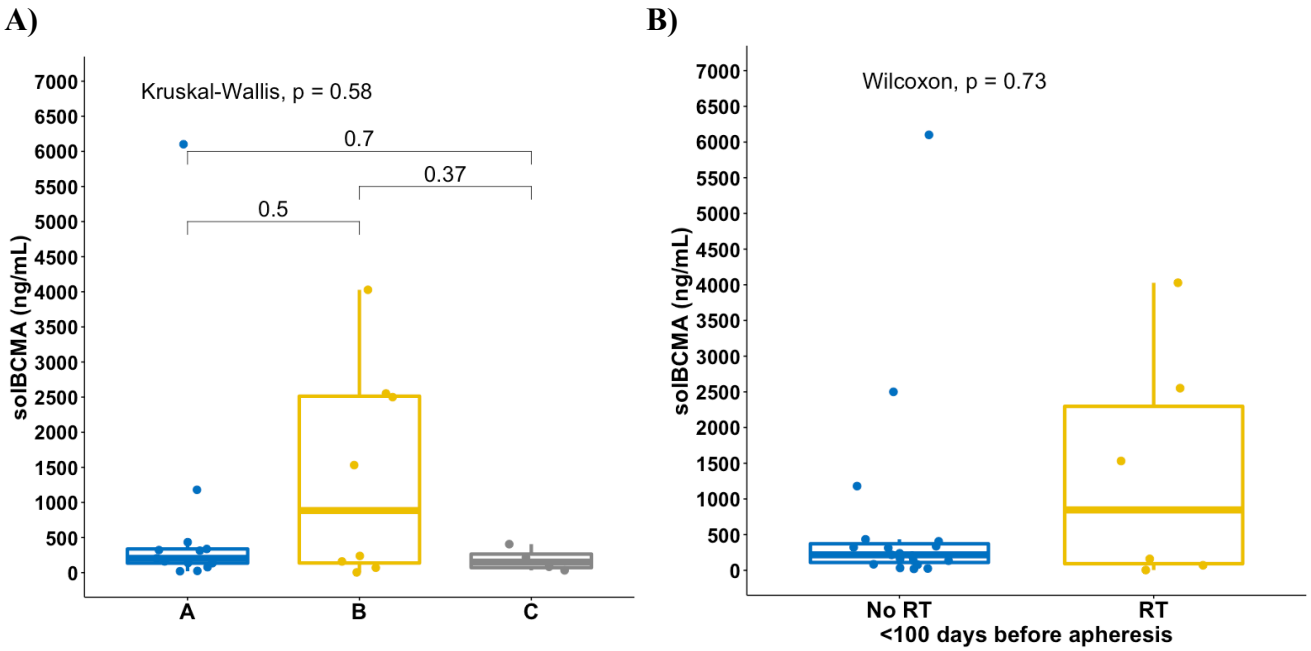
[b] The peak for subject 34 in Group A could not be determined due to lack of sample between days 10-21.

[c] Subjects 1 (Group A), 3 (Group B), 15 (Group B), and 25 (Group C) received 40% of planned CART-BCMA dose due to early cytokine release syndrome.

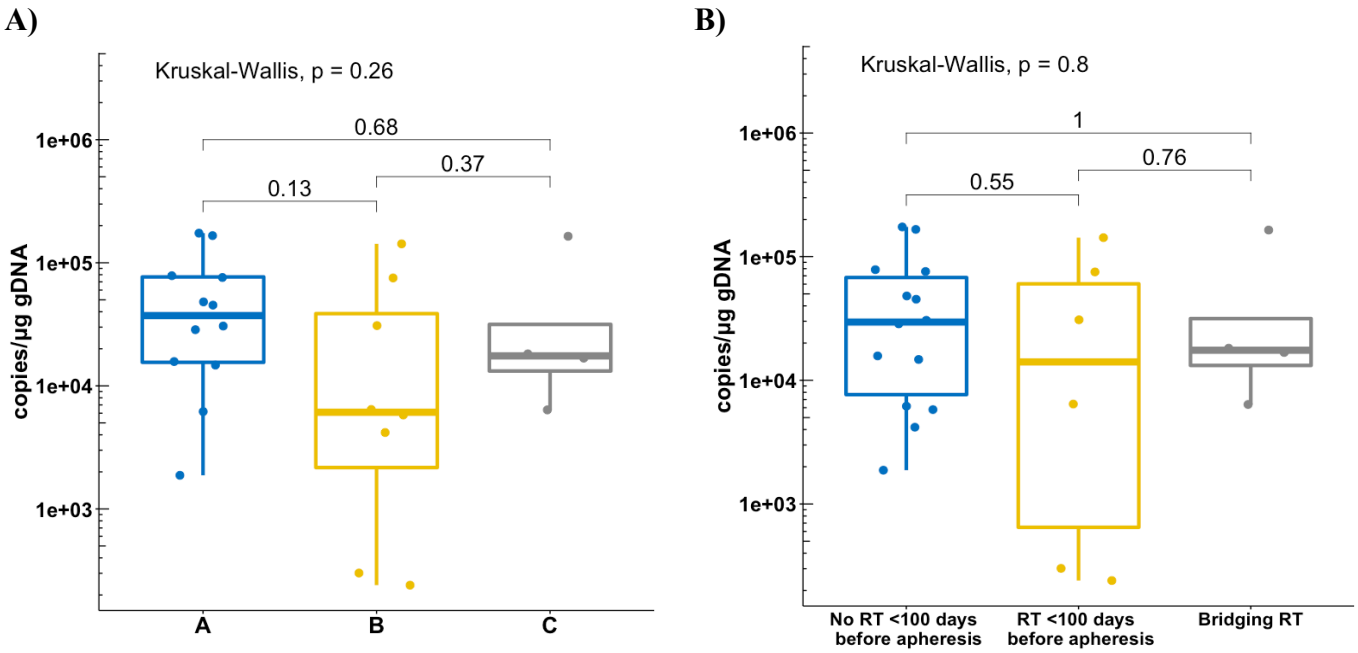
CD4:CD8 in seed culture, ratio of CD4+ to CD8+ T-cells in pre-manufacturing leukapheresis product; CD4/CD8 in harvest, ratio of CD4+ to CD8+ T-cells in manufactured product.

Radiation Characteristics received post CAR-T cell infusion						
Subject	Group	Course no: RT site	Total Dose (Gy)	Fxns	Modality	Radiation started after CAR-T infusion, days
12	A	C1: Skull base, left rib	30	10	3DCRT	50
		C2: Right knee, right hip	8	1	3DCRT	291
		C3: Left knee, left hip	8	1	3DCRT	294
		C4: bilateral humeri	8	1	3DCRT	303
32	A	C1: Skull base, bilateral orbits	20	10	3DCRT	490
		C2: L3-S2 spine	20	10	3DCRT	500
34	A	C1: Total Body	9	6	TBI	306
3	B	C2: Right rib	8	2	3DCRT	198
10	B	C2: Bilateral femurs	30	15	3DCRT	212
		C3: T6-T8 spine	30	15	3DCRT	503
		C4: Chest wall	8	1	3DCRT	1233
11	B	C2: Right humerus, right femur	30	10	3DCRT	217
		C3: Right humerus	30	10	3DCRT	403
		C4: T4-T9 Spine	20	5	3DCRT	438
		C5: Left femur	30	10	3DCRT	534
		C6: Left humerus	20	5	3DCRT	584
		C7: Right femur	20	5	3DCRT	680
		C8: T9-T12 spine	16	4	3DCRT	730
29	B	C2: Left hip,	15	5	3DCRT	83
		C3: T5-10 spine,	22	10	3DCRT	87
		C2-T1 spine,	26	13	3DCRT	84
		Right rib	24	8	Electrons	81
23	C	C4: Sacrum, Left mastoid	20	5	3DCRT	73
		C5: Right ribs, left ribs	20	5	3DCRT	122
		C6: Left femur, right ilium	16	4	3DCRT	128
			20	5	3DCRT	
		C7: Left ribs	16	4	3DCRT	253
		C8: Left ribs, T8-T11 spine	8	1	3DCRT	301
			8	1	3DCRT	

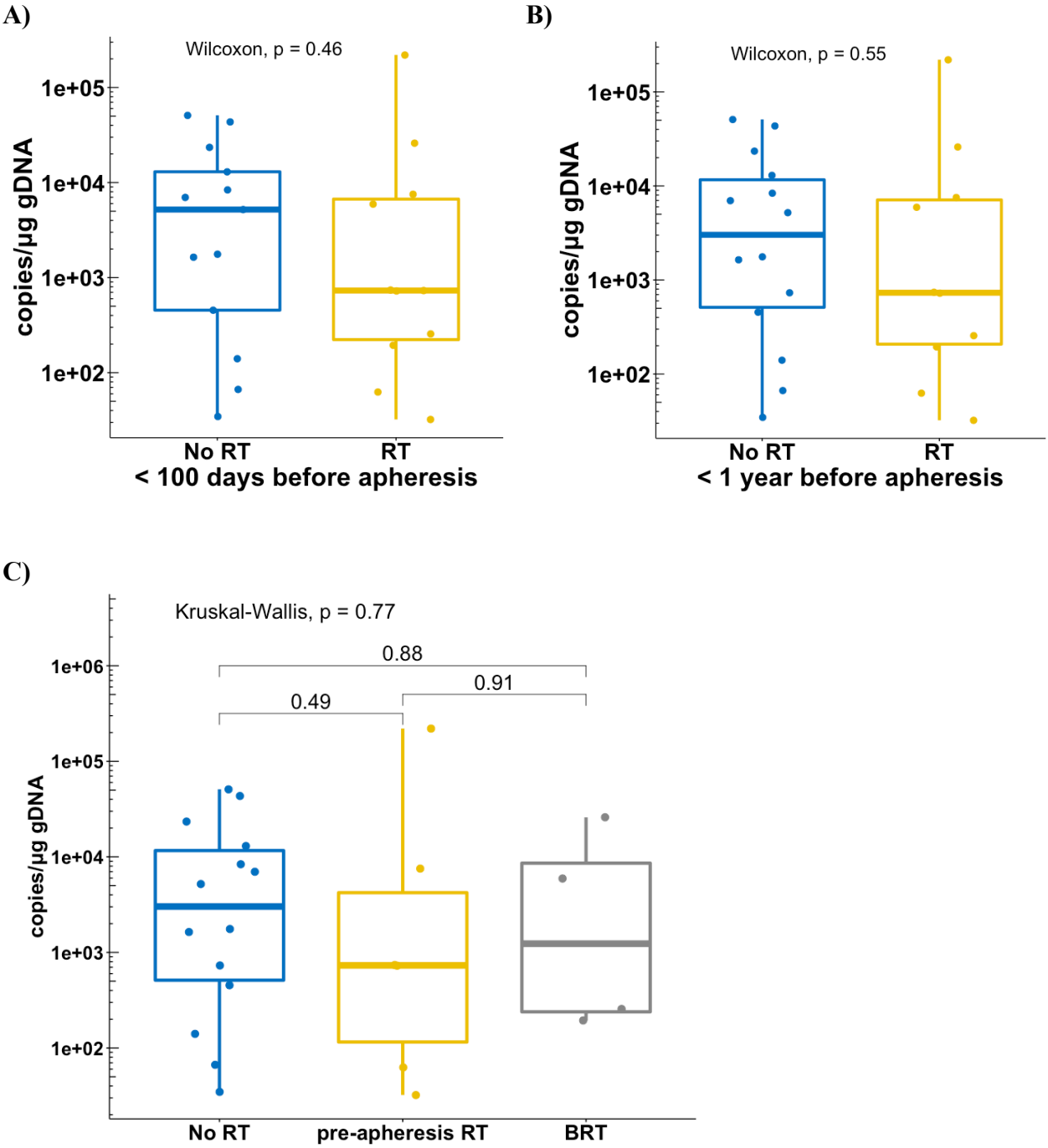
Supplemental Table 3: Details of radiation received after CART-BCMA therapy. Site of treatment, dose, fractions, radiation modality, and number of days until radiation is started post-CART infusion are listed for each subject.
Fxns, fractions; RT, radiation; 3DCRT, 3D conformal radiation therapy; IMRT, intensity modulated radiotherapy; TBI, total body irradiation; Group A, no RT within 1 year before apheresis (n=13); Group B, RT within 1 year before apheresis (n=8); Group C, bridging-RT defined as RT delivered after apheresis but before CART infusion (n=4).



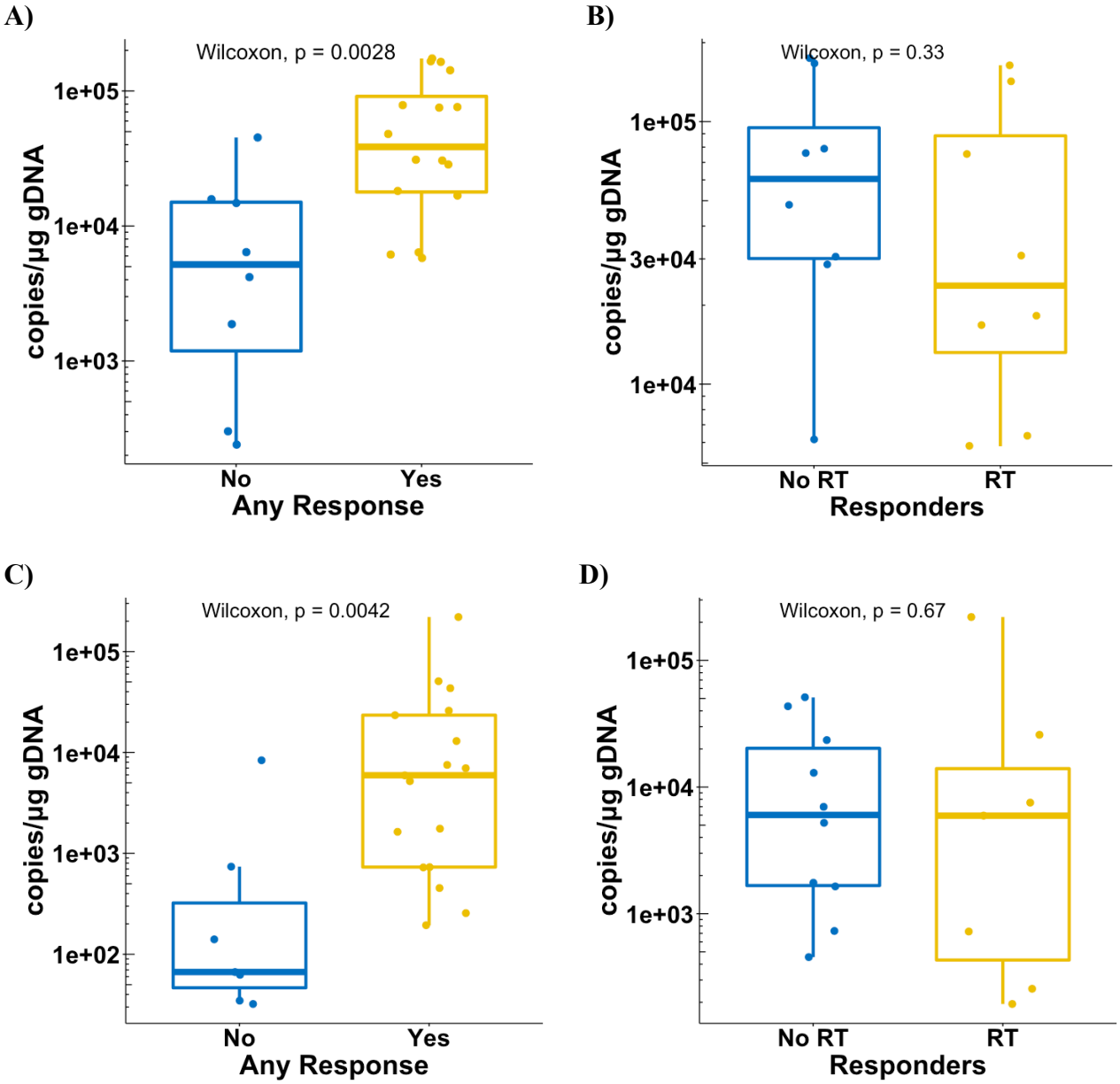
Supplemental Figure 1: Soluble BCMA(solBCMA) serum levels before cyclophosphamide lymphodepletion on D-3. A) Peripheral blood serum concentration of solBCMA between D-7 to D-3* was similar between Group A (No RT within 1 year before apheresis), B (RT within 1 year before apheresis), and C (bridging-RT) (median 204, 885, and 151 ng/mL, p=0.58, Kruskal-Wallis test). **B)** Peripheral blood serum concentration of solBCMA between D-7 to D-3* was similar between subjects who did and did not receive RT within 100 days prior to apheresis (median 846 and 217 ng/mL, p=0.73, Wilcoxon rank-sum test). *SolBCMA concentration for all subjects were measured at D-7 to D-3 using ELISA except for cohort 1 subjects whose solBCMA level was measured at either D-7 to D-3 or D0 pre-CART infusion since cohort 1 did not receive lymphodepletion. RT, radiation therapy.



Supplemental Figure 2: Prior radiation exposure was not associated with the level of CART-BCMA cells in peripheral blood at peak expansion. A) CAR transgene copy number, measured by qPCR, was not significantly different between Groups A (No RT within 1 year before apheresis), B (RT within 1 year before apheresis), and C (bridging-RT) (median 37946, 6109, and 17528 copies/µg DNA, p=0.26, Kruskal-Wallis test) at peak expansion in peripheral blood. **B)** CAR transgene copy number was not significantly different between subjects who received no RT within 100 days before apheresis, RT within 100 days before apheresis, and bridging-RT (median 29609, 18661, and 17528 copies/µg DNA, p=0.80, Kruskal-Wallis test). qPCR data was not available for subject 34 in Group A. gDNA, genomic DNA; RT, radiation therapy.



Supplemental Figure 3: RT was not associated with the level of persistent CART-BCMA cells in peripheral blood at Day 28. A) Median CAR transgene copies/µg genomic DNA, representing CART-BCMA cell levels, did not significantly differ between No RT (5199) and RT (731) (p=0.46, Wilcoxon rank sum test). RT group (n=11) included subjects who received either bridging RT or RT within 1 year before apheresis; No RT group (n=13) included subjects with no history of RT or remote RT completed >1 year before apheresis. **B)** RT delivered within 100 days before apheresis up to CART infusion (n=10) did not significantly change expansion compared to no/remote RT (n=14) (median 732 vs. 3478 copies/µg DNA, p=0.55) **C)** Level of persistent CART-BCMA cells was not significantly different between subjects who received bridging RT (n=4), RT <100 days before apheresis (n=6), or no/remote RT (n=14) (median 3102, 732, and 3478 copies/µg DNA, p=0.55, Kruskal-Wallis test). qPCR data was not available for subject 8 in Group B. RT, radiation therapy; BRT, bridging-RT; gDNA, genomic DNA.



Supplemental Figure 4: **Assessment of previously identified predictors of response and in vivo CART-BCMA cell levels relative to RT receipt.** Quantity of CART-BCMA cells, measured by qPCR, in peripheral blood at peak expansion **(A)** and Day 28 post-CART infusion **(C)** correlated with any clinical response (≥MR) (p=0.003 for peak expansion, p=0.004 for D28, Wilcoxon rank sum test). Within responders (≥MR), subjects who received RT within 1 year before apheresis up to CART infusion vs. subjects who received no RT/RT outside this window had comparable levels of CART BCMA cells at peak expansion **(B)** (p=0.33) and at D28 (p=0.67) **(D)**. qPCR data was not available for subject 8 in Group B. RT, radiation therapy; gDNA, genomic DNA.