Supplementary Table 1. CyTOF Reagents

Metal tag	Product	Vendor	Catalog no.
(102, 104, 105, 106, 108, 110) Pd	Cell-ID 20-Plex Pd Barcoding Kit	Fluidigm	201060
191Ir	Cell-ID Intercalator-Ir	Fluidigm	201192A
195Pt	Cisplatin	Sigma-Aldrich	P4394

Supplementary Table 2. CyTOF Panel for the Dose Escalation Arm

Metal tag	Marker	Clone	Vendor	Catalog no.
89Y	CD45	HI30	Fluidigm	3089003B
113In	CD61	C1-PL2	Biolegend	336402
113In	CD235ab	HIR2	Biolegend	306602
115In	Vimentin	RV202	abcam	ab8978
139La	CD33	J112-906 (RUO)	Biolegend	303402
140Ce	CD66	B1.1	BD Biosciences	551354
141Pr	CD3	UCHT1	Fluidigm	3141019B
142Nd	CD19	HIB19	Fluidigm	3142001B
143Nd	CD117	104D2	Fluidigm	3143001B
144Nd	CD11b	ICRF44	Fluidigm	3144001B
145Nd	CD4	RPA-T4	Fluidigm	3145001B
146Nd	CD8a	RPA-T8	Fluidigm	3146001B
147Sm	CD11c	BU15	BioLegend	337202
148Nd	CD14	M5E2	BioLegend	301802
149Sm	CD127	A019D5	Fluidigm	3149011B
150Nd	FcεRIa	AER-37 (CRA-1)	Fluidigm	3150027B
151Eu	CD123	6H6	Fluidigm	3151001B
152Sm	TCRgd	B1	Fluidigm	3152008B
153Sm	CD45RA	HI100	Fluidigm	3153001B
154Eu	TIM3	F38-2E2	Fluidigm	3154010B
155Gd	TIGIT	MBSA43	ThermoFisher	16-9500-82
156Gd	PD-L1 (CD274)	29E.2A3	Fluidigm	3156026B
157Gd	EpCAM	9c4	BioLegend	324202
158Gd	CD27	L128	Fluidigm	3158010B
159Tb	4-1BB (CD137)	4B4-1	BioLegend	309802
160Gd	*T-bet	4B10	Invitrogen	14-5825-82
161Dy	*CTLA-4 (CD152)	14D3	Fluidigm	3161004B
162Dy	*FoxP3	PCH101	Fluidigm	3162011A
163Dy	CD31	WM59	BioLegend	303102
164Dy	Podoplanin	NC08	BioLegend	337002
165Ho	VISTA	730804	R&D Systems	MAB71261
166Er	CD141 (BDCA3)	1A4	BD Biosciences	559780
167Er	CCR7 (CD197)	G043H7	Fluidigm	3167009A
168Er	*Ki-67	B56	Fluidigm	3168007B

169Tm	CD25	2A3	Fluidigm	3169003B
170Er	TCR Vα24-Jα18 (iNKT)	B6	BioLegend	331402
171Yb	GITR	621	BioLegend	311602
172Yb	CD38	HIT2	Fluidigm	3172007B
173Yb	HLA-DR	L243	Fluidigm	3173005B
174Yb	PD-1	EH12.2H7	Fluidigm	3174020B
175Lu	ICOS	C398.48	Biolegend	313502
176Yb	CD56	NCAM16.2	Fluidigm	3176008B
209Bi	CD16	3G8	Fluidigm	3209002B

*Intracellular stains

Supplementary Table 3. CyTOF Panel for the Immune Response Arm

Metal tag	Marker	Clone	Vendor	Catalog no.
89Y	CD45	HI30	Fluidigm	3089003B
113In	CD61	C1-PL2	Biolegend	336402
113In	CD235ab	HIR2	Biolegend	306602
115In	CD44	IM77	BioLegend	103002
139La	CD33	J112-906 (RUO)	Biolegend	303402
140Ce	CD15	W6D3	Biolegend	323002
141Pr	CD3	UCHT1	Fluidigm	3141019B
142Nd	CD19	HIB19	Fluidigm	3142001B
143Nd	CD117	104D2	Fluidigm	3143001B
144Nd	CD11b	ICRF44	Fluidigm	3144001B
145Nd	CD4	RPA-T4	Fluidigm	3145001B
146Nd	CD8a	RPA-T8	Fluidigm	3146001B
147Sm	CD11c	BU15	BioLegend	337202
148Nd	CD14	M5E2	BioLegend	301802
149Sm	CD127	A019D5	Fluidigm	3149011B
150Nd	FcεRIa	AER-37 (CRA-1)	Fluidigm	3150027B
151Eu	CD123	6H6	Fluidigm	3151001B
152Sm	TCRgd	B1	Fluidigm	3152008B
153Sm	CD45RA	HI100	Fluidigm	3153001B
154Eu	TIM3	F38-2E2	Fluidigm	3154010B
155Gd	TIGIT	MBSA43	ThermoFisher	16-9500-82
156Gd	PD-L1 (CD274)	29E.2A3	Fluidigm	3156026B
158Gd	CD27	L128	Fluidigm	3158010B
159Tb	4-1BB (CD137)	4B4-1	BioLegend	309802
160Gd	*T-bet	4B10	Invitrogen	14-5825-82
161Dy	*CTLA-4 (CD152)	14D3	Fluidigm	3161004B
162Dy	*FoxP3	PCH101	Fluidigm	3162011A
163Dy	CD31	WM59	BioLegend	303102
164Dy	Podoplanin	NC08	BioLegend	337002
No metal tag	VISTA-PE (used with anti-PE-165Ho)	D1L2G	Cell Signaling	64953S
165Ho	*Anti-PE	PE001	Fluidigm	3165015B
166Er	CD141 (BDCA3)	1A4	BD Biosciences	559780

167Er	CCR7 (CD197)	G043H7	Fluidigm	3167009A
168Er	*Ki-67	B56	Fluidigm	3168007B
169Tm	CD25	2A3	Fluidigm	3169003B
170Er	TCR Vα24-Jα18 (iNKT)	B6	BioLegend	331402
171Yb	*CD68	Y1/82A	Fluidigm	3171011B
172Yb	CD38	HIT2	Fluidigm	3172007B
173Yb	ICOS	C398.4A	BioLegend	313502
174Yb	HLA-DR	L243	Fluidigm	3174001B
175Lu	PD-1	EH12.2H7	Fluidigm	3175008B
176Yb	CD56	NCAM16.2	Fluidigm	3176008B
209Bi	CD16	3G8	Fluidigm	3209002B

*Intracellular stains

Supplementary Table 4. Serious Adverse Events

AE Category / AE Detail	Dose Escalation Cohort (*n* = 10)		Immune Response Cohort (*n* = 8)	
	***n* (%) of Subjects**	**Total No. of AEs**	***n* (%) of Subjects**	**Total No. of AEs**
Total	5 (50.0%)		3 (37.50%)	
Blood and lymphatic system disorders				
Thrombotic thrombocytopenic purpura	1 (10.00%)	1	0 (0.0%)	0
Gastrointestinal disorders				
GI bleed	1 (10.0%)	1	0 (0.0%)	0
Hepatobiliary disorders				
Hepatobiliary disorders - other	1 (10.0%)	1	0 (0.0%)	0
Infections and Infestations				
Sepsis	1 (10.0%)	1	2 (25.0%)	2
Abdominal infection	0 (0.0%)	0	1 (12.5%)	1
Infections and infestations - Other	0 (0.0%)	0	1 (12.5%)	2
Injury, poisoning and procedural complications				
Fall	0 (0.0%)	0	1 (12.5%)	1
Investigations				
Blood Bilirubin increased	2 (20.0%)	3	0 (0.0%)	0
Alanine aminotransferase increased	1 (10.0%)	1	0 (0.0%)	0
Aspartate Aminotransferase	1 (10.0%)	1	0 (0.0%)	0
Respiratory, thoracic and mediastinal disorders				
Pleural effusion	1 (10.0%)	1	0 (0.0%)	0
Vascular disorders				
Thromboembolic	1 (10.0%)	1	0 (0.0%)	0

event				
Note: Events were collected by systematic assessment. Note: National Cancer Institute Common Terminology Criteria for Adverse Events [CTCAE] version 4.0 was used for coding.				

Supplementary Table 5. Other (Not Including Serious) Adverse Events

AE Category / AE Detail	Dose Escalation Cohort (*n* = 10)		Immune Response Cohort (*n* = 8)		Total (*n* = 18)	
	n (%) of Subjects	Total No. of AEs	*n* (%) of Subjects	Total No. of AEs	*n* (%) of Subjects	Total No. of AEs
Subjects with any adverse event	10 (100.0%)	255	6 (75.0%)	79	16 (88.9%)	334
Blood and lymphatic system disorders						
Anemia	4 (40.0%)	9	1 (12.5%)	1	5 (27.8%)	10
Blood and lymphatic system disorders - Other, specify	0 (0.0%)	0	1 (12.5%)	1	1 (5.6%)	1
Disseminated intravascular coagulation	1 (10.0%)	2	0 (0.0%)	0	1 (5.6%)	2
Leukocytosis	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Eye disorders						
Blurred vision	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Gastrointestinal disorders						
Nausea	7 (70.0%)	12	5 (62.5%)	12	12 (66.7%)	24
Diarrhea	5 (50.0%)	13	5 (62.5%)	8	10 (55.6%)	21
Vomiting	3 (30.0%)	4	3 (37.5%)	8	6 (33.3%)	12
Abdominal pain	5 (50.0%)	6	0 (0.0%)	0	5 (27.8%)	6
Abdominal distension	4 (40.0%)	4	0 (0.0%)	0	4 (22.2%)	4
Constipation	4 (40.0%)	5	0 (0.0%)	0	4 (22.2%)	5
Bloating	1 (10.0%)	1	1 (12.5%)	1	2 (11.1%)	2
Dry mouth	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Gastritis	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Ascites	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Esophageal pain	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Mucositis oral	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Obstruction gastric	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Oral hemorrhage	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
General disorders and administration site conditions						
Fatigue	8 (80.0%)	17	3 (37.5%)	5	11 (61.1%)	22
Edema limbs	7 (70.0%)	12	0 (0.0%)	0	7 (38.9%)	12
Fever	3 (30.0%)	4	1 (12.5%)	1	4 (22.2%)	5
Flu like symptoms	1 (10.0%)	1	1 (12.5%)	1	2 (11.1%)	2
Edema face	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1

Facial pain	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Irritability	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Pain	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Hepatobiliary disorders						
Portal vein thrombosis	2 (20.0%)	2	1 (12.5%)	1	3 (16.7%)	3
Hepatobiliary disorders - Other, specify	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Immune system disorders						
Allergic reaction	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Infections and infestations						
Sepsis	1 (10.0%)	2	1 (12.5%)	1	2 (11.1%)	3
Urinary tract infection	1 (10.0%)	1	1 (12.5%)	1	2 (11.1%)	2
Lung infection	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Paronychia	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Upper respiratory infection	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Injury, poisoning and procedural complications						
Bruising	2 (20.0%)	2	1 (12.5%)	1	3 (16.7%)	3
Fall	0 (0.0%)	0	2 (25.0%)	3	2 (11.1%)	3
Investigations						
Platelet count decreased	6 (60.0%)	17	2 (25.0%)	6	8 (44.4%)	23
Blood bilirubin increased	3 (30.0%)	5	1 (12.5%)	1	4 (22.2%)	6
Weight loss	2 (20.0%)	2	2 (25.0%)	2	4 (22.2%)	4
Neutrophil count decreased	2 (20.0%)	3	1 (12.5%)	1	3 (16.7%)	4
Alanine aminotransferase increased	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Alkaline phosphatase increased	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Aspartate aminotransferase increased	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Creatinine increased	0 (0.0%)	0	1 (12.5%)	1	1 (5.6%)	1
Metabolism and nutrition disorders						
Anorexia	4 (40.0%)	6	2 (25.0%)	2	6 (33.3%)	8
Dehydration	2 (20.0%)	2	4 (50.0%)	4	6 (33.3%)	6
Hypokalemia	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Hyponatremia	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Musculoskeletal and connective tissue disorders						
Myalgia	3 (30.0%)	4	3 (37.5%)	3	6 (33.3%)	7
Back pain	4 (40.0%)	4	0 (0.0%)	0	4 (22.2%)	4
Bone pain	2 (20.0%)	3	0 (0.0%)	0	2 (11.1%)	3

Generalized muscle weakness	1 (10.0%)	1	1 (12.5%)	1	2 (11.1%)	2
Arthralgia	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Joint range of motion decreased	1 (10.0%)	2	0 (0.0%)	0	1 (5.6%)	2
Muscle weakness lower limb	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Neck pain	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Nervous system disorders						
Peripheral sensory neuropathy	7 (70.0%)	21	1 (12.5%)	2	8 (44.4%)	23
Dizziness	4 (40.0%)	5	0 (0.0%)	0	4 (22.2%)	5
Dysgeusia	2 (20.0%)	2	1 (12.5%)	1	3 (16.7%)	3
Peripheral motor neuropathy	2 (20.0%)	4	0 (0.0%)	0	2 (11.1%)	4
Headache	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Tremor	0 (0.0%)	0	1 (12.5%)	1	1 (5.6%)	1
Psychiatric disorders						
Depression	3 (30.0%)	3	0 (0.0%)	0	3 (16.7%)	3
Anxiety	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Agitation	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Confusion	1 (10.0%)	2	0 (0.0%)	0	1 (5.6%)	2
Insomnia	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Renal and urinary disorders						
Cystitis noninfective	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Hematuria	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Urinary incontinence	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Urinary tract pain	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Reproductive system and breast disorders						
Vaginal inflammation	0 (0.0%)	0	1 (12.5%)	1	1 (5.6%)	1
Respiratory, thoracic and mediastinal disorders						
Cough	2 (20.0%)	2	2 (25.0%)	2	4 (22.2%)	4
Nasal congestion	2 (20.0%)	2	1 (12.5%)	1	3 (16.7%)	3
Dyspnea	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Epistaxis	1 (10.0%)	3	1 (12.5%)	1	2 (11.1%)	4
Pleural effusion	2 (20.0%)	2	0 (0.0%)	0	2 (11.1%)	2
Postnasal drip	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Sore throat	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Skin and subcutaneous tissue disorders						
Rash maculo-papular	7 (70.0%)	7	1 (12.5%)	1	8 (44.4%)	8
Alopecia	4 (40.0%)	5	1 (12.5%)	1	5 (27.8%)	6
Dry skin	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Pruritus	1 (10.0%)	1	0 (0.0%)	0	1 (5.6%)	1
Vascular disorders						
Thromboembolic event	3 (30.0%)	3	0 (0.0%)	0	3 (16.7%)	3

Hypotension	0 (0.0%)	0	2 (25.0%)	2	2 (11.1%)	2

Note: If a subject experienced more than one adverse event within a toxicity category, the subject was counted once under that category. If a subject had more than one count for a particular toxicity, the subject was counted once for that toxicity.
Note: National Cancer Institute Common Terminology Criteria for Adverse Events [CTCAE] version 4.0 was used for coding.

Supplementary Table 6. Clinical Response

Outcome	Dose Escalation Cohort (*n*=10)	Immune Response Cohort (*n*=8)	Overall (*n*=18)
Time to Progression; median (95% CI)	128 (56, NR)	126 (64, NR)	126 (72, 261)
Overall Survival; median (95% CI)	246 (84, NR)	170 (66, NR)	234 (84, 412)
Progression-Free Survival; median (95% CI)	128 (56, NR)	99 (64, NR)	114 (64, 261)

NR, not reachable