

Table S1. Patient summaries. Summary from all evaluable patients treated on study.

CyTOF?	Patient	Dose		Gender	Age	Diagnosis	Pre-Treatment BM Blast (%)	No. Prior Therapies	Best Response	LFS (days)	OS (days)
		Level	Level								
No	001	1	1	Male	73	AML	16	2	PD	14	33
No	006	1	1	Male	70	AML	28	3	PD	14	60
No	007	1	1	Male	77	AML	47	1	CR	181	256
No	008	2	2	Male	76	t-AML	17	3	PD	28	75
No	009	2	2	Female	73	AML	80	3	MLFS	30	198
No	012	2	2	Female	71	AML	15	3	CR	104	338
Yes	016	3	3	Male	43	AML	78	7	PD	14	27
Yes	017	3	3	Male	63	t-AML	69	4	MLFS	31	43
Yes	020	3	3	Male	60	AML	13	1	CRi	77	77
Yes	022	3	3	Female	71	AML	90	1	PD	14	19
Yes	023	3	3	Male	83	AML	86	1	CRi	49	162
Yes	024	3	3	Male	73	AML	0	2	MLFS	29	29
Yes	025	2	2	Male	72	t-AML	2	1	CR	92*	1260+
Yes	027	3	3	Male	76	AML	1	2	CRi	267	1170+
Yes	028	3	3	Female	69	MDS	5	1	CRi	91	390

BM, bone marrow; AML, acute myeloid leukemia; t-AML, treatment-related AML; MDS, myelodysplastic syndrome; PD, progressive disease; CR, complete response; MLFS, morphologic leukemia free state on day 14; CRi, CR with incomplete count recovery; LFS, Leukemia-free survival; OS, overall survival. *Leukemia-free survival censored at time of stem cell transplant. For CIML026, see methods. Dose level 1: 0.5x10⁶/kg, 2: 1x10⁶/kg, 3: 2-10x10⁶/kg.

Table S2. Toxicities considered possibly or probably related to ML NK cell infusion, Grade \geq 2 (n= 15).
 All adverse events were treatment emergent and graded according to the Common Terminology Criteria for Adverse events (CTCAE), v4.

Toxicity	Grade 2	Grade 3	Grade 4
Increased bilirubin	1		
Sinus tachycardia	1		
Hypoxia	1		
Dyspnea	1		
Confusion	1		
Lethargy	1		
Chills	1		
Anorexia	1		
Fatigue	1		
Alopecia	1		

Table S3. All toxicities \geq grade 3, regardless of attribution, excepting cytopenias and correctable electrolyte abnormalities (n= 15). All adverse events were treatment emergent and graded according to the CTCAE, v4.

Toxicity	Grade 3	Grade 4	Grade 5
Febrile neutropenia	13		
Bacteremia	3		
Candidemia	1		
Sepsis		4	
Skin infection	5		
Urinary tract infection	1		
Lung infection	1		
Increased bilirubin	1		
Increase liver enzymes	2	2	
Hyperglycemia	3		
Hypoalbuminemia	2		
Acidosis		1	
Prolonged PTT	1		
Troponin increased	1		
Intracranial hemorrhage		1	
Other bleeding	4	1	
Respiratory failure		4	
Hypoxia	3		
Shortness of breath	1		
Pulmonary edema	1		
Cardiopulmonary arrest			1
Hypotension	4	1	
Hypertension	3		
Atrial fibrillation	2		
Supraventricular tachycardia	1		
Generalized weakness	2		
Headache	1		
Acute kidney injury	1		
Mucositis		1	
Nausea	2		
Edema	2		
Multi-organ failure			1
Anorexia	1		
Pain in extremity	1		
Encephalopathy			1

Table S4. NK cell phenotypic, functional and mass cytometry panels. The metal isotope tag, marker name, antibody clone, source and clustering usage are shown for the mass cytometry phenotypic (P), functional (F), or resistance (R) panels. Clustering demarcates which channels were used for generating the NK cell viSNE plots, and identifying lymphocyte subsets (FlowSOM) in the phenotypic panel (Lymph) or the resistance (Resist) panel. The asterisk (*) included after the source indicates antibodies that were custom-conjugated using Fluidigm antibody labeling kits, per manufacturer's instructions. NA, not applicable.

Tag	Antibody	Clone	Source	Panel	Clustering
89 Y	CD45	HI30	Fluidigm	P/F/R	Lymph, Resist
141 Pr	CD14	M5E2	BD Pharmingen*	P/F/R	Lymph, Resist
142 Nd	CD19	HIB19	Fluidigm	P/F	Lymph
143 Nd	KIR3DL1	DX9	R&D*	P/F	NK
143 Nd	CD117	104D2	Biolegend*	R	Resist
144 Nd	FITC	FIT-22	Fluidigm	P/F	NA
144 Nd	CD19	HIB19	Biolegend*	R	Resist
145 Nd	KIR2DS4	FES172	Beckman Coulter*	P/F	NK
145 Nd	HLA-E	3D12	Biolegend*	R	NA
146 Nd	KIR2DL1/2DS1	EB6B	Beckman Coulter*	P/F	NK
147 Sm	NKG2D	1D11	R&D*	P/F	NK
147 Sm	CD15	W6D3	Biolegend*	R	Resist
148 Nd	KIR2DL2/2DL3	CH-L	BD Pharmingen*	P/F/R	NK, Resist
148 Nd	KIR2DL1	EB6B	Beckman Coulter*	R	Resist
148 Nd	KIR3DL1	X27	Beckman Coulter*	R	Resist
149 Sm	CD127	AO19D5	Fluidigm	P/R	Lymph, Resist
149 Sm	T-Bet	4B10	BD Pharmingen*	F	NA
150 Nd	CD4	OKT4	Miltenyi*	P/R	Lymph, Resist
150 Nd	Mip1a	93342	R&D*	F	NA
151 Eu	TRAIL	RIK-2	Biolegend*	P	NK
151 Eu	CD107a	H4A3	Fluidigm	F	NA
152 Sm	CD8	SK1	eBioscience*	P/R	Lymph, Resist
152 Sm	TNF	Mab11	Fluidigm	F	NA
153 Eu	CD62L	DREG-56	Fluidigm	P/F	NK
154 Sm	KIR2DL5	UP-R1	Beckman Coulter*	P/F	NK
155 Gd	CD27	L128	Fluidigm	P/F	NK
156 Gd	PDL1/PDL2	29E.2A3	Fluidigm	P	NA
158 Gd	CD137	4B4-1	Fluidigm	P/F	NK
159 Tb	NKG2C	134591	R&D*	P/F	NK
160 Gd	CD69	FN50	Biolegend*	P/F	NK
161 Dy	NKp30	P30-15	Biolegend*	P/F	NK
162 Dy	KI-67	B56	Fluidigm	P	NK
162 Dy	LAG3	11C3C65	Biolegend*	F	NA
162 Dy	FoxP3	PCH101	Fluidigm	R	Resist
163 Dy	CD94	DX22	Biolegend*	P/F	NK
163 Er	CD33	WM53	Fluidigm	R	Resist
164 Dy	FoxP3	PCH101	Invitrogen*	P	NA
164 Dy	Tim-3	F38-2E2	Biolegend*	F	NA
165 Ho	CD16	3G8	Fluidigm	P/F/R	Lymph, NK, Resist

166 Er	NKG2A	ZI99	Beckman Coulter*	P/F/R	NK
167 Er	NKp44	P44-8	Biolegend*	P/F	NK
168 Er	DNAM1	DX11	Miltenyi*	P	NK
168 Er	IFN- γ	B27	Fluidigm	F	NA
169 Tm	CD25	2A3	Fluidigm	P/R	Lymph, NK, Resist
169 Tm	Eomes	WD1928	Invitrogen*	F	NA
170 Er	CD34	581	Invitrogen*	P/F/R	Lymph, Resist
171 Yb	Granzyme B	GB11	Fluidigm	P	NK
171 Yb	PD-1	EbioJ105	Invitrogen*	F	NA
172 Yb	CD57	HCD57	Fluidigm	P/F	NK
173 Yb	CD3	UCHT1	BD Pharmingen*	P/F/R	Lymph, Resist
174 Yb	NKp46	9E2	R&D*	P/F	NK
174 Yb	HLA-DR	L243	Fluidigm	R	Resist
175 Lu	Perforin	B-D48	Fluidigm	P/F	NK
176 Yb	CD56	NCAM16.2	Fluidigm	P/F/R	Lymph, NK, Resist
209 Bi	CD11b	209Bi	Fluidigm	P/F/R	Lymph, NK, Resist