

Supplemental Table 1. Clinical characteristics of 51 recruited patients.

	OA (n=15)	leukocyte-poor RA (n=17)	leukocyte-rich RA (n=19)
Demographic variables			
Age, mean (Range)	71 (64-81)	64.2 (42-79)	57.3 (36-71)
Females, n (%)	10 (66.7)	15 (82.4)	14 (73.7)
RA-related variables			
Mean years of disease duration (range)		15.7 (<1-51)	5.5* (<1-29)
RF positive, n (%)		8 (47.1)	16* (84.2)
CCP positive, n (%)		10 (58.8)	14 (73.7)
DMARDs			
Prednisone, n (%)		10 (55.6)	4* (22.2)
Methotrexate, n (%)		7 (41.2)	3 (15.8)
TNFi, n (%)		4 (23.5)	2 (10.5)
Rituximab, n (%)		0 (0)	1 (5.3)
Abatacept, n (%)		1 (5.9)	1 (5.3)
Tofacitinib, n (%)		2 (11.8)	1 (5.3)

DMARDs = Disease-Modifying Antirheumatic Drugs.

TNFi = TNF inhibitors (infliximab, etanercept, adalimumab, Golimumab).

RhF = Rheumatoid Factor. CCP = Cyclic Citrullinated Peptide.

*Significant p-value between leukocyte-poor RA and leukocyte-rich RA.

Supplemental Table 2. Antibody staining and fixation of mass cytometry panel.

marker	clone	Metal	Dilution
CD45	HI30	141Pr	1:100
CD19	HIB19	142Nd	1:100
RANKL	MIH24	143Nd	1:50
CD64	10.1	144Nd	1:100
CD16	3G8	145Nd	1:100
CD8a	RPA T8	146Nd	1:100
FAP	Poly	147Sm	1:50
CD20	2H7	148Nd	1:100
CD45RO	UCHL1	149Sm	1:100
CD38	HIT2	150Nd	1:100
CD279/PD-1	EH12.2H7	151Eu	1:100
CD14	M5E2	152Sm	1:100
CD69	FN50	153Eu	1:100
CD185/CXCR5	J252D4	154Sm	1:100
CD4	RPA T4	155Gd	1:100
Podoplanin	NC-08	156Gd	1:100
CD3	UCHT1	158Gd	1:100
CD11c	Bu15	159Tb	1:100
CD307d/FcRL4	413D12	160Gd	1:100
CD138	MI15	161Dy	1:100
CD90	5.00E+10	162Dy	1:50
CCR2	K036C2	163Dy	1:100
Cadherin 11	3C10	164Dy	2:25
FoxP3	PCH101	165Ho	1:50
CD34	581	166Er	1:100
CD146/MCAM	SHM-57	167Er	1:50
IgA	9H9H11	168Er	1:100
ICOS	C398.4A	170Er	1:100
CD66b	G10F5	171Yb	1:100
IgM	MHM-88	172Yb	1:200
CD144/VE-Cadherin	BV9	173Yb	1:100
HLA-DR	L243	174Yb	1:100
IgD	IA6-2	175Lu	1:100
CD106/VCAM-1	STA	176Yb	1:100

Supplemental Table 3. Identified mass cytometry populations with proportion of cells from each disease cohort and on tailed FDR q value.

Cell type	mass cytometry cluster	# Cells	Cells from OA (%)	Cells from leukocyte-poor RA (%)	Cells from leukocyte-rich RA (%)	One-sided FDR q value
Fibroblast	THY1 ⁻ Cadherin-11 ⁻	4,333	48.3	45.7	6.0	1.00
	THY1 ⁻ Cadherin-11 ⁺	3,752	55.8	40.9	3.3	1.00
	THY1 ⁻ CD34 ⁺ HLA-DR ^{hi}	1,474	42.5	44.2	13.3	1.00
	THY1 ⁻ CD34 ⁻ HLA-DR ^{hi}	4,171	50.2	28.3	21.5	1.00
	THY1 ⁺ CD34 ⁻ HLA-DR ^{hi}	2,577	7.1	9.4	83.4	5.8E-04
	THY1 ⁺ CD34 ⁻ HLA-DR ^{lo}	3,794	38.1	38.6	23.3	1.00
	THY1 ⁺ CD34 ⁺ HLA-DR ^{lo}	3,514	52.0	40.9	7.1	1.00
	THY1 ⁺ CD34 ⁺ HLA-DR ^{hi}	1,546	9.8	10.2	80.0	1.2E-03
Monocyte	CD11c ⁻	2,801	58.0	33.4	8.6	1.00
	CD11c ⁺ CCR2 ⁺	5,602	32.6	24.2	43.2	0.72
	CD11c ⁺ CD38 ⁻	1,313	37.0	54.8	8.2	1.00
	CD11c ⁺ CD38 ⁻ CD64 ⁺	1,031	37.9	43.7	18.3	1.00
	CD11c ⁺ CD38 ⁺	4,551	20.0	13.1	66.9	9.5E-04
T cell	CD4 ⁻ CD8 ⁻	2,475	44.6	34.5	20.9	1.00
	CD4 ⁺ CCR2 ⁺	4,093	51.7	28.7	19.6	1.00
	CD4 ⁺ HLA-DR ⁺	1,178	29.3	62.3	8.4	1.00
	CD4 ⁺ PD-1 ⁺ ICOS ⁻	2,368	33.7	37.1	29.1	1.00
	CD4 ⁺ PD-1 ⁺ ICOS ⁺	3,138	22.9	28.6	48.5	1.7E-03
	CD8 ⁺ PD-1 ⁻ HLA-DR ⁻	2,535	46.1	31.6	22.3	1.00
	CD8 ⁺ PD-1 ⁻ HLA-DR ⁺	400	42.3	35.5	22.3	1.00
	CD8 ⁺ PD-1 ⁺ HLA-DR ⁻	2,710	40.0	29.3	30.8	1.00
	CD8 ⁺ PD-1 ⁺ HLA-DR ⁺	1,088	9.8	9.4	80.8	9.5E-04
B cell	CD38 ⁺⁺ CD20 ⁻ IgM ⁻ IgD ⁻	770	3.6	6.5	89.9	0.04
	CD38 ⁺⁺ CD20 ⁻ IgM ⁺ HLA-DR ⁺	220	1.8	5.5	92.7	0.04
	IgM ⁻ IgD ⁻ HLA-DR ⁻	379	42.0	39.1	19.0	1.00
	CD38 ⁺ HLA-DR ⁺⁺ CD20 ⁻ CD11c ⁺	550	16.7	18.2	65.1	1.00
	IgM ⁻ IgD ⁻ HLA-DR ⁺⁺ CD20 ⁺ CD11c ⁺	771	1.0	6.6	92.3	0.01
	IgM ⁻ IgD ⁻ HLA-DR ⁺	1,774	15.7	25.3	59.0	1.00
	IgA ⁺ IgM ⁻ IgD ⁻	336	20.2	11.0	68.8	1.00
	IgM ⁺ IgD ⁻	1,126	18.7	22.6	58.8	1.00
	IgM ⁺ IgD ⁺ CD11c ⁻	1,762	5.6	7.3	87.2	0.05
	IgM ⁺ IgD ⁺ CD11c ⁺	491	8.8	7.5	83.7	0.69

