

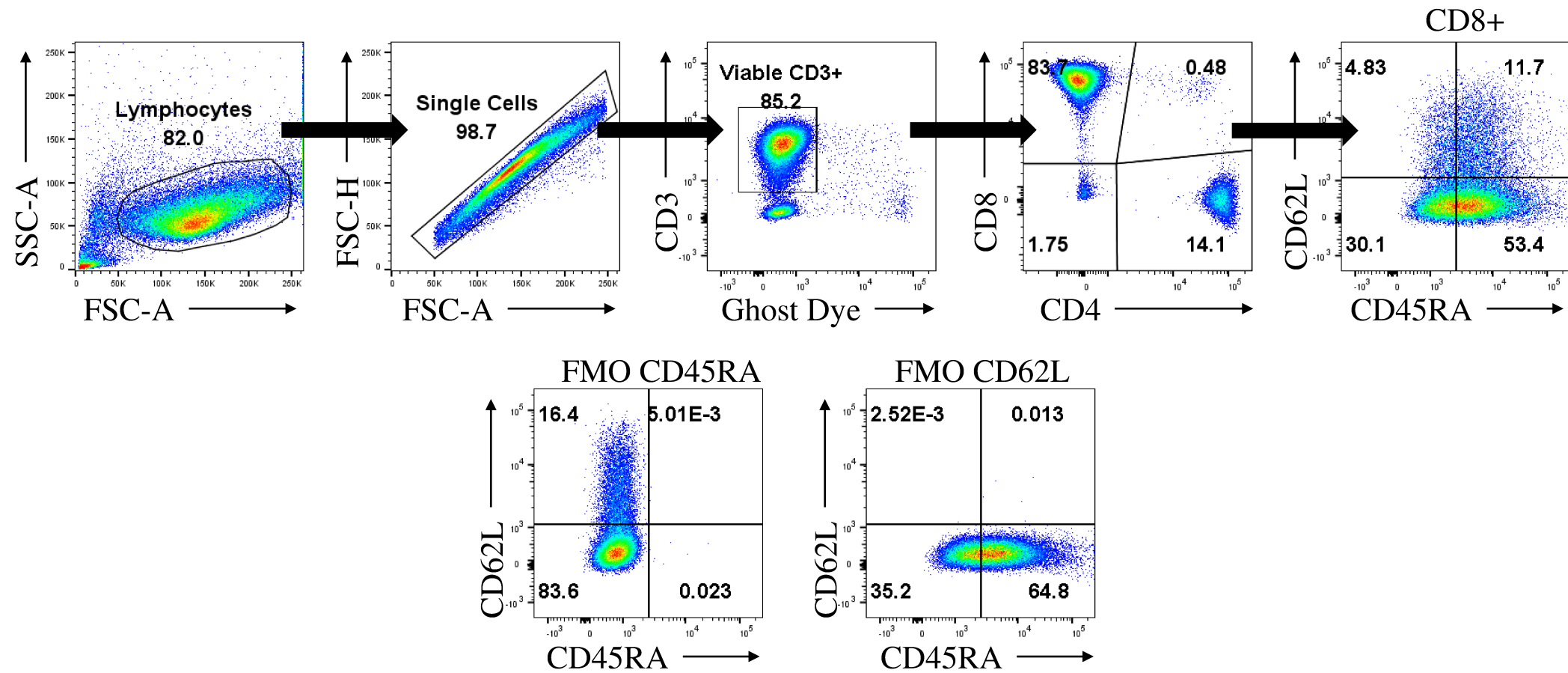
# Supplemental Table 1 – Summary of RCC Patient Characteristics

BSR ID	RCC #	Age at Date of Surgery	Gender	Race/Ethnicity	Histologic Classification	Grade	TNM Stage	T1 Generation Successful by Paving?	Clinical Notes	Research Notes
29299	1	66	Male	White/Not Hispanic or Latino	clear cell RCC	G4	pT1aM0N0/A	N/A		Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29321	2	61	Male	White/Not Hispanic or Latino	clear cell RCC	G4	pT3a NO M0N/A	N/A	Sarcomatoid Features (30%)	Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29359	3	57	Male	Cislat/Not Hispanic or Latino	clear cell Papillary RCC	G1	pT1aM0M0/A	N/A		Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29370	4	74	Female	White/Not Hispanic or Latino	clear cell RCC	G3	pT3aM0M0/A	N/A		Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29721	5	70	Female	White/Not Hispanic or Latino	clear cell RCC	G2	pT3aM0M0N/A	N/A		Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29446	6	59	Male	White/Not Hispanic or Latino	Chromophobe RCC	N/A	pT3aM0M0/A	N/A		Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29712	7	82	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT3aM0M0N/A	N/A		Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29722	8	67	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT3aM0M0/A	N/A		Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29821	9	43	Female	White/Not Hispanic or Latino	clear cell RCC	G2	pT3a NO M0N/A	N/A		Establishment of Tumor Digestion Protocol and Adherent Tumor Cell Culture
29858	10	66	Male	White/Not Hispanic or Latino	clear cell RCC	G4	pT3a NO M0N/A	N/A		Validation of Adherent Cell Culture via NGS sequencing
29096	11	54	Female	Hispanic or Latino	clear cell RCC	G2	pT3a NO M0N/A	N/A		Validation of Adherent Cell Culture via NGS sequencing
30000	12	53	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT3a NO M0N/A	N/A		Validation of Adherent Cell Culture via NGS sequencing
29651	13	70	Male	White/Not Hispanic or Latino	clear cell RCC	G3	pT3a N0 M1	N/A		Method Development for T1 Expansion
29665	14	60	Male	White/Not Hispanic or Latino	clear cell RCC	G3	pT1d N0 M0N/A	N/A		Method Development for T1 Expansion
24774	15	62	Male	White/Not Hispanic or Latino	invasive high grade urothelial carcinoma	Low Grade	pT4 N1 M0N/A	N/A		Method Development for T1 Expansion
28281	16	57	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT2aM0M0N/A	N/A		Method Development for T1 Expansion
28369	17	70	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT3a NO M0N/A	N/A		Method Development for T1 Expansion/ Characterization of Immunosuppressive Ligands (TCL1)
29623	18	70	Male	White/Not Hispanic or Latino	Papillary RCC	G4	pT3aM0M0N/A	N/A		Method Development for T1 Expansion
28382	19	82	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT3aM0M0/A	N/A		Method Development for T1 Expansion
28383	20	57	Male	White/Not Hispanic or Latino	Papillary RCC	G3	pT3aM0M0/A	N/A		Method Development for T1 Expansion
28912	21	43	Male	White/Not Hispanic or Latino	Hemorrhagic Cyst w/ benign epithelial lining	N/A	N/A	N/A		Method Development for T1 Expansion
24862	22	68	Male	Hispanic or Latino	Papillary RCC	G1	pT1aM0M0N/A	N/A		Method Development for T1 Expansion
28496	23	62	Male	Hispanic or Latino	clear cell RCC	G2	pT3aM0M0N/A	N/A		Method Development for T1 Expansion
24475	24	56	Female	White/Not Hispanic or Latino	clear cell RCC	G2	pT3aM0M0/A	N/A		Method Development for T1 Expansion
28445	25	70	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT1aM0M0N/A	N/A		Method Development for T1 Expansion
28434	26	64	Male	White/Not Hispanic or Latino	Oncocytoma	N/A	N/A	N/A		Method Development for T1 Expansion
24941	27	63	Male	White/Not Hispanic or Latino	Papillary RCC	G3	pT3Nx	N/A		Method Development for T1 Expansion
24951	28	52	Male	White/Not Hispanic or Latino	clear cell RCC	G1	pT1aMx	N/A		Method Development for T1 Expansion
28484	29	69	Male	White/Not Hispanic or Latino	clear cell RCC	G4	pT3a NO M0N/A	N/A		Method Development for T1 Expansion
28486	30	44	Female	White/Not Hispanic or Latino	clear cell RCC	G2	pT3aM0M0N/A	N/A		Method Development for T1 Expansion
28544	31	62	Male	White/Not Hispanic or Latino	Papillary RCC	G2	pT3aM0M0N/A	N/A		Method Development for T1 Expansion
28564	32	40	Female	White/Not Hispanic or Latino	clear cell RCC	G2	pT1aM0M0N/A	N/A		Method Development for T1 Expansion
28609	33	88	Female	White/Not Hispanic or Latino	clear cell RCC	G2	pT1aM0M0N/A	N/A		Method Development for T1 Expansion
28614	34	59	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT3aM0M0N/A	N/A		Method Development for T1 Expansion
28624	35	61	Female	Black or African American	Papillary RCC	G2	pT2aM0M0N/A	N/A		Method Development for T1 Expansion
28651	36	47	Male	White/Not Hispanic or Latino	RCC, unclassified	G2	mpT2bM0M0N/A	N/A		Method Development for T1 Expansion
28573	37	50	Male	White/Not Hispanic or Latino	clear cell RCC	G3	pT3aM0M0N/A	N/A		Method Development for T1 Expansion
30019	38	44	Female	White/Not Hispanic or Latino	clear cell RCC	G2	pT3a NO M0N/A	N/A		Method Development for T1 Expansion
30034	39	61	Male	White/Not Hispanic or Latino	clear cell RCC	G1	pT1aM0M0N/A	N/A		Method Development for T1 Expansion / PreExpansion Characterization
31597	40	46	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT1aM0M0N/A	N/A		Method Development for T1 Expansion
31249	41	61	Male	White/Not Hispanic or Latino	clear cell RCC	G3	pT3a N0 M0N/A	N/A		Method Development for T1 Expansion / PreExpansion Characterization
31260	42	72	Female	White/Not Hispanic or Latino	clear cell RCC	G4	pT3a N1 (6/5)M1	N/A		Method Development for T1 Expansion / PreExpansion Characterization
33261	43	58	Male	Hispanic or Latino	clear cell RCC	G3	pT3a N0 M0N/A	N/A		Method Development for T1 Expansion / PreExpansion Characterization
30998	44	62	Male	White/Not Hispanic or Latino	clear cell RCC	G2	pT3aM0M0N/A	N/A		Method Development for T1 Expansion
31028	45	71	Male	White/Not Hispanic or Latino	clear cell RCC	G4	pT3a NO M1	N/A		Method Development for T1 Expansion / PreExpansion Characterization
31032	46	65	Female	White/Not Hispanic or Latino	clear cell RCC	G3	pT3aM0M0N/A	N/A		Method Development for T1 Expansion
31287	47	64	Male	White/Not Hispanic or Latino	Chromophobe RCC	N/A	pT2aM0M0/A	N/A		Method Development for T1 Expansion
31076	48	80	Male	White/Not Hispanic or Latino	Papillary RCC	G1	pT2aMx	N/A		Method Development for T1 Expansion
31110	49	58	Male	White/Not Hispanic or Latino	clear cell RCC	G3	pT1aM0M0N/A	N/A		Method Development for T1 Expansion
31324	50	59	Male	Hispanic or Latino	clear cell RCC	G2	pT1aMx	N/A		Method Development for T1 Expansion
31145	51	56	Female	White/Not Hispanic or Latino	clear cell RCC	G3	pT2a N0 M0N/A	N/A		Method Development for T1 Expansion / PreExpansion Characterization
31277	52	55	Male	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT1d N0 M0N/A	Yes		Validation of Paving Protocol for T1 Expansion
29096	PreC3	61	Male	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT3a N0 M0N/A	Yes	Patient enrolled in Prospec RCC clinical trial - randomized to surgery alone arm	Validation of Paving Protocol for T1 Expansion
33710	53	57	Female	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT3a N0 M0N/A	Yes		Validation of Paving Protocol for T1 Expansion
33750	54	58	Male	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT1d N0(0/5) M0N/A	Yes		Validation of Paving Protocol for T1 Expansion / PreExpansion Characterization
33792	56	60	Male	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT3b N0(0/10) M1	Yes	Two left lower lobe pulmonary nodules favored for metastases rather than noncalcified granulomas or other etiology on imaging	Validation of Paving Protocol for T1 Expansion / PreExpansion Characterization
33821	57	44	Female	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT3a N0 M0N/A	Yes		Validation of Paving Protocol for T1 Expansion / Characterization of Immunosuppressive Ligands (TCL2)
33836	58	69	Female	White/Not Hispanic or Latino	Clear Cell RCC	G3	pT3a N0 M0N/A	No		Validation of Paving Protocol for T1 Expansion
33851	59	46	Female	White/Not Hispanic or Latino	Chromophobe RCC	G3	pT3a N0 M0N/A	No	Immunostain for CK7/CD117/CAIX supporting chromophobe subtype	Validation of Paving Protocol for T1 Expansion
33885	60	62	Female	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT1d N0(0/9) M0N/A	Yes		Validation of Paving Protocol for T1 Expansion
33906	61	24	Male	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT1d N0(0/2) M0N/A	Yes		Validation of Paving Protocol for T1 Expansion / PreExpansion Characterization
33915	62	48	Male	White/Not Hispanic or Latino	Clear Cell RCC	G4	pT3a N1(15/7) M1	Yes	Biopsy consistent with metastases to liver. Numerous pulmonary nodules and mediastinal lymphadenopathy noted on imaging. Sarcomatoid differentiation noted (30%). Immunostain for PAX8/CAIX/PanCK/VSAT3/ps63 supporting clear cell subtype	Validation of Paving Protocol for T1 Expansion
33956	63	74	Female	White/Not Hispanic or Latino	Papillary RCC	G2	pT2b N0 M0N/A	No		Validation of Paving Protocol for T1 Expansion
33965	64	79	Male	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT3a N0 M0N/A	Yes		Validation of Paving Protocol for T1 Expansion / PreExpansion Characterization
35707	65	84	Male	White/Not Hispanic or Latino	Papillary RCC	G3	pT2a N0 M0N/A	No		Validation of Paving Protocol for T1 Expansion
35712	66	58	Female	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT3a N0 M0N/A	Yes		Validation of Paving Protocol for T1 Expansion
32147	67	75	Male	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT1d N0 M0N/A	Yes		Validation of Paving Protocol for T1 Expansion
35769	68	64	Male	White/Not Hispanic or Latino	Clear Cell RCC	G4	pT3a N0 M0N/A	Yes		Validation of Paving Protocol for T1 Expansion
35808	69	53	Male	White/Not Hispanic or Latino	Clear Cell RCC	G4	pT3a N0 M0N/A	Yes		Immunostain for PAX8/CAIX supporting clear cell subtype. High risk of recurrence due to G4, pT3, rhuboid features, and necrosis
35862	70	53	Female	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT3a N0 M0N/A	Yes		Validation of Paving Protocol for T1 Expansion
35887	71	85	Male	White/Not Hispanic or Latino	Clear Cell RCC	G4	pT3aM0M0N/A	N/A		Characterization of MDSG
35891	72	62	Male	Asian	clear cell papillary RCC	G1	pT1a	N/A		Characterization of immunosuppressive ligands (TCL3)
35934	74	49	Male	White/Not Hispanic or Latino	Metastatic Clear Cell RCC	Unavailable	Unavailable	N/A		Characterization of MDSG
35955	75	69	Male	White/Not Hispanic or Latino	Clear Cell RCC	G2	pT1d N0 M0N/A	N/A		Characterization of MDSG

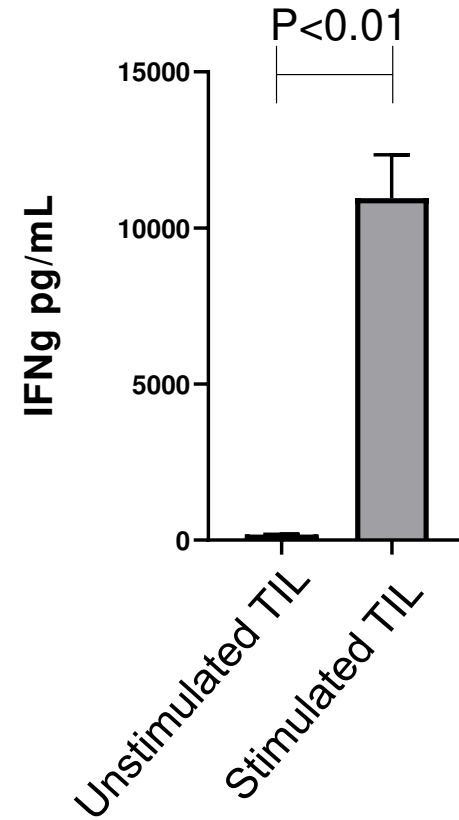
## Supplemental Table 2 – Mutation profile of adherent RCC TCLs

<b>Gene</b>	<b>RCC11</b>	<b>RCC12</b>	<b>RCC13</b>
<i>VHL</i>	Val155Met	Ser72fs	His115Asn
<i>PBRM1</i>	WT	Ile97fs	Asp419Gly
<i>SETD2</i>	WT	WT	Lys1712_Ser1714del
<i>TP53</i>	WT	WT	Leu330His

# Supplemental Figure 1 – Representative Gating Scheme

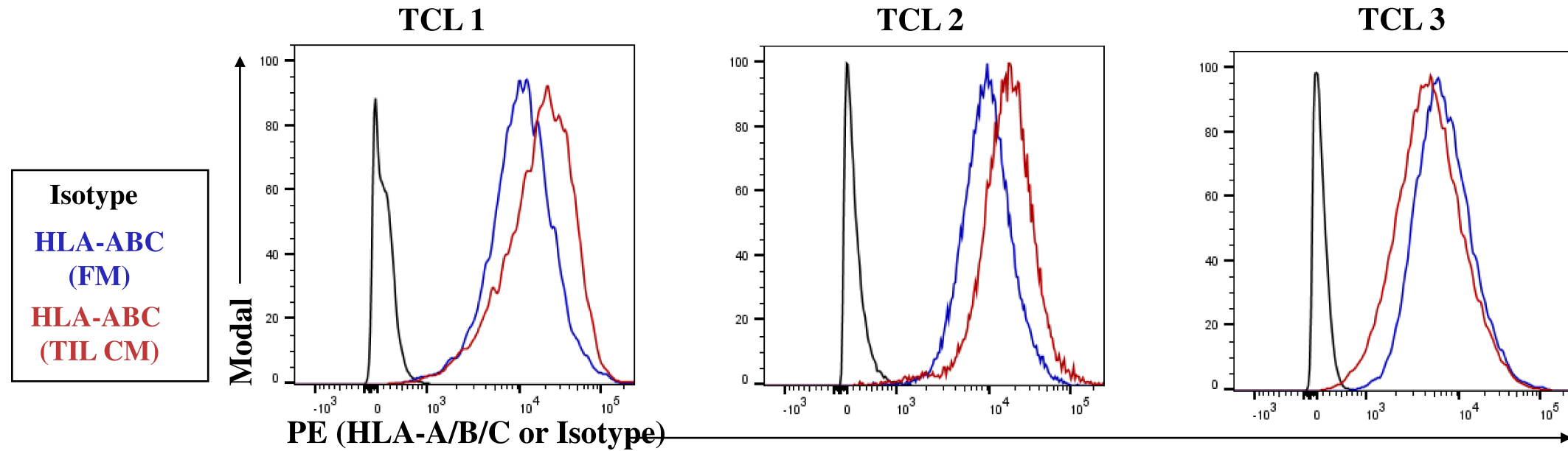


## Supplemental Figure 2

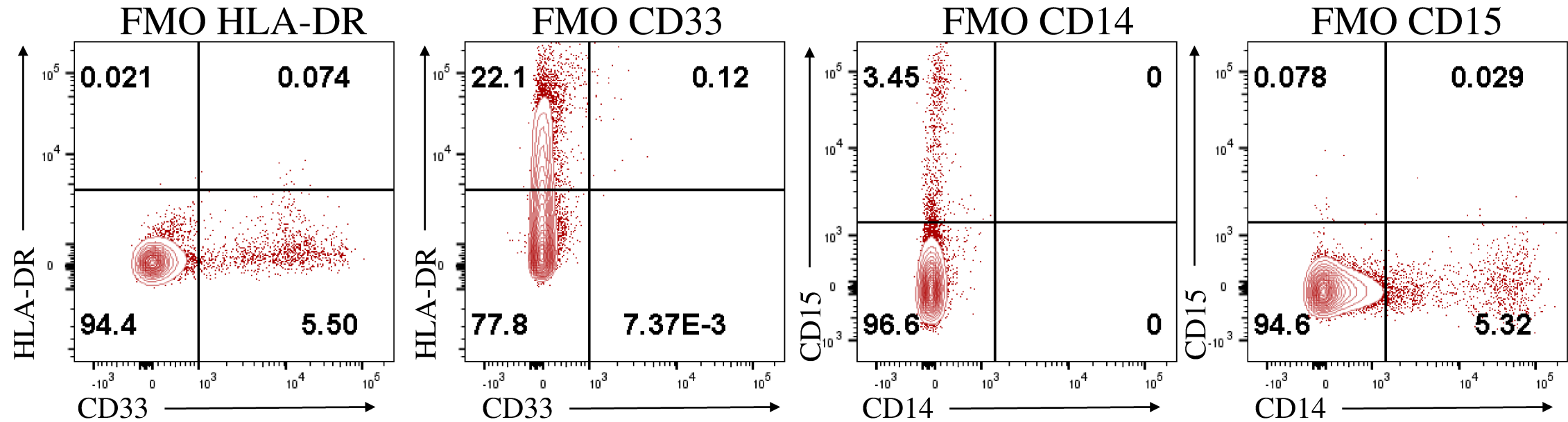
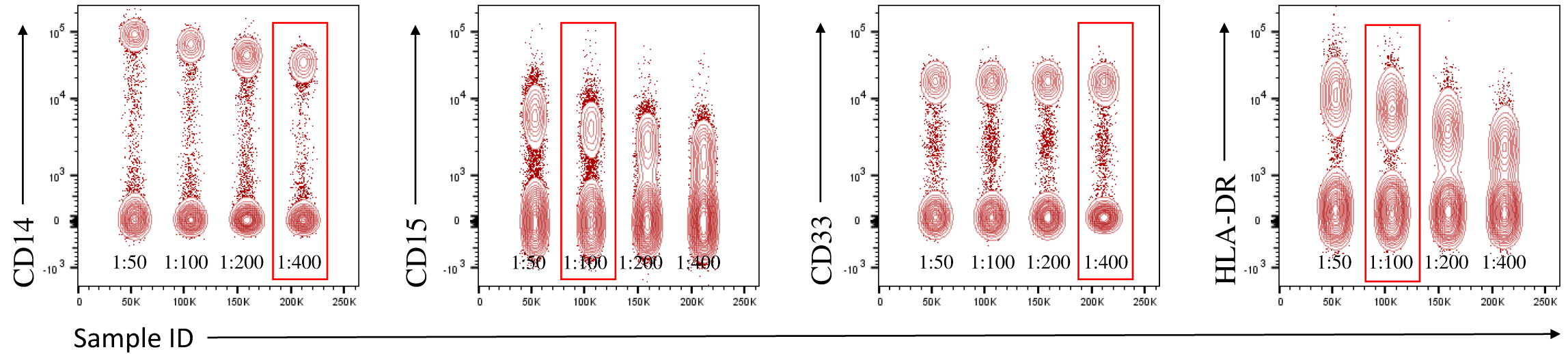




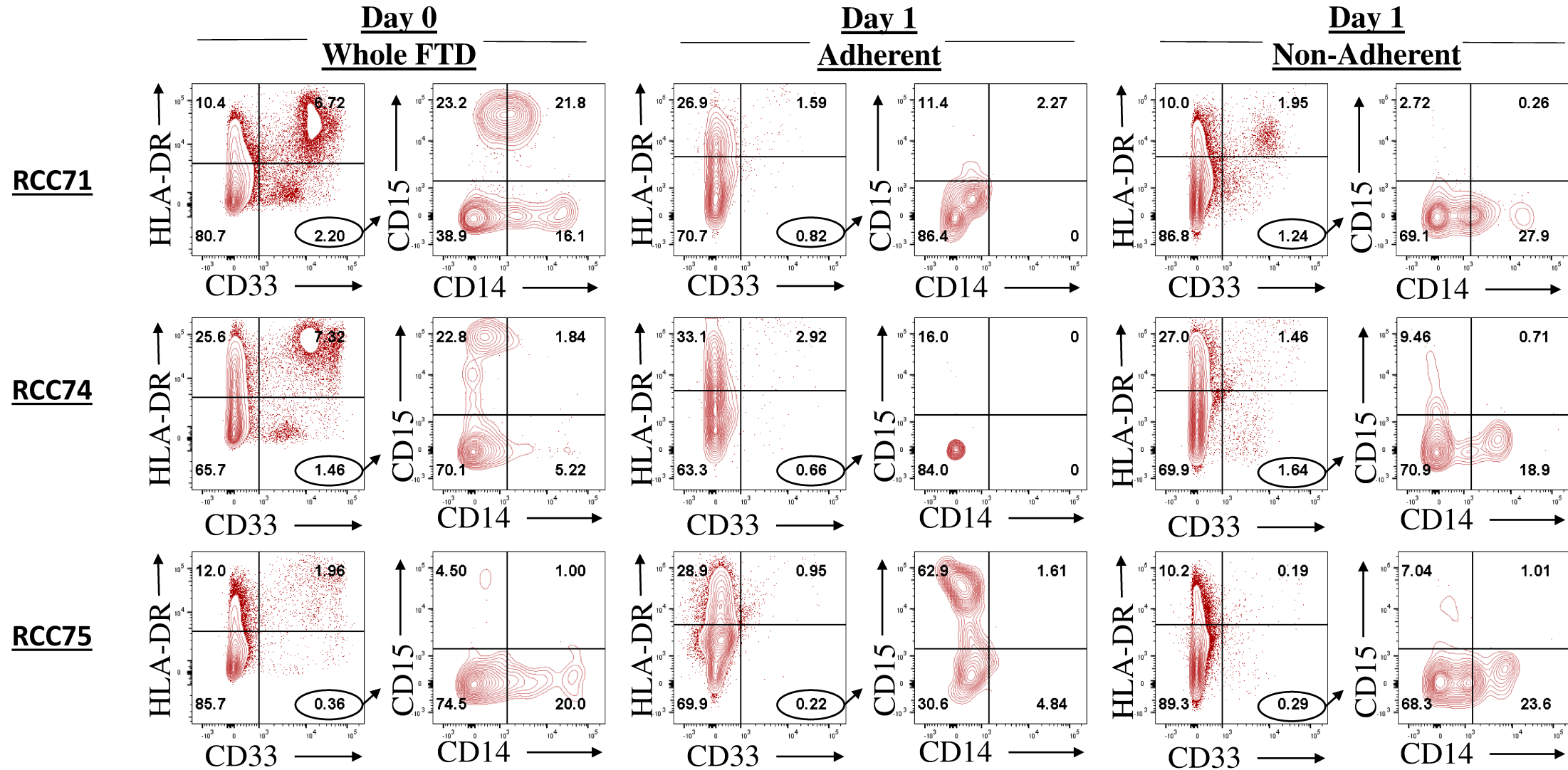
# Supplemental Figure 3



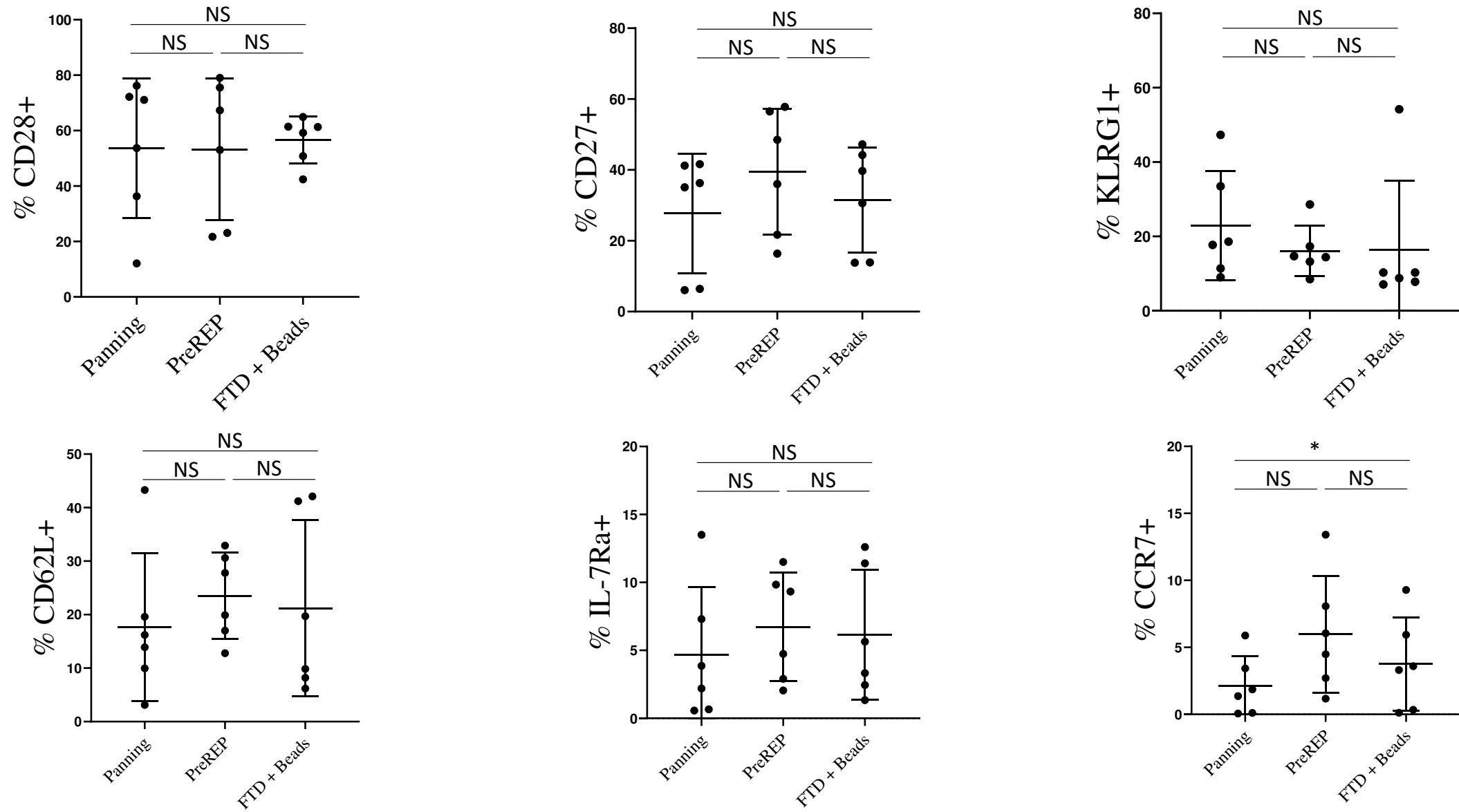
## Supplemental Figure 4



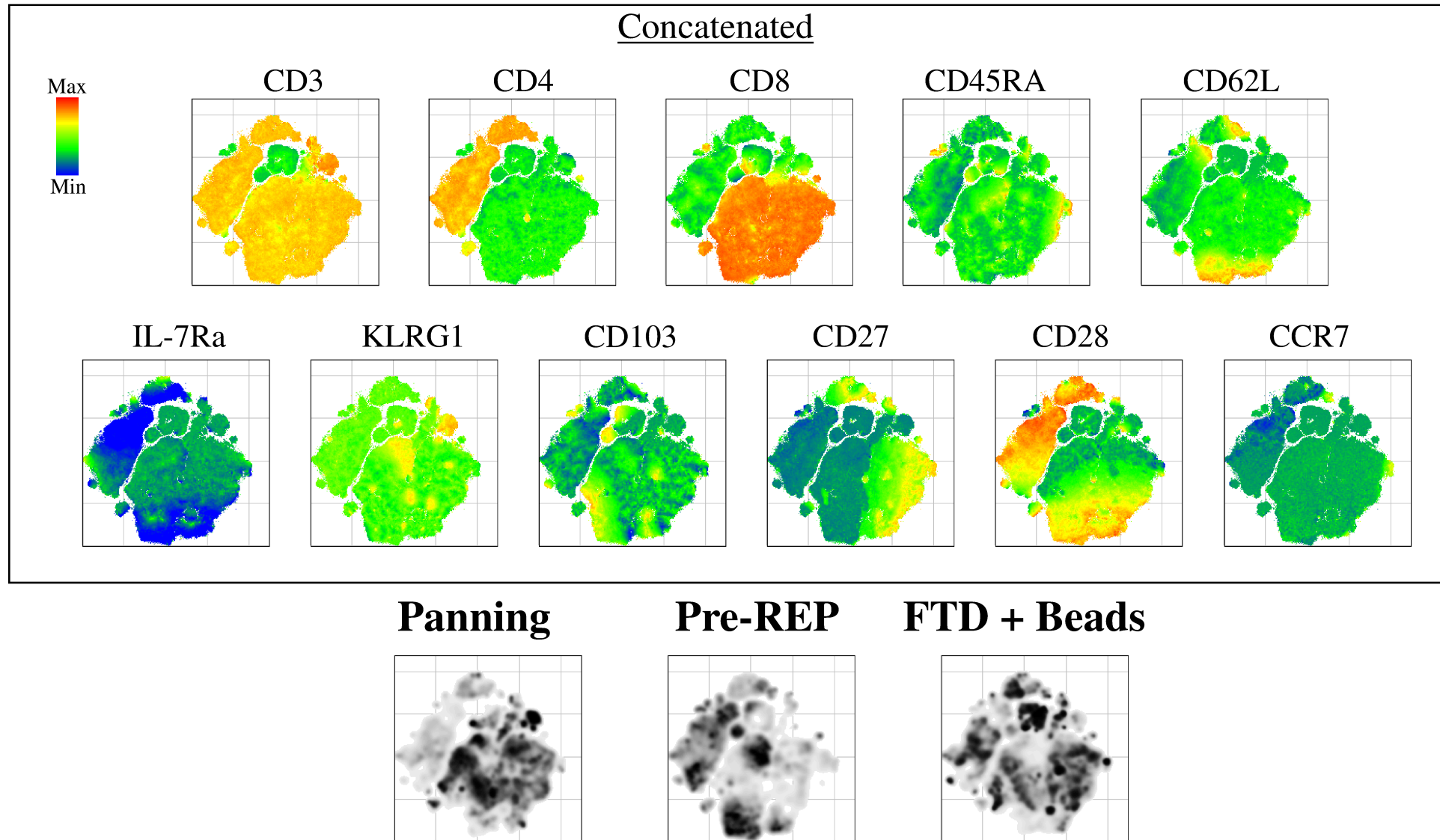
## Supplemental Figure 5



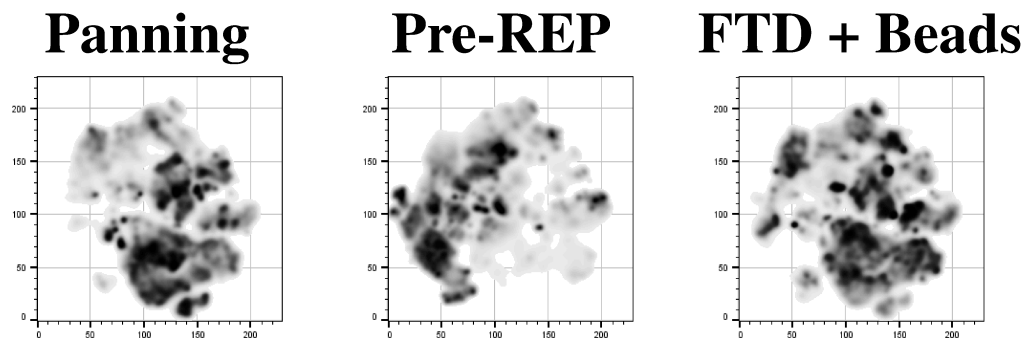
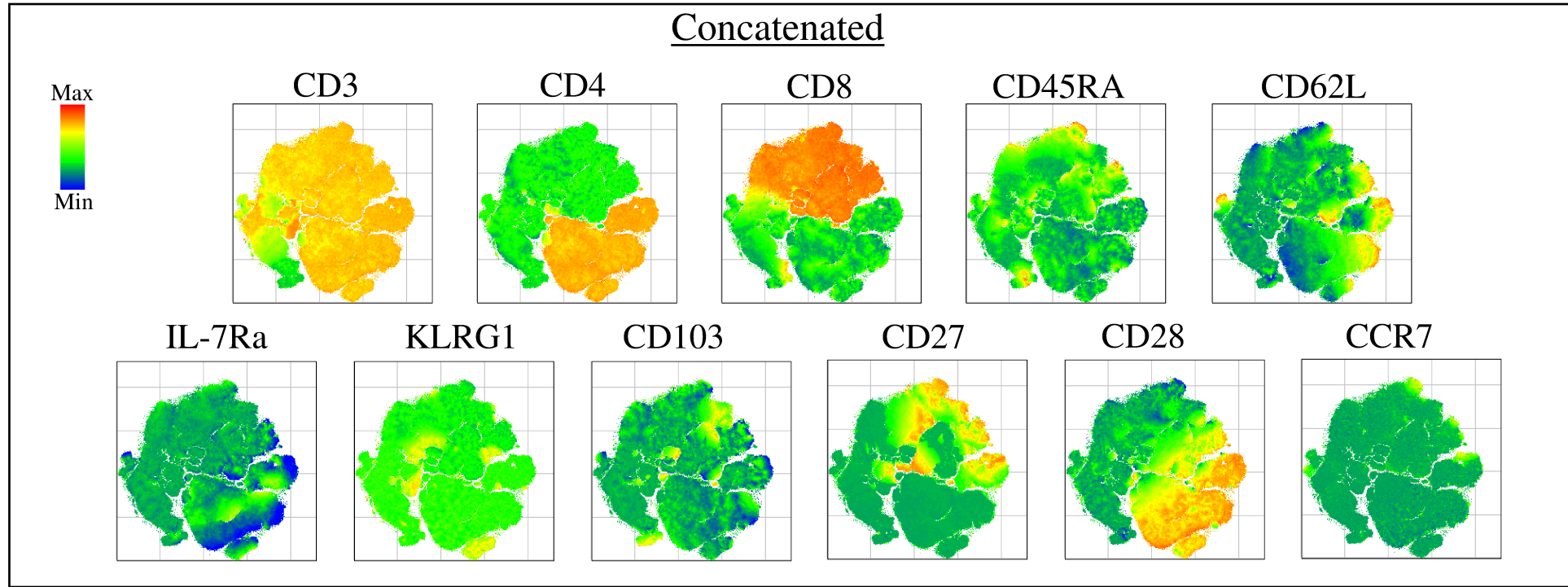
## Supplemental Figure 6



## Supplemental Figure 7 - RCC 57

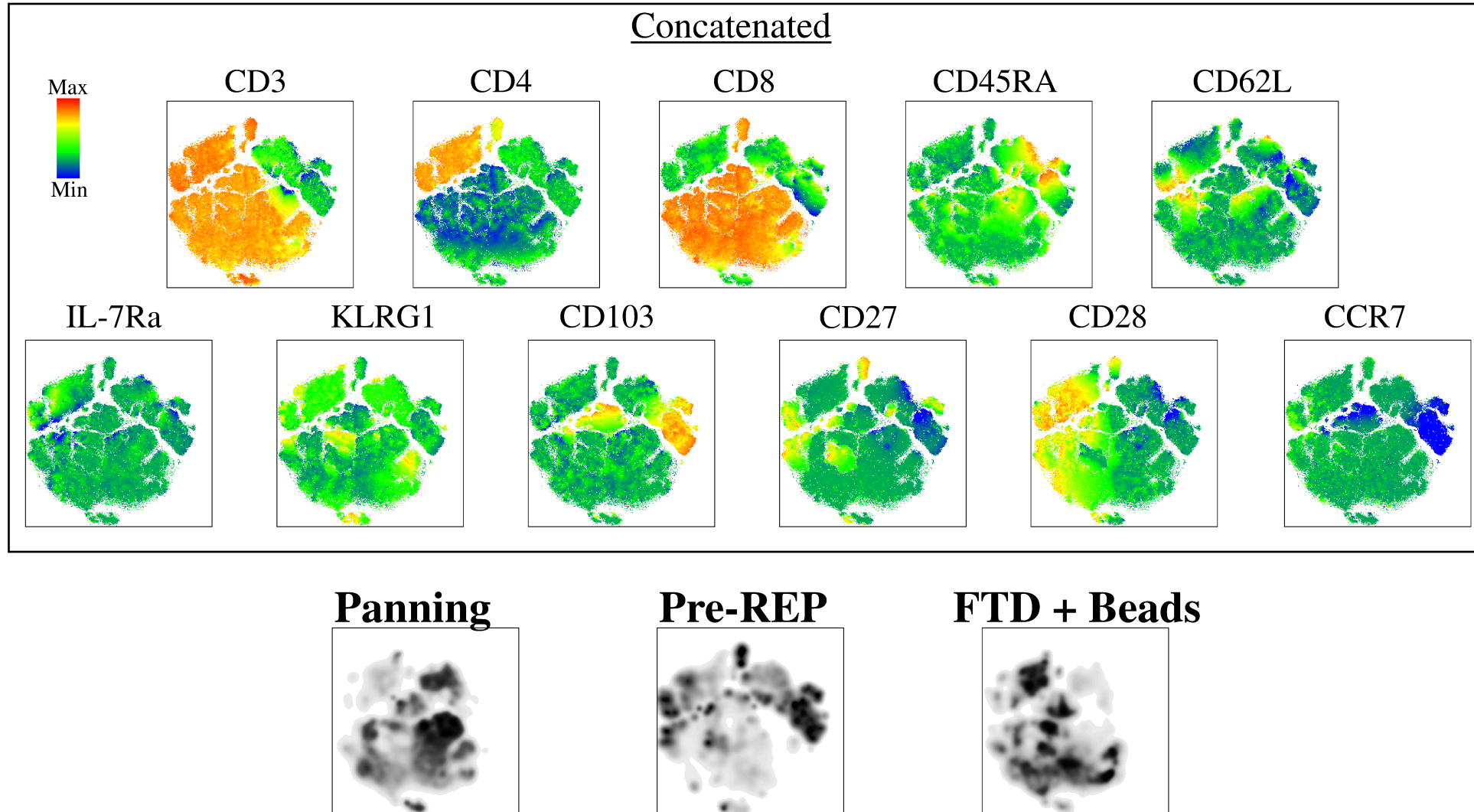


# Supplemental Figure 8 - RCC62

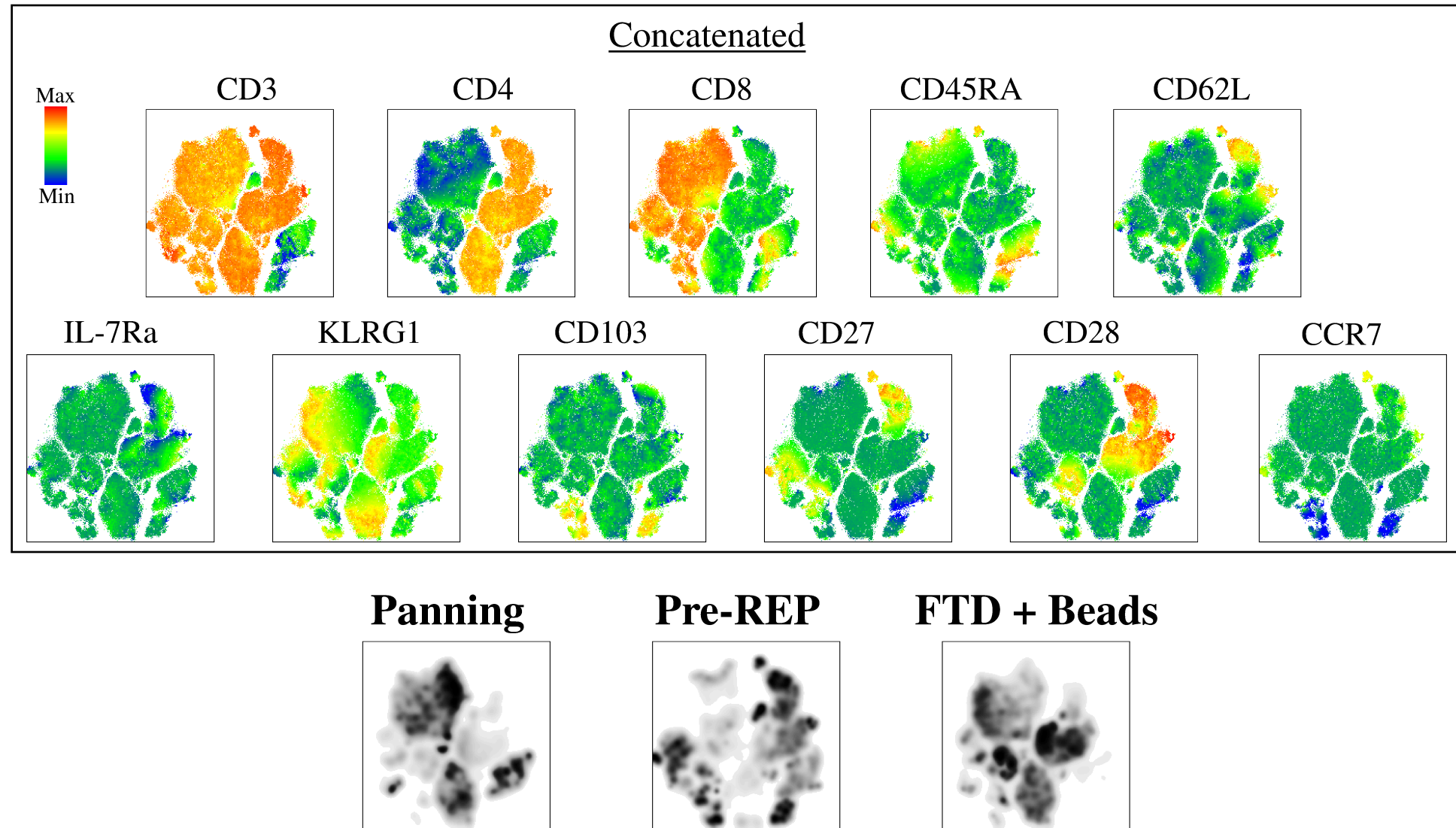




# Supplemental Figure 9 - RCC64

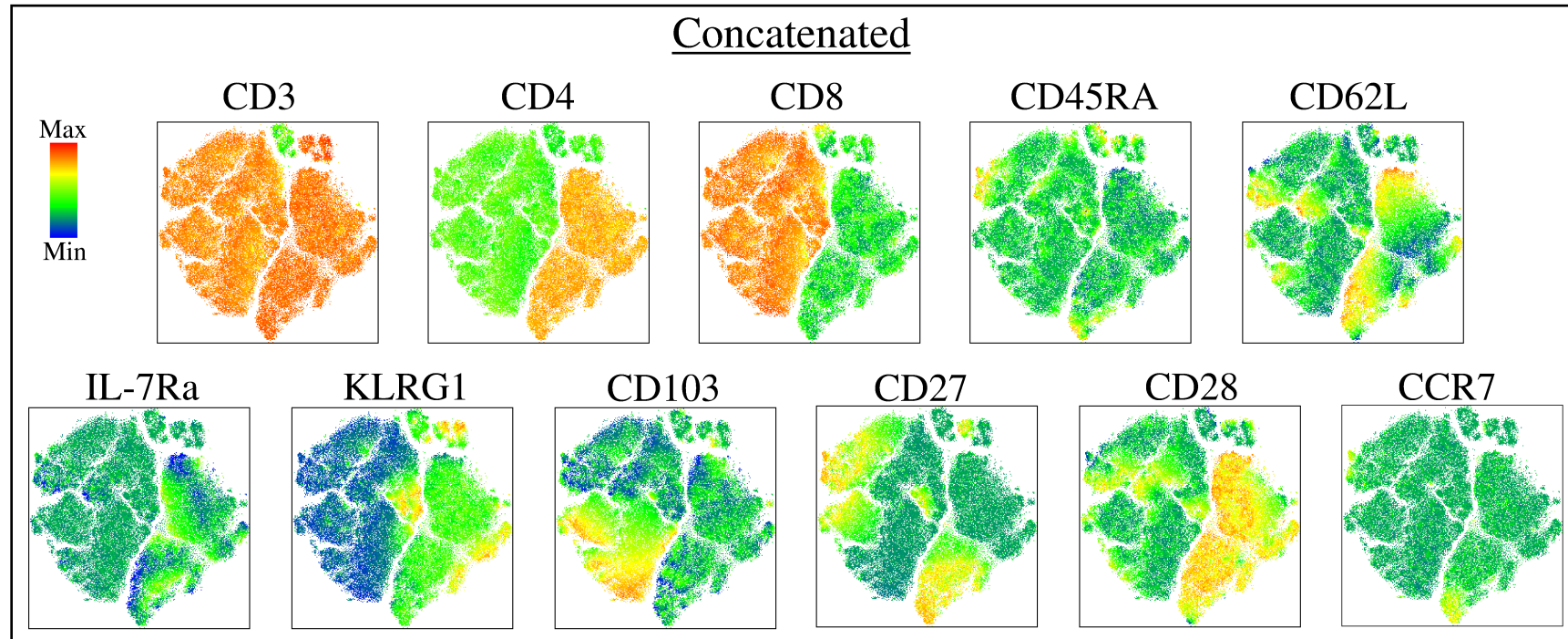


## Supplemental Figure 10 - RCC66

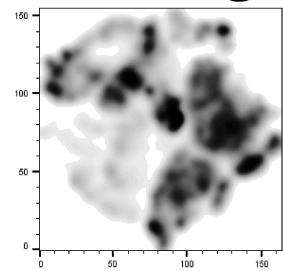




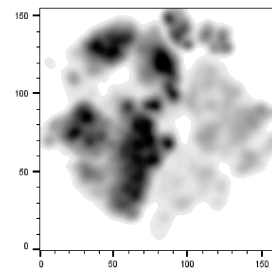
# Supplemental Figure 11 - RCC68



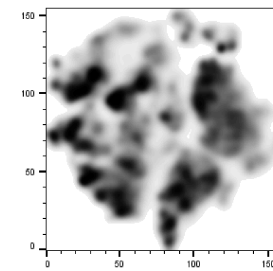
**Panning**



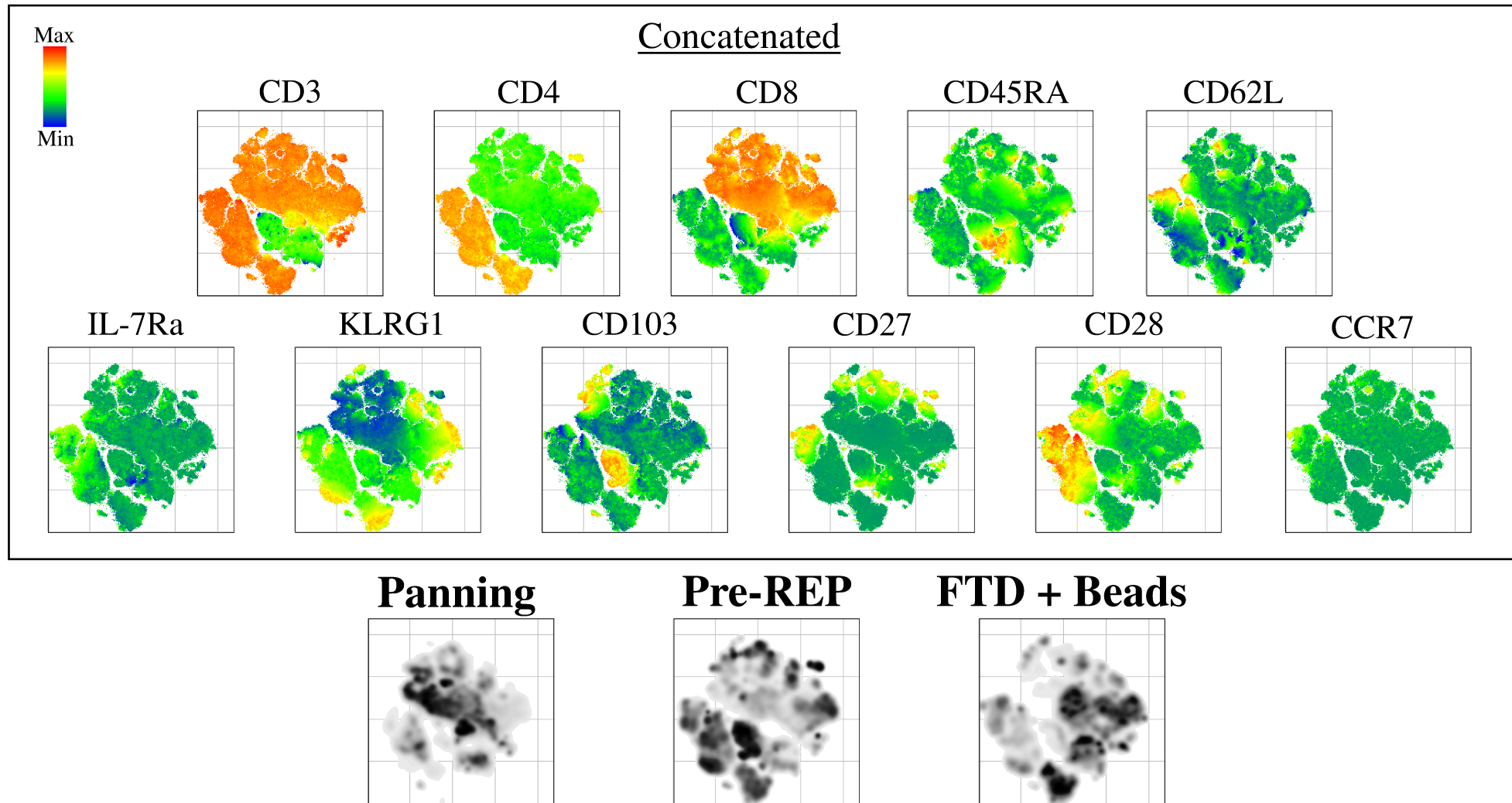
**Pre-REP**



**FTD + Beads**

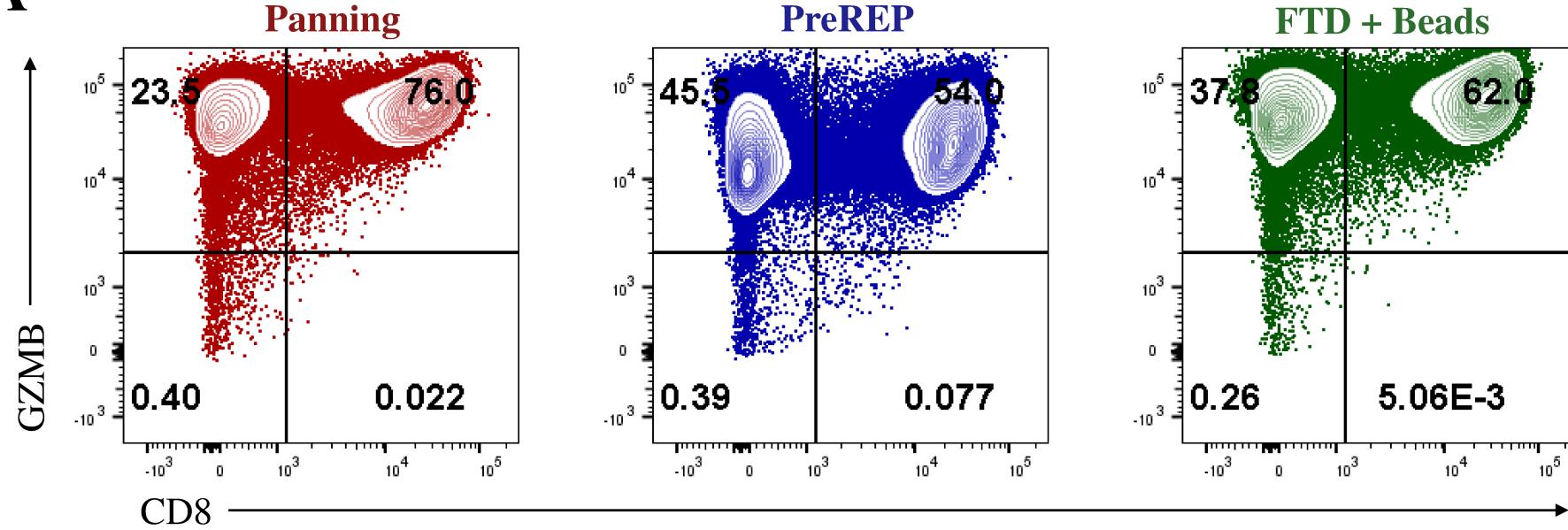


## Supplemental Figure 12 - RCC69

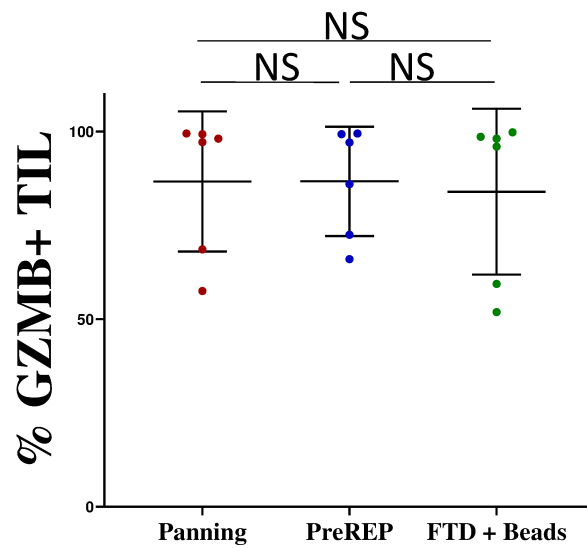


## Supplemental Figure 13

A

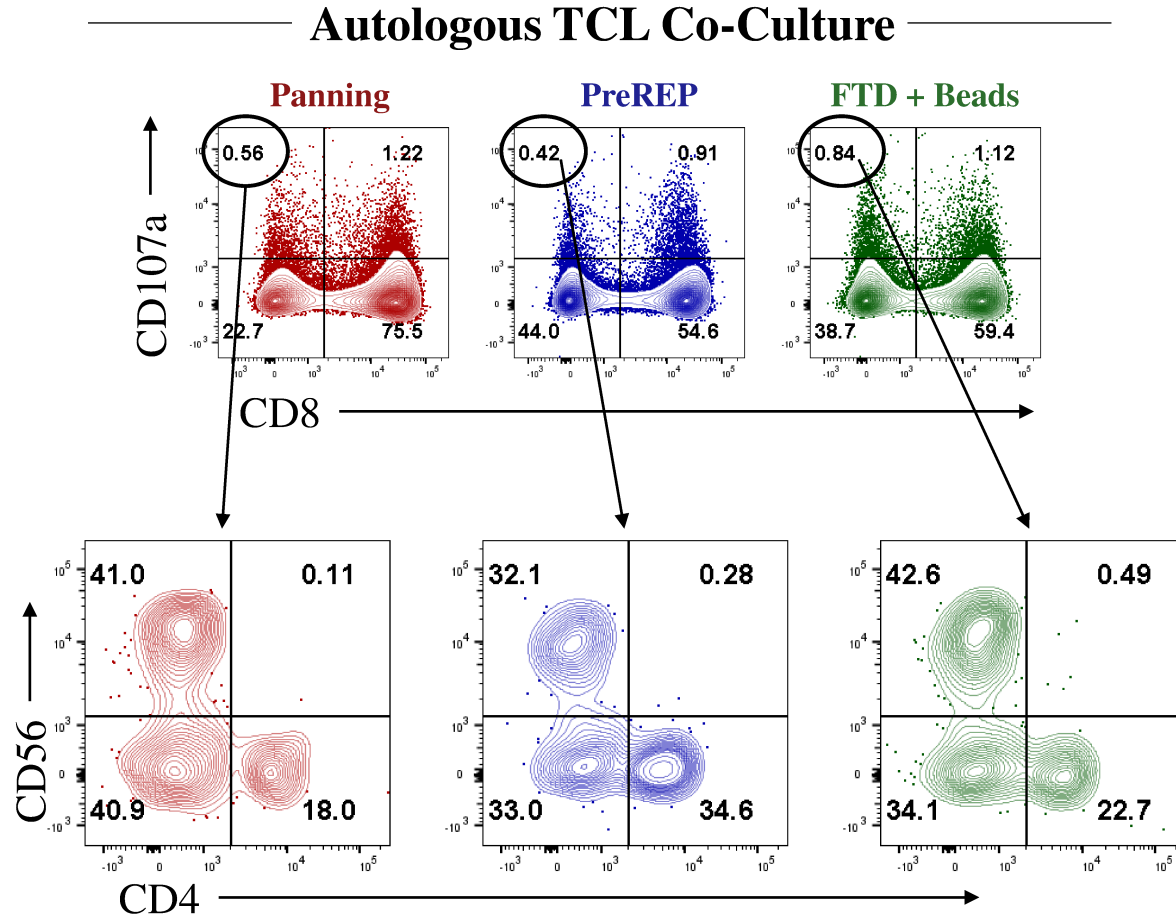


B

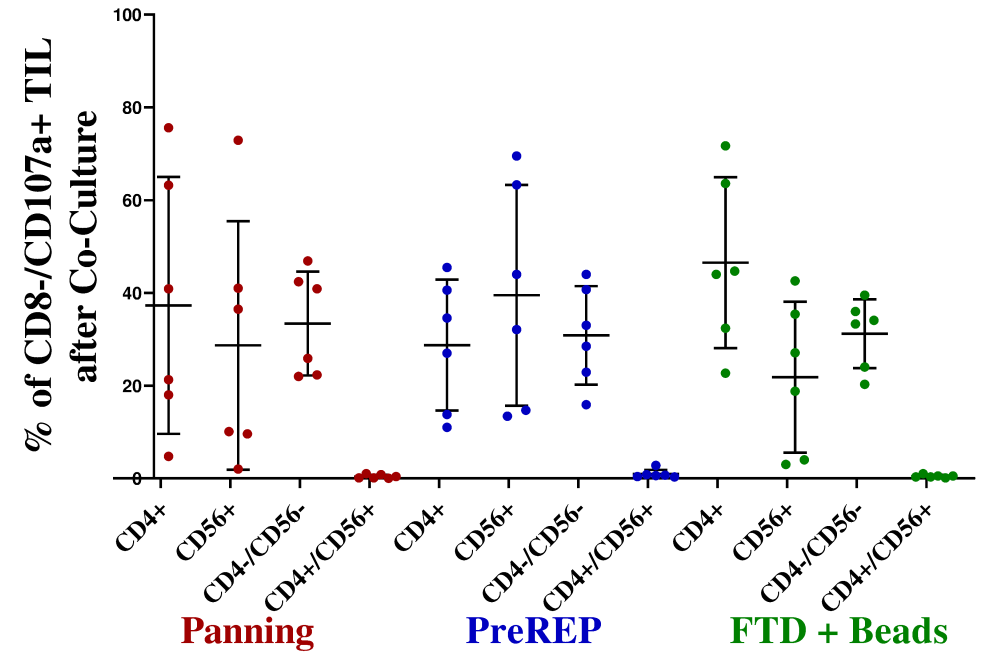


## Supplemental Figure 14

A



B



## Supplemental Figure 15

