

Supplemental Table 2a - MEM Labels for Enriched Features in All Cell Hotspots from COVID-19 Patients in Dataset 2

patient_id	degree_change	direction_change	DBSCAN_cluster	total_counts	Marker Enrichment Modeling (MEM) Label
COV24	1.025	0.991	1	85	2401095 : ▲ CD147+6 CD99+6 CD29+5 CD38+4 CD3+3 CD49d+2 CD81+2 CD52+2 CD27+2 CD28+2 CD55+1 CD62L+1 CD56+1 CD5+1 CD4+1 ▼ None
			2	174	2402095 : ▲ CD9+5 CD29+5 CD147+4 CD99+4 IgD+1 CD55+1 CX3CR1+1 CD34+1 ▼ None
			3	157	2403095 : ▲ CD147+5 CD9+4 CD29+3 CD81+2 Siglec-8+2 CD39+2 CD55+1 CD123+1 CD24+1 CD99+1 CD8a+1 ▼ None
			4	54	2404095 : ▲ CD147+6 CD99+6 CD29+4 CD38+4 CD8a+4 CD49d+2 CD3+2 CD27+2 CD39+2 CD81+1 CD52+1 CD55+1 CD56+1 ▼ None
			5	135	2405095 : ▲ CD147+6 CD29+5 CD56+5 CD99+5 CD38+4 CD49d+2 CD81+2 CD7+2 CD52+1 CD55+1 CD8a+1 ▼ None
COV26	2.020	0.997	1	1062	2601095 : ▲ CD147+6 CD99+5 CD29+4 CD38+3 CD55+2 CD14+2 CD64+1 CD56+1 CD39+1 ▼ None
			2	974	2602095 : ▲ CD9+4 CD147+4 CD81+1 CD55+1 Siglec-8+1 CD29+1 CD8a+1 ▼ None
			3	163	2603095 : ▲ CD9+7 CD29+6 CD147+5 CD99+5 CX3CR1+4 CD34+2 IgD+1 CD43+1 CD45RB+1 CD55+1 CD20+1 CD24+1 CD56+1 ▼ None
			4	58	2604095 : ▲ CD147+6 CD29+3 CD55+2 CD99+2 CD49d+1 CD52+1 CD56+1 ▼ None
			5	97	2605095 : ▲ CD38+5 CD147+5 CD123+4 CD55+2 CD99+2 CD9+1 CD62L+1 CD8a+1 ▼ None
COV27	0.047	-0.043	1	8	270105 : ▲ CD147+7 CD99+6 CD29+4 CD64+3 CD38+3 CD55+2 CD14+2 CD56+2 CD62L+1 CD39+1 CD8a+1 ▼ None
			2	4	270205 : ▲ CD99+6 CD57+4 CD147+4 CD45RA+3 CD56+3 CD29+2 CD38+2 CD43+1 CD81+1 CD8a+1 ▼ None
			3	8	2703095 : ▲ CD147+4 CD16+3 CD24+2 CD55+1 CD29+1 CD38+1 CD39+1 ▼ None
			4	2	2704095 : ▲ CD147+4 CD16+2 CD55+1 CD24+1 CD56+1 CD99+1 CD39+1 CD8a+1 ▼ None
COV29	9.811	-0.514	1	11879	290105 : ▲ CD16+5 CD147+4 CD55+3 CD24+3 CD29+2 CD127+2 CD39+2 CD45+1 CD38+1 CD8a+1 ▼ None
			2	284	290205 : ▲ CD147+6 CD16+6 CD55+4 CD24+4 CD29+3 CD127+3 CD39+3 CD38+2 CD45+1 CD33+1 CD11c+1 CD43+1 CD64+1 CD62L+1 CD56+1 CD99+1 CD8a+1 ▼ None
			3	2495	2903095 : ▲ CD147+4 CD55+2 CD29+2 CD24+2 CD39+2 CD16+2 CD38+1 ▼ None
			4	192	2904095 : ▲ CD147+4 CD29+2 CD64+1 CD24+1 CD39+1 CD8a+1 ▼ None
			5	759	2905095 : ▲ CD9+4 CD147+4 Siglec-8+3 CD81+2 CD29+2 CD39+2 CD45+1 CD55+1 CD34+1 CD127+1 CD24+1 CD38+1 CD99+1 CD8a+1 ▼ None
			6	246	2906095 : ▲ CD147+6 CD9+4 CD55+3 Siglec-8+3 CD29+3 CD24+3 CD39+3 CD16+3 CD81+2 CD38+2 CD45+1 CD11c+1 CD43+1 CD34+1 CD62L+1 CD127+1 CD56+1 CD99+1 CD8a+1 ▼ None
COV32	68.266	-0.090	1	99147	320105 : ▲ CD147+5 CD55+3 CD16+3 CD29+2 CD24+2 CD39+2 CD62L+1 CD38+1 CD56+1 ▼ None
			2	5835	320205 : ▲ CD147+6 CD55+4 CD24+4 CD16+4 CD29+3 CD39+3 CD62L+2 CD45+1 CD11c+1 CD43+1 CD64+1 CD38+1 CD56+1 CD99+1 CD8a+1 ▼ None
			3	165	320305 : ▲ CD147+5 CD55+3 CD29+3 CD16+3 CD9+2 CD24+2 CD39+2 CD62L+1 CD38+1 CD99+1 CD8a+1 ▼ None
			4	10719	320405 : ▲ CD147+6 CD29+5 CD55+4 CD38+4 CD99+4 CD64+3 CD14+3 CD45+2 CD11c+2 CD62L+2 CD56+2 CD39+2 CD33+1 HLA-DR+1 CD49d+1 CD137+1 CD141+1 CD85j+1 ▼ None
			5	765	320505 : ▲ CD123+8 Siglec-8+8 CD127+8 CD28+8 CD43+5 CD147+5 CD55+3 CD39+3 CD16+3 CD20+2 CD29+2 CD24+2 CD62L+1 CD38+1 CD56+1 ▼ None
			6	937	320605 : ▲ CD147+7 CD55+5 CD29+5 CD38+5 CD99+4 CD16+4 CD64+3 CD14+3 CD45+2 CD11c+2 CD62L+2 CD56+2 CD33+1 HLA-DR+1 CD49d+1 CD43+1 CD52+1 CD137+1 CD141+1 CD85j+1 CD8a+1 ▼ None
			7	1014	320705 : ▲ CD147+5 CD9+4 Siglec-8+3 CD81+2 CD29+2 CD24+2 CD39+2 CD45+1 CD49d+1 CD55+1 CD34+1 CD127+1 CD127+1 CD38+1 CD56+1 CD99+1 CD8a+1 ▼ None
			8	435	320805 : ▲ CD57+4 CD3+4 CD45RA+4 CD29+3 CD38+3 CD147+3 CD99+3 CD45+2 CD43+2 CD81+2 CD56+2 CD8a+2 CD11c+1 CD49d+1 CD52+1 CD161+1 ▼ None
			9	116	320905 : ▲ CD57+5 CD29+4 CD3+3 CD147+3 CD99+3 CD45+2 CD43+2 CD81+2 CD52+2 CD49d+1 CD38+1 CD8a+1 CD5+1 ▼ None
			10	12	3202095 : ▲ CD147+7 CD24+5 CD16+5 CD55+4 CD29+4 CD39+4 CD45+2 CD11c+2 CD38+2 CD56+2 CD43+1 CD64+1 CD9+1 CD62L+1 CD127+1 CD99+1 CD8a+1 ▼ None
			11	76142	3203095 : ▲ CD147+4 CD24+3 CD16+3 CD55+2 CD29+2 CD39+2 CD45+1 CD11c+1 CD38+1 ▼ None
			12	493	3205095 : ▲ CD123+8 Siglec-8+8 CD127+8 CD28+8 CD43+5 CD147+4 CD20+3 CD24+3 CD39+3 CD16+3 CD55+2 CD29+2 CD45+1 CD11c+1 CD9+1 ▼ None
			13	1802	3206095 : ▲ CD147+7 CD29+5 CD99+5 CD55+4 CD38+4 CD16+4 CD11c+3 CD9+3 CD14+3 CD24+3 CD39+3 CD45+2 CD64+2 CD56+2 CD33+1 HLA-DR+1 CD49d+1 CD52+1 CD137+1 CD62L+1 CD141+1 CD85j+1 CD8a+1 ▼ None
			14	1307	3207095 : ▲ CD9+5 CD147+5 CD81+3 Siglec-8+3 CD29+3 CD24+3 CD45+2 CD55+2 CD99+2 CD39+2 CD11c+1 CD52+1 CD34+1 CD38+1 CD56+1 CD99+1 CD8a+1 ▼ None
			15	572	3208095 : ▲ CD57+5 CD45RA+5 CD99+5 CD3+4 CD147+4 CD29+3 CD56+3 CD8a+3 CD45+2 CD43+2 CD81+2 CD38+2 CD11c+1 CD49d+1 CD52+1 CD161+1 CD7+1 ▼ None
COV34	32.688	-0.200	1	92331	3401095 : ▲ CD29+5 CD147+5 CD38+4 CD56+4 CD99+4 CD45+2 CD49d+2 CD81+2 CD52+2 CD43+1 CD55+1 CD161+1 CD137+1 CD62L+1 CD45RA+1 CD8a+1 CD7+1 ▼ None
			2	370	340205 : ▲ CD147+6 CD29+5 CD99+4 CD11c+3 CD55+3 CD9+3 CD14+3 CD38+3 CD45+2 CD64+2 CD56+2 CD39+2 CD33+1 CD137+1 CD62L+1 CD56+1 CD5+1 CD4+1 ▼ None
			3	935	340305 : ▲ CD147+4 CD24+4 CD16+4 CD55+3 CD29+3 CD39+2 CD45+1 CD11c+1 CD38+1 ▼ None
			4	1762	340405 : ▲ CD147+6 CD29+5 CD55+4 CD38+4 CD99+4 CD64+3 CD14+3 CD62L+3 CD56+2 CD39+2 CD45+1 CD11c+1 CD137+1 CD141+1 CD85j+1 CD8a+1 ▼ None
			5	340	340505 : ▲ CD147+5 CD55+4 CD24+4 CD16+4 CD29+3 CD127+2 CD39+2 CD8a+2 CD45+1 CD43+1 CD64+1 CD62L+1 CD38+1 CD56+1 CD99+1 ▼ None
			6	704	340705 : ▲ CD147+4 CD55+2 CD29+2 CD24+1 CD56+1 CD99+1 CD39+1 CD8a+1 CD16+1 ▼ None
			7	907	340805 : ▲ CD38+4 CD99+4 CD29+3 CD45RA+3 CD147+3 CD57+2 CD56+2 CD45+1 CD43+1 CD81+1 CD8a+1 ▼ None
			8	11	340905 : ▲ CD57+4 CD99+4 CD29+3 CD147+3 CD8a+3 CD38+2 CD45+1 CD49d+1 CD43+1 CD3+1 CD81+1 CD52+1 CD45RA+1 CD5+1 ▼ None
			9	177	3403095 : ▲ CD147+5 CD24+4 CD16+4 CD55+3 CD29+3 CD39+2 CD45+1 CD43+1 CD64+1 CD62L+1 CD38+1 CD56+1 CD8a+1 ▼ None
			10	59047	3406095 : ▲ CD147+4 CD16+4 CD55+3 CD29+2 CD24+2 CD62L+1 CD38+1 CD56+1 CD39+1 CD8a+1 ▼ None
			11	299	3408095 : ▲ CD45RA+5 CD99+5 CD57+4 CD29+4 CD38+4 CD147+4 CD56+4 CD43+2 CD8a+2 CD45+1 CD49d+1 CD81+1 CD161+1 CD7+1 ▼ None
			12	786	3409095 : ▲ CD57+5 CD99+5 CD29+4 CD8a+4 CD147+3 CD45+2 CD43+2 CD3+2 CD81+2 CD45RA+2 CD49d+1 CD52+1 CD5+1 ▼ None
			13	893	3401095 : ▲ CD9+4 CD29+4 CD55+3 CD147+3 CD99+3 CD43+1 CD64+1 CX3CR1+1 CD34+1 CD24+1 CD56+1 ▼ None
			14	941	34011095 : ▲ CD9+4 CD147+4 CD29+3 CD81+2 CD55+2 Siglec-8+2 CD8a+2 CD45+1 CD34+1 CD127+1 CD24+1 CD38+1 CD56+1 CD99+1 CD39+1 ▼ None
			15	1338	34012095 : ▲ CD147+6 CD29+5 CD99+5 CD55+3 CD38+3 CD62L+2 CD56+2 CD45+1 CD64+1 CD14+1 CD137+1 CD141+1 CD39+1 CD8a+1 ▼ None
16	312	34013095 : ▲ CD147+5 CD55+3 CD29+3 CD62L+2 CD24+2 CD16+2 CD38+1 CD56+1 CD99+1 CD39+1 CD8a+1 ▼ None			
COV35	0.923	0.625	1	36	350105 : ▲ CD147+5 CD55+3 CD62L+1 CD24+1 CD16+1 ▼ None
			2	92	350205 : ▲ CD99+5 CD45RA+4 CD57+3 CD147+2 CD56+2 CD43+1 CD29+1 CD38+1 CD8a+1 ▼ None
			3	204	3503095 : ▲ CD9+5 CD147+5 CD81+2 CD55+1 Siglec-8+1 CD29+1 CD127+1 CD24+1 CD39+1 CD8a+1 ▼ None
			4	202	3504095 : ▲ CD9+5 CD29+5 CD147+3 CD99+2 CX3CR1+1 ▼ None
			5	194	3505095 : ▲ CD9+7 CD29+6 CD147+5 CD99+4 CD55+2 CD34+2 CX3CR1+1 CD38+1 CD56+1 ▼ None
COV36	3.915	0.053	1	2378	360105 : ▲ CD147+6 CD29+5 CD55+4 CD38+4 CD14+3 CD99+3 CD45+2 CD11c+2 CD64+2 CD33+1 HLA-DR+1 CD62L+1 CD56+1 CD39+1 ▼ None
			2	2310	360205 : ▲ CD9+3 CD29+3 IgD+1 CX3CR1+1 CD24+1 CD147+1 CD99+1 ▼ None
			3	352	360305 : ▲ CD55+4 CD147+4 CD24+2 CD45+1 CD64+1 CD29+1 CD62L+1 CD39+1 CD16+1 ▼ None
			4	421	360405 : ▲ CD147+4 CD55+3 CD24+3 CD16+3 CD127+2 CD45+1 CD29+1 CD39+1 ▼ None
			5	2152	3605095 : ▲ CD147+6 CD29+5 CD99+5 CD38+3 CD45+2 CD11c+2 CD55+2 CD14+2 CD39+2 CD33+1 HLA-DR+1 CD64+1 CD9+1 CD56+1 ▼ None
COV37	64.947	0.026	1	1410	370105 : ▲ CD147+4 CD55+2 CD24+1 CD16+1 ▼ None
			2	229	370205 : ▲ CD99+4 CD3+2 CD52+1 CD29+1 CD27+1 CD147+1 ▼ None
			3	113	370305 : ▲ CD38+5 CD147+3 CD99+3 CD29+1 CD45RA+1 CD56+1 ▼ None
			4	77	370405 : ▲ CD147+6 CD55+4 CD29+3 CD38+3 CD64+2 CD99+2 CD14+1 CD56+1 CD39+1 ▼ None
			5	1639	3705095 : ▲ CD147+4 CD9+3 CD81+1 Siglec-8+1 CD29+1 CD127+1 CD39+1 CD8a+1 ▼ None
			6	254	3706095 : ▲ CD9+10 CD29+9 CD147+8 CD99+7 CD34+6 CD55+5 CD20+4 CD56+4 CD137+3 CD38+2 CX3CR1+1 ▼ None
COV39	31.962	-0.460	1	24346	390105 : ▲ CD147+5 CD16+5 CD55+4 CD45+1 CD64+1 CD29+1 CD62L+1 CD24+1 CD39+1 ▼ None
			2	17959	390205 : ▲ CD9+4 CD29+4 CD147+2 IgD+1 CD99+1 ▼ None
			3	1198	390405 : ▲ CD29+5 CD147+5 CD55+4 CD9+4 CD16+4 CD24+2 CD45+1 CD11c+1 IgD+1 CD64+1 CX3CR1+1 CD62L+1 CD38+1 CD99+1 CD39+1 ▼ None
			4	1173	390505 : ▲ CD147+7 CD99+5 CD29+4 CD38+4 CD55+3 CD64+3 CD45+1 CD11c+1 CD14+1 CD62L+1 CD56+1 CD39+1 ▼ None
			5	194	3901095 : ▲ CD99+6 CD29+5 CD147+5 CD45+3 CD27+3 CD3+2 CD52+2 CD38+2 CD28+2 CD49d+1 CD5+1 ▼ None
			6	222	39011095 : ▲ CD9+5 CD147+3 CD29+2 CD45+1 CD81+1 Siglec-8+1 CD39+1 ▼ None
			7	7	3901105 : ▲ CD147+4 CD9+3 CD45+1 CD81+1 CD55+1 Siglec-8+1 CD29+1 CD24+1 CD39+1 ▼ None
			8	9986	3903095 : ▲ CD147+4 CD55+1 CD29+1 CD24+1 CD16+1 ▼ None
			9	1930	3906095 : ▲ CD147+4 CD29+1 ▼ None
COV40	2.700	0.469	1	228	400105 : ▲ CD147+6 CD55+4 CD29+4 CD38+4 CD99+3 CD64+2 CD62L+2 CD45+1 ▼ None
			2	52	400205 : ▲ CD147+8 CD38+7 CD29+6 CD39+6 CD45RA+5 CD99+5 CD27+4 CD45+2 HLA-DR+1 CD49d+1 CD81+1 CD62L+1 ▼ None
			3	748	4003095 : ▲ CX3CR1+6 CD9+6 CD29+6 CD147+3 IgD+2 CD99+2 CD33+1 CD11c+1 HLA-DR+1 CD24+1 ▼ None
			4	57	4004095 : ▲ CX3CR1+5 CD9+4 CD29+3 IgD+2 CD11c+1 CD147+1 ▼ None
			5	52	4005095 : ▲ CX3CR1+4 IgD+2 CD9+2 CD11c+1 CD29+1 ▼ None
COV41	18.412	-0.713	1	10355	410105 : ▲ CD147+5 CD16+5 CD55+3 CD24+2 CD45+1 CD64+1 CD29+1 CD62L+1 CD39+1 ▼ None
			2	3930	410205 : ▲ CD9+2 CD29+2 IgD+1 CX3CR1+1 CD147+1 ▼ None
			3	493	410305 : ▲ CD24+3 CD147+3 CD55+2 CD29+1 CD62L+1 CD39+1 CD16+1 ▼ None
			4	404	410405 : ▲ CD147+5 CD55+3 CD24+2 CD16+2 CD64+1 CD29+1 CD39+1 ▼ None
			5	211	410505 : ▲ CD147+6 CD29+5 CD99+5 CD55+3 CD64+3 CD38+3 CD45+1 CD14+1 CD56+1 CD39+1 ▼ None
			6	70	410605 : ▲ CD147+5 CD55+4 CD24+3 CD16+3 CD29+2 CD45+1 CD64+1 CD62L+1 CD39+1 ▼ None
			7	1362	4107095 : ▲ CD9+5 CD147+4 CD81+2 Siglec-8+2 CD29+2 CD45+1 CD55+1 CD24+1 CD99+1 CD39+1 ▼ None
			8	876	4108095 : ▲ CD147+6 CD29+4 CD11c+3 CD45+2 CD55+2 HLA-DR+1 CD49d+1 CD64+1 CD14+1 CD38+1 CD56+1 CD99+1 CD39+1 ▼ None
			9	117	4109095 : ▲ CD147+6 CD29+5 CD99+5 CD38+4 CD45+3 CD8a+3 CD49d+2 CD3+2 CD81+1 CD52+1 CD55+1 CD62L+1 CD56+1 ▼ None
			10	93	4101095 : ▲ CD9+5 CD147+5 CD55+3 CD24+3 CD16+3 CD81+2 CD29+2 CD39+2 CD45+1 CD64+1 Siglec-8+1 CD38+1 CD99+1 ▼ None

*Red MEM labels denote that the cell hotspot is a region with ≥95% expansion and blue MEM labels denote that the cell hotspot is a region with ≥95% contraction after T-REX analysis when comparing Day 0 to Day 4 (±3 days)