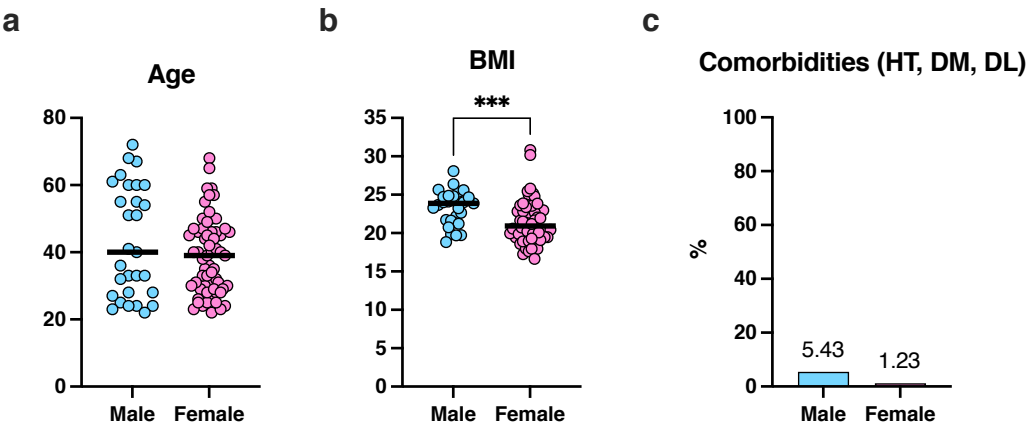


Extended Data Fig. 1

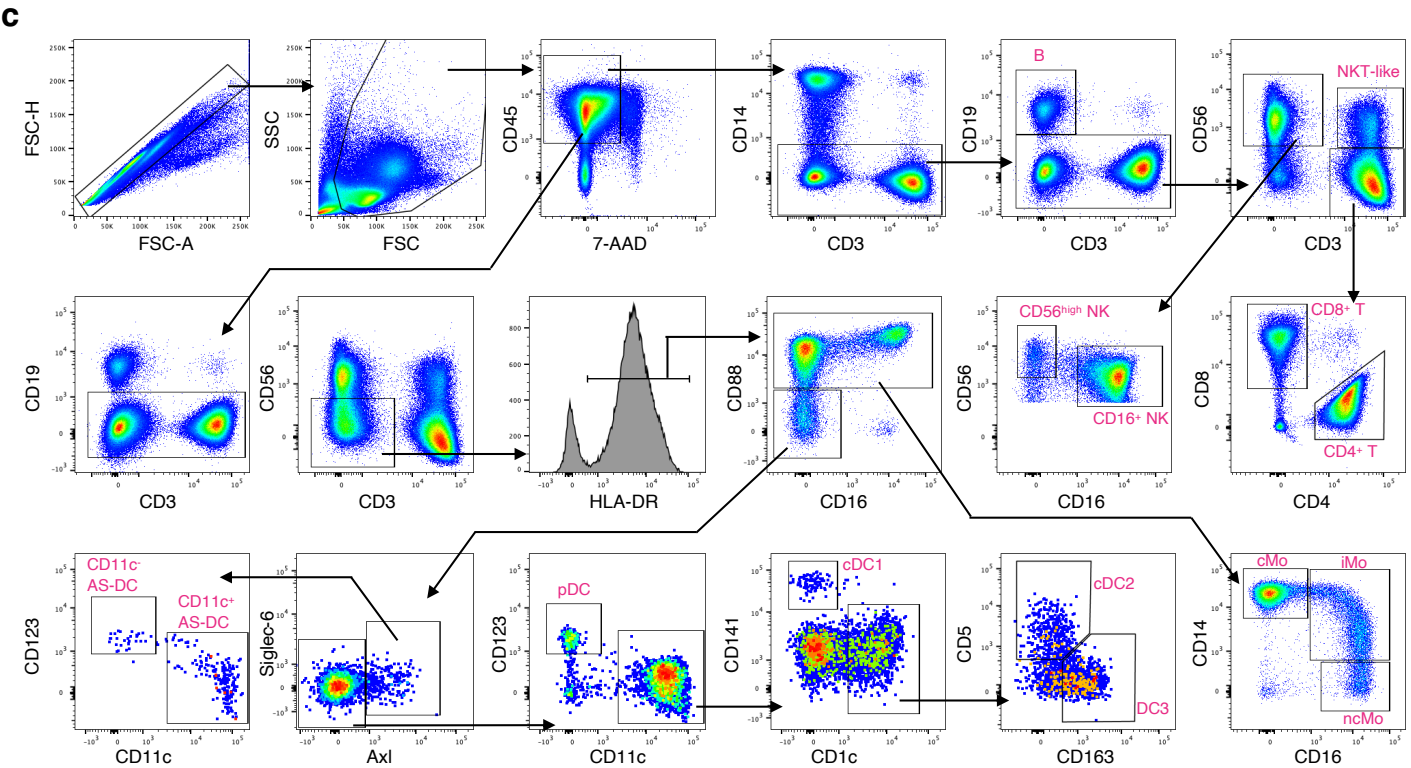
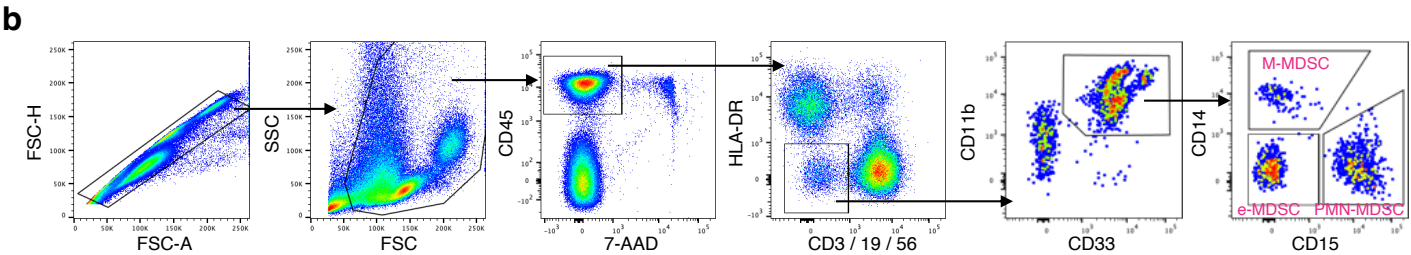


Extended Data Fig. 1: The participant demographics in this study. **a**, Age. **b**, Body mass index. **c**, Proportion of participants with comorbidities. HT, hypertension; DM, diabetes mellitus; DL, dyslipidemia. **a**, **c**, Male, n = 29; Female, n = 63. **b**, Male, n = 29; Female, n = 58. Bars represent the median values. Mann-Whitney test: ***p < 0.001.

Extended Data Fig. 2

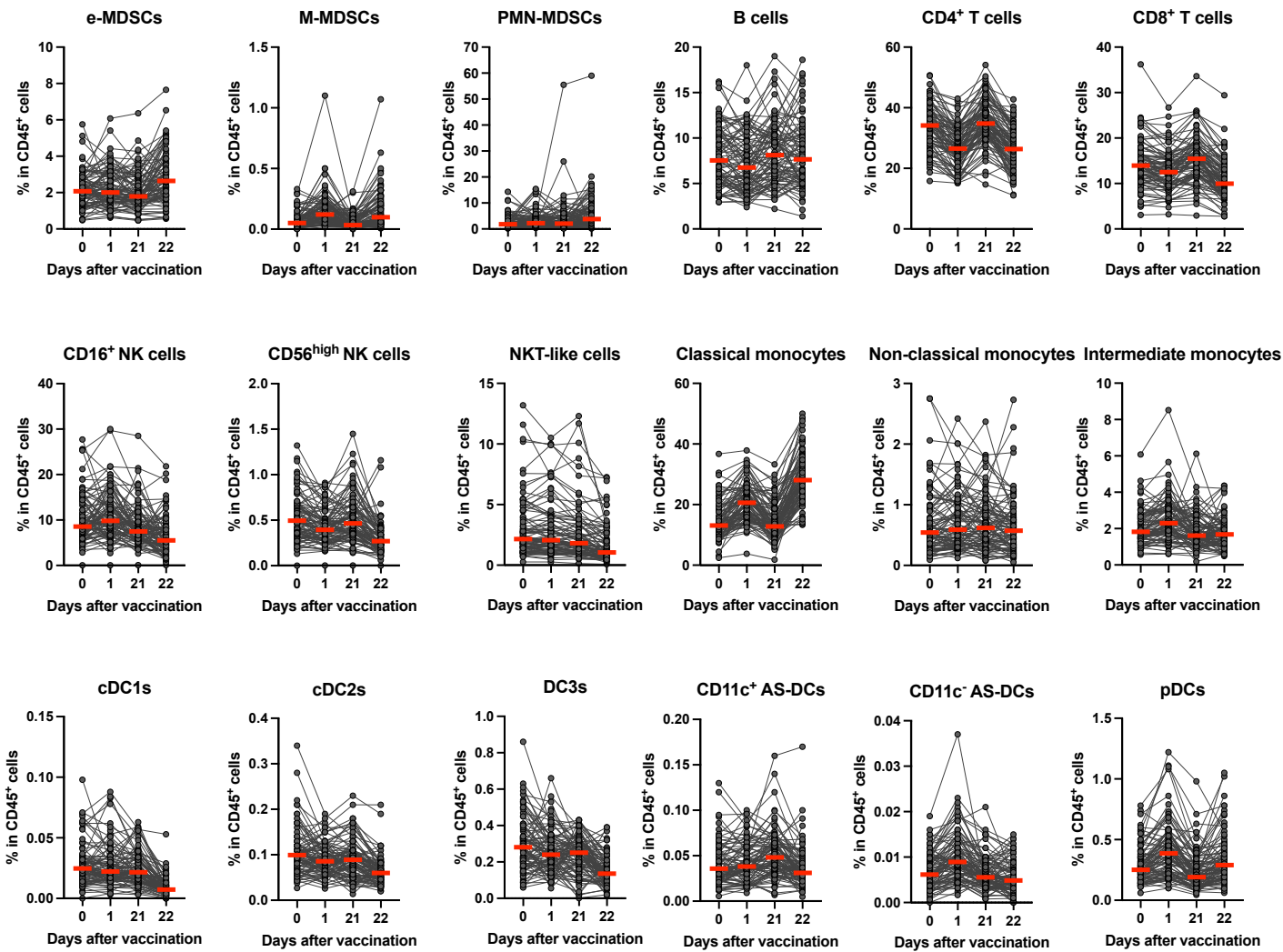
a

Cell type	Marker
e-MDSCs	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁻ CD11b ⁺ CD33 ⁺ CD14 ⁻ CD15 ⁻
M-MDSCs	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁻ CD11b ⁺ CD33 ⁺ CD14 ⁺ CD15 ⁻
PMN-MDSCs	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁻ CD11b ⁺ CD33 ⁺ CD14 ⁻ CD15 ⁺
B cells	CD45 ⁺ CD14 ⁻ CD3 ⁺ CD19 ⁺
CD4 ⁺ T cells	CD45 ⁺ CD3 ⁺ CD4 ⁺
CD8 ⁺ T cells	CD45 ⁺ CD3 ⁺ CD8 ⁺
CD16 ⁺ NK	CD45 ⁺ CD14 ⁻ CD3 ⁺ CD19 ⁻ CD56 ⁺ CD16 ⁺
CD56 ^{high} NK	CD45 ⁺ CD14 ⁻ CD3 ⁺ CD19 ⁻ CD56 ^{hi}
NKT-like	CD45 ⁺ CD14 ⁻ CD3 ⁺ CD19 ⁻ CD56 ^{hi}
Classical monocyte	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁺ CD14 ⁺ CD16 ⁻
Non-classical monocyte	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁺ CD14 ⁺ CD16 ⁺
Intermediate monocyte	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁺ CD14 ⁺ CD16 ⁺
cDC1	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁻ CD16 ⁻ Siglec-6 ⁺ Axl ⁻ CD11c ⁺ CD123 ⁻ CD1c ⁻ CD141 ⁺
cDC2	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁻ CD16 ⁻ Siglec-6 ⁺ Axl ⁻ CD11c ⁺ CD123 ⁻ CD1c ⁺ CD141 ⁺ CD5 ⁺ CD163 ⁻
DC3	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁻ CD16 ⁻ Siglec-6 ⁺ Axl ⁻ CD11c ⁺ CD123 ⁻ CD1c ⁺ CD141 ⁺ CD5 ⁺ CD163 ⁺
CD11c ⁺ AS-DC	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁻ Siglec-6 ⁺ Axl ⁺ CD11c ⁺ CD123 ⁻
CD11c ⁻ AS-DC	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁻ Siglec-6 ⁺ Axl ⁺ CD11c ⁻ CD123 ⁺
pDC	CD45 ⁺ CD3 ⁻ CD19 ⁻ CD56 ⁺ HLA-DR ⁺ CD88 ⁻ CD16 ⁻ Siglec-6 ⁺ Axl ⁻ CD11c ⁻ CD123 ⁺



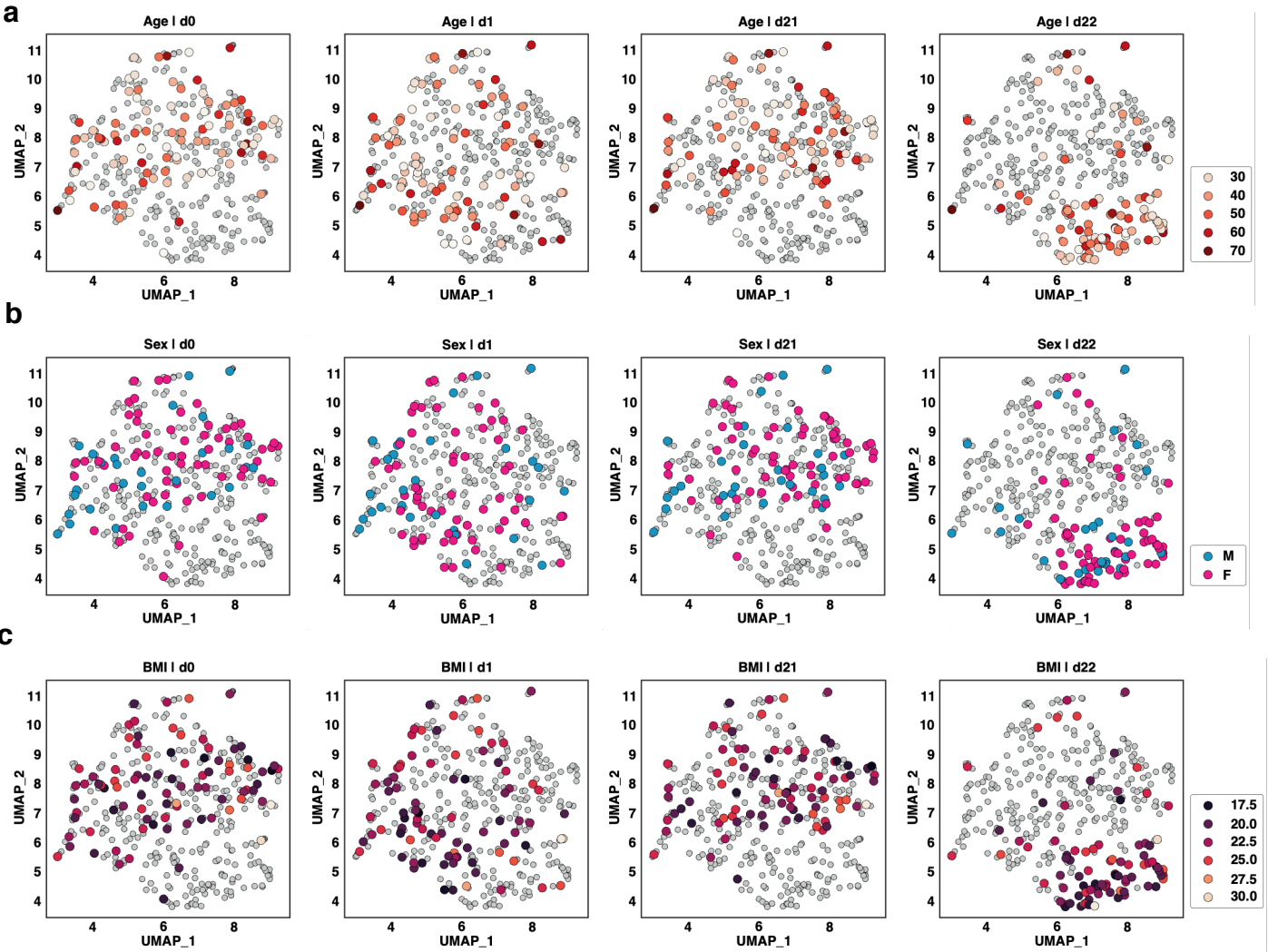
Extended Data Fig. 2: Gating strategy of flow cytometric analysis.
a, Phenotypes of 18 immune cells defined by cell surface markers used in flow cytometric analysis. **b**, Gating strategy for identifying e-MDSCs, M-MDSCs, and PMN-MDSCs. **c**, Gating strategy for identifying B cells, CD4⁺ T cells, CD8⁺ T cells, CD16⁺ NK cells, CD56^{high} NK cells, NKT-like cells, classical monocytes, non-classical monocytes, intermediate monocytes, cDC1s, cDC2s, DC3s, CD11c⁺ AS-DCs, CD11c⁻ AS-DC, and pDCs.

Extended Data Fig. 3



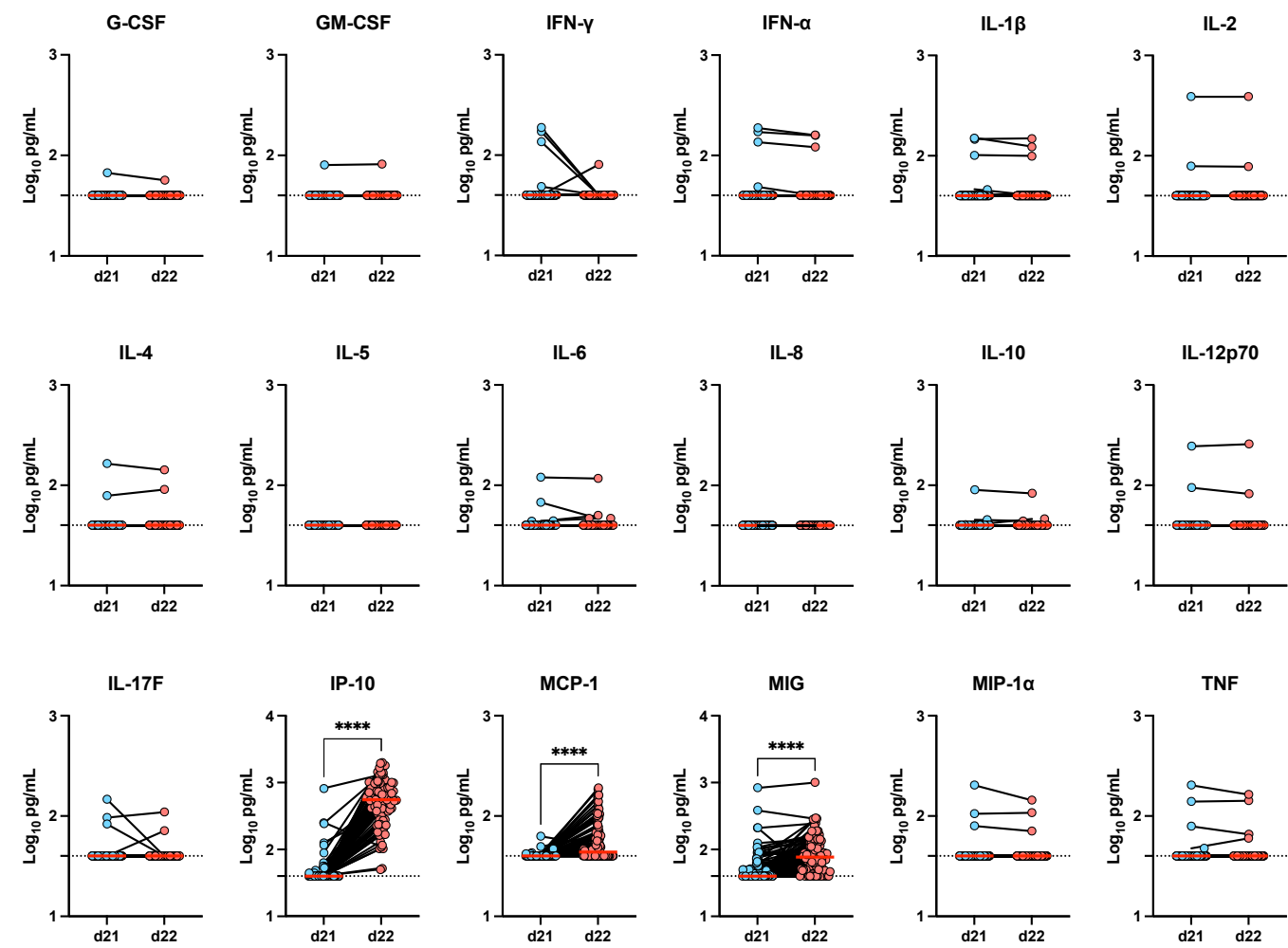
Extended Data Fig. 3: Longitudinal analysis of 18 immune cells frequencies.
Longitudinal plots of cell frequencies at each time point. Bars represent the median values. n = 92. Circles connected with a line represent data from the same individual.

Extended Data Fig. 4



Extended Data Fig. 4: UMAP of 18 immune cell frequencies among four time points.
a–c, UMAP of 18 immune cell frequencies shown in Fig. 1j. Data points of individual participants and colored by age (a), sex (b), and BMI (c).

Extended Data Fig. 5

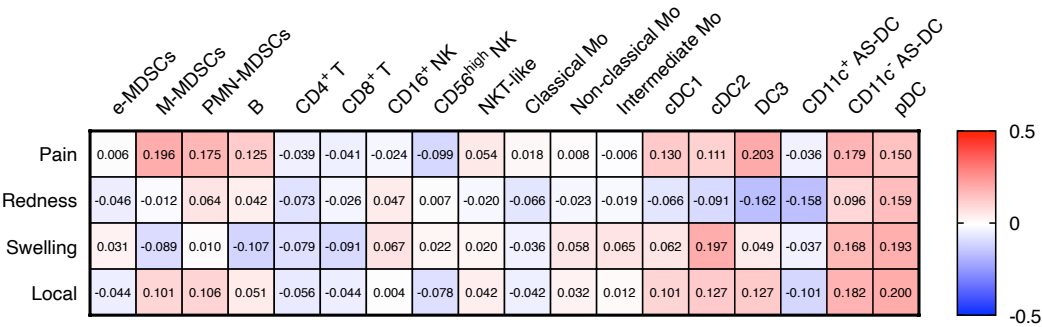


Extended Data Fig. 5: Quantification of plasma cytokines/chemokines after the second vaccination.

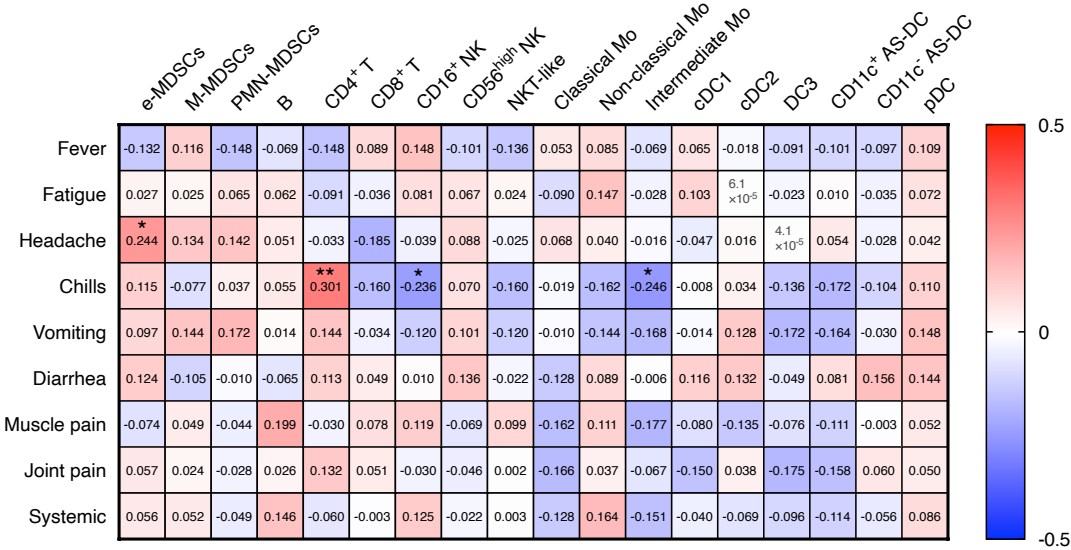
Concentration of cytokines in plasma; Day 21, n = 92; Day 22, n = 92. Bars represent the median values. Circles connected with a line represent data from the same individual. Dotted lines represent the detection limits. Wilcoxon test: ****p < 0.0001.

Extended Data Fig. 6

a



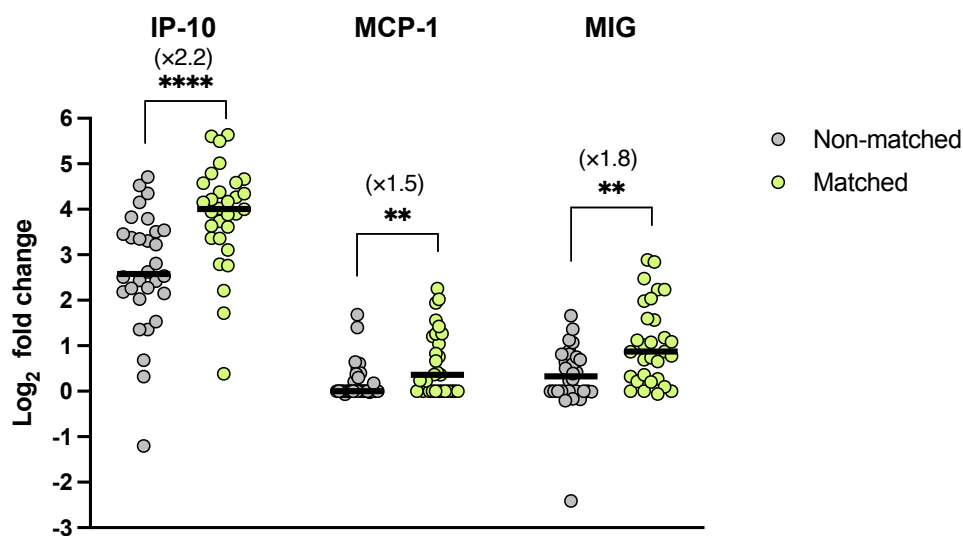
b



Extended Data Fig. 6: Correlation between cellular dynamics and adverse events after the primary vaccination.

a, b, Correlations between symptom severity scores and cell dynamics (d1–d0 post / pre ratio). a Local symptom severity scores on primary vaccination and cell dynamics. b, Systemic symptom severity scores on primary vaccination and cell dynamics. Spearman's r values are indicated in each cell. n = 92. Spearman's rank-order correlation coefficient test: *p < 0.05, **p < 0.01.

Extended Data Fig. 7



Extended Data Fig. 7: Comparison of cytokine/chemokine dynamics between groups with and without cell dynamics specific to adverse event.

Participants were stratified into matched group and non-matched group for 2-parameter model specific to adverse events. Comparison of cytokine dynamics between matched and non-matched group. Matched group, n = 30; non-matched group, n = 30. Bars represent the median value. Mann-Whitney test: **p < 0.01, ****p < 0.0001.