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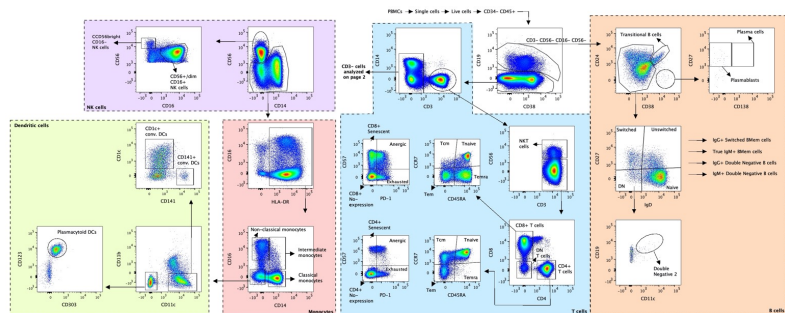
## 1. What is immunophenotyping?

Immunophenotyping is the identification and quantitation of heterogeneous populations of cells by multi-parameter flow cytometry using a panel of fluorescently-labelled antibodies that recognize specific antigens on a cell surface, known as cell markers.

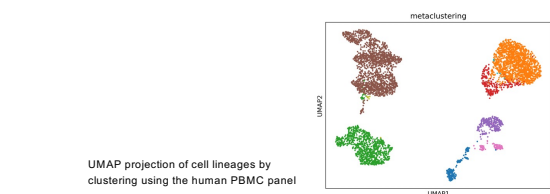
## 2. Why use immunophenotyping in your work?

Immunophenotyping is used to monitor the molecular, metabolic, phenotypic and functional attributes of cells that circulate through the blood. Alterations in these cellular attributes, particularly over time, may be closely associated with specific disease manifestations, disease progression and responsiveness to treatment. Thus, immunophenotyping is a powerful approach to identify easily monitored biomarkers and cellular signatures that may be useful as diagnostic and prognostic indicators of disease. Immunophenotyping is particularly helpful when monitoring patients who are exposed to immunotherapies, such as checkpoint inhibitors and targeted immune modulators that are increasingly used in chronic disease settings.

## 4. Identification of 44+ cell subsets using the human PBMC panel



| Cell Population | Cell Subset Name                  | Gating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
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| B Cells         | Non-Progenitor Hematopoietic Cell | CD45-CD34-                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|                 | B Cell                            | CD3-CD14-CD16-CD56-CD19+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|                 | Transitional B Cell (T)           | CD3-CD14-CD16-CD56-CD19-CD24-CD38-CD44-CD45RA-CD45RO-CD45L-CD45H-CD45N-CD45P-CD45T-CD45E-CD45F-CD45G-CD45I-CD45J-CD45K-CD45L-CD45M-CD45N-CD45O-CD45P-CD45Q-CD45R-CD45S-CD45T-CD45U-CD45V-CD45W-CD45X-CD45Y-CD45Z-CD45AA-CD45AB-CD45AC-CD45AD-CD45AE-CD45AF-CD45AG-CD45AH-CD45AI-CD45AJ-CD45AK-CD45AL-CD45AM-CD45AN-CD45AO-CD45AP-CD45AQ-CD45AR-CD45AS-CD45AT-CD45AU-CD45AV-CD45AW-CD45AX-CD45AY-CD45AZ-CD45BA-CD45BB-CD45BC-CD45BD-CD45BE-CD45BF-CD45BG-CD45BH-CD45BI-CD45BJ-CD45BK-CD45BL-CD45BM-CD45BN-CD45BO-CD45BP-CD45BQ-CD45BR-CD45BS-CD45BT-CD45BU-CD45BV-CD45BW-CD45BX-CD45BY-CD45BZ-CD45CA-CD45CB-CD45CC-CD45CD-CD45CE-CD45CF-CD45CG-CD45CH-CD45CI-CD45CJ-CD45CK-CD45CL-CD45CM-CD45CN-CD45CO-CD45CP-CD45CQ-CD45CR-CD45CS-CD45CT-CD45CU-CD45CV-CD45CW-CD45CX-CD45CY-CD45CZ-CD45DA-CD45DB-CD45DC-CD45DD-CD45DE-CD45DF-CD45DG-CD45DH-CD45DI-CD45DJ-CD45DK-CD45DL-CD45DM-CD45DN-CD45DO-CD45DP-CD45DQ-CD45DR-CD45DS-CD45DT-CD45DU-CD45DV-CD45DW-CD45DX-CD45DY-CD45DZ-CD45EA-CD45EB-CD45EC-CD45ED-CD45EE-CD45EF-CD45EG-CD45EH-CD45EI-CD45EJ-CD45EK-CD45EL-CD45EM-CD45EN-CD45EO-CD45EP-CD45EQ-CD45ER-CD45ES-CD45ET-CD45EU-CD45EV-CD45EW-CD45EX-CD45EY-CD45EZ-CD45FA-CD45FB-CD45FC-CD45FD-CD45FE-CD45FF-CD45FG-CD45FH-CD45FI-CD45FJ-CD45FK-CD45FL-CD45FM-CD45FN-CD45FO-CD45FP-CD45FQ-CD45FR-CD45FS-CD45FT-CD45FU-CD45FV-CD45FW-CD45FX-CD45FY-CD45FZ-CD45GA-CD45GB-CD45GC-CD45GD-CD45GE-CD45GF-CD45GG-CD45GH-CD45GI-CD45GJ-CD45GK-CD45GL-CD45GM-CD45GN-CD45GO-CD45GP-CD45GQ-CD45GR-CD45GS-CD45GT-CD45GU-CD45GV-CD45GW-CD45GX-CD45GY-CD45GZ-CD45HA-CD45HB-CD45HC-CD45HD-CD45HE-CD45HF-CD45HG-CD45HH-CD45HI-CD45HJ-CD45HK-CD45HL-CD45HM-CD45HN-CD45HO-CD45HP-CD45HQ-CD45HR-CD45HS-CD45HT-CD45HU-CD45HV-CD45HW-CD45HX-CD45HY-CD45HZ-CD45IA-CD45IB-CD45IC-CD45ID-CD45IE-CD45IF-CD45IG-CD45IH-CD45II-CD45IJ-CD45IK-CD45IL-CD45IM-CD45IN-CD45IO-CD45IP-CD45IQ-CD45IR-CD45IS-CD45IT-CD45IU-CD45IV-CD45IW-CD45IX-CD45IY-CD45IZ-CD45JA-CD45JB-CD45JC-CD45JD-CD45JE-CD45JF-CD45JG-CD45JH-CD45JI-CD45JJ-CD45JK-CD45JL-CD45JM-CD45JN-CD45JO-CD45JP-CD45JQ-CD45JR-CD45JS-CD45JT-CD45JU-CD45JV-CD45JW-CD45JX-CD45JY-CD45JZ-CD45KA-CD45KB-CD45KC-CD45KD-CD45KE-CD45KF-CD45KG-CD45KH-CD45KI-CD45KJ-CD45KK-CD45KL-CD45KM-CD45KN-CD45KO-CD45KP-CD45KQ-CD45KR-CD45KS-CD45KT-CD45KU-CD45KV-CD45KW-CD45KX-CD45KY-CD45KZ-CD45LA-CD45LB-CD45LC-CD45LD-CD45LE-CD45LF-CD45LG-CD45LH-CD45LI-CD45LJ-CD45LK-CD45LL-CD45LM-CD45LN-CD45LO-CD45LP-CD45LQ-CD45LR-CD45LS-CD45LT-CD45LU-CD45LV-CD45LW-CD45LX-CD45LY-CD45LZ-CD45MA-CD45MB-CD45MC-CD45MD-CD45ME-CD45MF-CD45MG-CD45MH-CD45MI-CD45MJ-CD45MK-CD45ML-CD45MM-CD45MN-CD45MO-CD45MP-CD45MQ-CD45MR-CD45MS-CD45MT-CD45MU-CD45MV-CD45MW-CD45MX-CD45MY-CD45MZ-CD45NA-CD45NB-CD45NC-CD45ND-CD45NE-CD45NF-CD45NG-CD45NH-CD45NI-CD45NJ-CD45NK-CD45NL-CD45NM-CD45NN-CD45NO-CD45NP-CD45NQ-CD45NR-CD45NS-CD45NT-CD45NU-CD45NV-CD45NW-CD45NX-CD45NY-CD45NZ-CD45OA-CD45OB-CD45OC-CD45OD-CD45OE-CD45OF-CD45OG-CD45OH-CD45OI-CD45OJ-CD45OK-CD45OL-CD45OM-CD45ON-CD45OO-CD45OP-CD45OQ-CD45OR-CD45OS-CD45OT-CD45OU-CD45OV-CD45OW-CD45OX-CD45OY-CD45OZ-CD45PA-CD45PB-CD45PC-CD45PD-CD45PE-CD45PF-CD45PG-CD45PH-CD45PI-CD45PJ-CD45PK-CD45PL-CD45PM-CD45PN-CD45PO-CD45PP-CD45PQ-CD45PR-CD45PS-CD45PT-CD45PU-CD45PV-CD45PW-CD45PX-CD45PY-CD45PZ-CD45QA-CD45QB-CD45QC-CD45QD-CD45QE-CD45QF-CD45QG-CD45QH-CD45QI-CD45QJ-CD45QK-CD45QL-CD45QM-CD45QN-CD45QO-CD45QP-CD45QQ-CD45QR-CD45QS-CD45QT-CD45QU-CD45QV-CD45QW-CD45QX-CD45QY-CD45QZ-CD45RA-CD45RB-CD45RC-CD45RD-CD45RE-CD45RF-CD45RG-CD45RH-CD45RI-CD45RJ-CD45RK-CD45RL-CD45RM-CD45RN-CD45RO-CD45RP-CD45RQ-CD45RR-CD45RS-CD45RT-CD45RU-CD45RV-CD45RW-CD45RX-CD45RY-CD45RZ-CD45SA-CD45SB-CD45SC-CD45SD-CD45SE-CD45SF-CD45SG-CD45SH-CD45SI-CD45SJ-CD45SK-CD45SL-CD45SM-CD45SN-CD45SO-CD45SP-CD45SQ-CD45SR-CD45SS-CD45ST-CD45SU-CD45SV-CD45SW-CD45SX-CD45SY-CD45SZ-CD45TA-CD45TB-CD45TC-CD45TD-CD45TE-CD45TF-CD45TG-CD45TH-CD45TI-CD45TJ-CD45TK-CD45TL-CD45TM-CD45TN-CD45TO-CD45TP-CD45TQ-CD45TR-CD45TS-CD45TT-CD45TU-CD45TV-CD45TW-CD45TX-CD45TY-CD45TZ-CD45UA-CD45UB-CD45UC-CD45UD-CD45UE-CD45UF-CD45UG-CD45UH-CD45UI-CD45UJ-CD45UK-CD45UL-CD45UM-CD45UN-CD45UO-CD45UP-CD45UQ-CD45UR-CD45US-CD45UT-CD45UU-CD45UV-CD45UW-CD45UX-CD45UY-CD45UZ-CD45VA-CD45VB-CD45VC-CD45VD-CD45VE-CD45VF-CD45VG-CD45VH-CD45VI-CD45VJ-CD45VK-CD45VL-CD45VM-CD45VN-CD45VO-CD45VP-CD45VQ-CD45VR-CD45VS-CD45VT-CD45VU-CD45VV-CD45VW-CD45VX-CD45VY-CD45VZ-CD45WA-CD45WB-CD45WC-CD45WD-CD45WE-CD45WF-CD45WG-CD45WH-CD45WI-CD45WJ-CD45WK-CD45WL-CD45WM-CD45WN-CD45WO-CD45WP-CD45WQ-CD45WR-CD45WS-CD45WT-CD45WU-CD45WV-CD45WW-CD45WX-CD45WY-CD45WZ-CD45XA-CD45XB-CD45XC-CD45XD-CD45XE-CD45XF-CD45XG-CD45XH-CD45XI-CD45XJ-CD45XK-CD45XL-CD45XM-CD45XN-CD45XO-CD45XP-CD45XQ-CD45XR-CD45XS-CD45XT-CD45XU-CD45XV-CD45XW-CD45XX-CD45XY-CD45XZ-CD45YA-CD45YB-CD45YC-CD45YD-CD45YE-CD45YF-CD45YG-CD45YH-CD45YI-CD45YJ-CD45YK-CD45YL-CD45YM-CD45YN-CD45YO-CD45YP-CD45YQ-CD45YR-CD45YS-CD45YT-CD45YU-CD45YV-CD45YW-CD45YX-CD45YY-CD45YZ-CD45ZA-CD45ZB-CD45ZC-CD45ZD-CD45ZE-CD45ZF-CD45ZG-CD45ZH-CD45ZI-CD45ZJ-CD45ZK-CD45ZL-CD45ZM-CD45ZN-CD45ZO-CD45ZP-CD45ZQ-CD45ZR-CD45ZS-CD45ZT-CD45ZU-CD45ZV-CD45ZW-CD45ZX-CD45ZY-CD45ZZ |



UMAP projection of cell lineages by clustering using the human PBMC panel

## 5. Identification of 23+ subsets using the human B cell panel

| Cell Population | Cell Subset Name                  | Gating                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
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| B Cells         | Non-Progenitor Hematopoietic Cell | CD45+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|                 | B Cell                            | CD3-CD14-CD16-CD56-CD19+                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|                 | Transitional B Cell (T)           | CD3-CD14-CD16-CD56-CD19-CD24-CD38-CD44-CD45RA-CD45RO-CD45L-CD45H-CD45N-CD45P-CD45T-CD45E-CD45F-CD45G-CD45I-CD45J-CD45K-CD45L-CD45M-CD45N-CD45O-CD45P-CD45Q-CD45R-CD45S-CD45T-CD45U-CD45V-CD45W-CD45X-CD45Y-CD45Z-CD45AA-CD45AB-CD45AC-CD45AD-CD45AE-CD45AF-CD45AG-CD45AH-CD45AI-CD45AJ-CD45AK-CD45AL-CD45AM-CD45AN-CD45AO-CD45AP-CD45AQ-CD45AR-CD45AS-CD45AT-CD45AU-CD45AV-CD45AW-CD45AX-CD45AY-CD45AZ-CD45BA-CD45BB-CD45BC-CD45BD-CD45BE-CD45BF-CD45BG-CD45BH-CD45BI-CD45BJ-CD45BK-CD45BL-CD45BM-CD45BN-CD45BO-CD45BP-CD45BQ-CD45BR-CD45BS-CD45BT-CD45BU-CD45BV-CD45BW-CD45BX-CD45BY-CD45BZ-CD45CA-CD45CB-CD45CC-CD45CD-CD45CE-CD45CF-CD45CG-CD45CH-CD45CI-CD45CJ-CD45CK-CD45CL-CD45CM-CD45CN-CD45CO-CD45CP-CD45CQ-CD45CR-CD45CS-CD45CT-CD45CU-CD45CV-CD45CW-CD45CX-CD45CY-CD45CZ-CD45DA-CD45DB-CD45DC-CD45DD-CD45DE-CD45DF-CD45DG-CD45DH-CD45DI-CD45DJ-CD45DK-CD45DL-CD45DM-CD45DN-CD45DO-CD45DP-CD45DQ-CD45DR-CD45DS-CD45DT-CD45DU-CD45DV-CD45DW-CD45DX-CD45DY-CD45DZ-CD45EA-CD45EB-CD45EC-CD45ED-CD45EE-CD45EF-CD45EG-CD45EH-CD45EI-CD45EJ-CD45EK-CD45EL-CD45EM-CD45EN-CD45EO-CD45EP-CD45EQ-CD45ER-CD45ES-CD45ET-CD45EU-CD45EV-CD45EW-CD45EX-CD45EY-CD45EZ-CD45FA-CD45FB-CD45FC-CD45FD-CD45FE-CD45FF-CD45FG-CD45FH-CD45FI-CD45FJ-CD45FK-CD45FL-CD45FM-CD45FN-CD45FO-CD45FP-CD45FQ-CD45FR-CD45FS-CD45FT-CD45FU-CD45FV-CD45FW-CD45FX-CD45FY-CD45FZ-CD45GA-CD45GB-CD45GC-CD45GD-CD45GE-CD45GF-CD45GG-CD45GH-CD45GI-CD45GJ-CD45GK-CD45GL-CD45GM-CD45GN-CD45GO-CD45GP-CD45GQ-CD45GR-CD45GS-CD45GT-CD45GU-CD45GV-CD45GW-CD45GX-CD45GY-CD45GZ-CD45HA-CD45HB-CD45HC-CD45HD-CD45HE-CD45HF-CD45HG-CD45HH-CD45HI-CD45HJ-CD45HK-CD45HL-CD45HM-CD45HN-CD45HO-CD45HP-CD45HQ-CD45HR-CD45HS-CD45HT-CD45HU-CD45HV-CD45HW-CD45HX-CD45HY-CD45HZ-CD45IA-CD45IB-CD45IC-CD45ID-CD45IE-CD45IF-CD45IG-CD45IH-CD45II-CD45IJ-CD45IK-CD45IL-CD45IM-CD45IN-CD45IO-CD45IP-CD45IQ-CD45IR-CD45IS-CD45IT-CD45IU-CD45IV-CD45IW-CD45IX-CD45IY-CD45IZ-CD45JA-CD45JB-CD45JC-CD45JD-CD45JE-CD45JF-CD45JG-CD45JH-CD45JI-CD45JJ-CD45JK-CD45JL-CD45JM-CD45JN-CD45JO-CD45JP-CD45JQ-CD45JR-CD45JS-CD45JT-CD45JU-CD45JV-CD45JW-CD45JX-CD45JY-CD45JZ-CD45KA-CD45KB-CD45KC-CD45KD-CD45KE-CD45KF-CD45KG-CD45KH-CD45KI-CD45KJ-CD45KK-CD45KL-CD45KM-CD45KN-CD45KO-CD45KP-CD45KQ-CD45KR-CD45KS-CD45KT-CD45KU-CD45KV-CD45KW-CD45KX-CD45KY-CD45KZ-CD45LA-CD45LB-CD45LC-CD45LD-CD45LE-CD45LF-CD45LG-CD45LH-CD45LI-CD45LJ-CD45LK-CD45LM-CD45LN-CD45LO-CD45LP-CD45LQ-CD45LR-CD45LS-CD45LT-CD45LU-CD45LV-CD45LW-CD45LX-CD45LY-CD45LZ-CD45MA-CD45MB-CD45MC-CD45MD-CD45ME-CD45MF-CD45MG-CD45MH-CD45MI-CD45MJ-CD45MK-CD45ML-CD45MM-CD45MN-CD45MO-CD45MP-CD45MQ-CD45MR-CD45MS-CD45MT-CD45MU-CD45MV-CD45MW-CD45MX-CD45MY-CD45MZ-CD45NA-CD45NB-CD45NC-CD45ND-CD45NE-CD45NF-CD45NG-CD45NH-CD45NI-CD45NJ-CD45NK-CD45NL-CD45NM-CD45NN-CD45NO-CD45NP-CD45NQ-CD45NR-CD45NS-CD45NT-CD45NU-CD45NV-CD45NW-CD45NX-CD45NY-CD45NZ-CD45OA-CD45OB-CD45OC-CD45OD-CD45OE-CD45OF-CD45OG-CD45OH-CD45OI-CD45OJ-CD45OK-CD45OL-CD45OM-CD45ON-CD45OO-CD45OP-CD45OQ-CD45OR-CD45OS-CD45OT-CD45OU-CD45OV-CD45OW-CD45OX-CD45OY-CD45OZ-CD45PA-CD45PB-CD45PC-CD45PD-CD45PE-CD45PF-CD45PG-CD45PH-CD45PI-CD45PJ-CD45PK-CD45PL-CD45PM-CD45PN-CD45PO-CD45PP-CD45PQ-CD45PR-CD45PS-CD45PT-CD45PU-CD45PV-CD45PW-CD45PX-CD45PY-CD45PZ-CD45QA-CD45QB-CD45QC-CD45QD-CD45QE-CD45QF-CD45QG-CD45QH-CD45QI-CD45QJ-CD45QK-CD45QL-CD45QM-CD45QN-CD45QO-CD45QP-CD45QQ-CD45QR-CD45QS-CD45QT-CD45QU-CD45QV-CD45QW-CD45QX-CD45QY-CD45QZ-CD45RA-CD45RB-CD45RC-CD45RD-CD45RE-CD45RF-CD45RG-CD45RH-CD45RI-CD45RJ-CD45RK-CD45RL-CD45RM-CD45RN-CD45RO-CD45RP-CD45RQ-CD45RR-CD45RS-CD45RT-CD45RU-CD45RV-CD45RW-CD45RX-CD45RY-CD45RZ-CD45SA-CD45SB-CD45SC-CD45SD-CD45SE-CD45SF-CD45SG-CD45SH-CD45SI-CD45SJ-CD45SK-CD45SL-CD45SM-CD45SN-CD45SO-CD45SP-CD45SQ-CD45SR-CD45SS-CD45ST-CD45SU-CD45SV-CD45SW-CD45SX-CD45SY-CD45SZ-CD45TA-CD45TB-CD45TC-CD45TD-CD45TE-CD45TF-CD45TG-CD45TH-CD45TI-CD45TJ-CD45TK-CD45TL-CD45TM-CD45TN-CD45TO-CD45TP-CD45TQ-CD45TR-CD45TS-CD45TT-CD45TU-CD45TV-CD45TW-CD45TX-CD45TY-CD45TZ-CD45UA-CD45UB-CD45UC-CD45UD-CD45UE-CD45UF-CD45UG-CD45UH-CD45UI-CD45UJ-CD45UK-CD45UL-CD45UM-CD45UN-CD45UO-CD45UP-CD45UQ-CD45UR-CD45US-CD45UT-CD45UU-CD45UV-CD45UW-CD45UX-CD45UY-CD45UZ-CD45VA-CD45VB-CD45VC-CD45VD-CD45VE-CD45VF-CD45VG-CD45VH-CD45VI-CD45VJ-CD45VK-CD45VL-CD45VM-CD45VN-CD45VO-CD45VP-CD45VQ-CD45VR-CD45VS-CD45VT-CD45VU-CD45VV-CD45VW-CD45VX-CD45VY-CD45VZ-CD45WA-CD45WB-CD45WC-CD45WD-CD45WE-CD45WF-CD45WG-CD45WH-CD45WI-CD45WJ-CD45WK-CD45WL-CD45WM-CD45WN-CD45WO-CD45WP-CD45WQ-CD45WR-CD45WS-CD45WT-CD45WU-CD45WV-CD45WW-CD45WX-CD45WY-CD45WZ-CD45XA-CD45XB-CD45XC-CD45XD-CD45XE-CD45XF-CD45XG-CD45XH-CD45XI-CD45XJ-CD45XK-CD45XL-CD45XM-CD45XN-CD45XO-CD45XP-CD45XQ-CD45XR-CD45XS-CD45XT-CD45XU-CD45XV-CD45XW-CD45XX-CD45XY-CD45XZ-CD45YA-CD45YB-CD45YC-CD45YD-CD45YE-CD45YF-CD45YG-CD45YH-CD45YI-CD45YJ-CD45YK-CD45YL-CD45YM-CD45YN-CD45YO-CD45YP-CD45YQ-CD45YR-CD45YS-CD45YT-CD45YU-CD45YV-CD45YW-CD45YX-CD45YY-CD45YZ-CD45ZA-CD45ZB-CD45ZC-CD45ZD-CD45ZE-CD45ZF-CD45ZG-CD45ZH-CD45ZI-CD45ZJ-CD45ZK-CD45ZL-CD45ZM-CD45ZN-CD45ZO-CD45ZP-CD45ZQ-CD45ZR-CD45ZS-CD45ZT-CD45ZU-CD45ZV-CD45ZW-CD45ZX-CD45ZY-CD45ZZ |

Two channels available for additional surface markers and/or B cell tetramers (used to identify antigen-specific populations of B cells). B cell tetramers are currently available from the Immunology Institute's Antibody Characterization and Serology (ACS) recharge facility. The facility offers 70 tetramers capable of identifying specificity to 18 influenza antigens, 15 COVID antigens and 1 CMV antigen.

## 6. Identification of 22+ subsets using the BASIC/EXPANDED T cell panels

**22 cell subpopulations:**

- NKT cells
- CD3+ T cells
- Naive CD4+ and CD8+ T cells
- Effector CD4+ and CD8+ T cells
- Memory CD4+ and CD8+ T cells
- Exhausted CD4+ and CD8+ T cells
- Senescent CD4+ and CD8+ T cells
- Anergic CD4+ and CD8+ T cells

(Available T cell exhaustion marker: PD-1)

**58 cell subpopulations:**

- NKT cells
- CD3+ T cells
- Regulatory T cells
- T Follicular helper (Tfh) cells
- T helper (Th) cells
- Naive CD4+ and CD8+ T cells
- Effector CD4+ and CD8+ T cells
- Memory CD4+ and CD8+ T cells
- Exhausted CD4+ and CD8+ T cells
- Senescent CD4+ and CD8+ T cells
- Anergic CD4+ and CD8+ T cells
- CD8+ Tumor-infiltrating T cells

(Available T cell exhaustion markers: LAG-3, PD-1, TIGIT, TIM-3)

## 3. Available immunophenotyping panels

**PBMC FLOW CYTOMETRY PANEL (36-PARAMETER; 28-COLOR)**

Panel design: ☒ Panel testing: ☒ Panel optimization: ☒ Panel validation: ☒

| Parameters            | CD11b              | CD11c | CD123 | CD138  | CD14       | CD141     |
|-----------------------|--------------------|-------|-------|--------|------------|-----------|
| COR7/CD197            | CD11b              | CD11c | CD123 | CD138  | CD14       | CD141     |
| CD16                  | CD19               | CD1c  | CD24  | CD27   | CD3        | CD303     |
| CD34                  | CD38               | CD4   | CD45  | CD45RA | CD56       | CD57      |
| CD8                   | HLA-DR             | IgD   | IgG   | IgM    | PD-1/CD279 | LIVE/DEAD |
| Forward Scatter (FSC) | Side Scatter (SSC) |       |       |        |            |           |

44 subsets

**B CELL FLOW CYTOMETRY PANEL (24-PARAMETER; 22-COLOR)**

Panel design: ☒ Panel testing: ☒ Panel optimization: ☒ Panel validation: ☒

| Parameters | CD11c                 | CD138              | CD14 | CD16 | CD19  | CD21 | CD24 |
|------------|-----------------------|--------------------|------|------|-------|------|------|
| CD11c      | CD138                 | CD14               | CD16 | CD19 | CD21  | CD24 |      |
| CD27       | CD3                   | CD38               | CD45 | CD56 | CD62L | CD71 |      |
| CXCR5      | FCRL5                 | IgD                | IgG  | IgM  | PD-1  | PD-1 |      |
| LIVE/DEAD  | Forward Scatter (FSC) | Side Scatter (SSC) |      |      |       |      |      |

23+ subsets

**BASIC T CELL FLOW CYTOMETRY PANEL (16-PARAMETER; 14-COLOR)**

Panel design: ☒ Panel testing: ☒ Panel optimization: ☒ Panel validation: ☒

| Parameters            | CD14               | CD19 | CD3  | CD34 | CD38       | CD4       |
|-----------------------|--------------------|------|------|------|------------|-----------|
| COR7/CD197            | CD14               | CD19 | CD3  | CD34 | CD38       | CD4       |
| CD45                  | CD45RA             | CD56 | CD57 | CD8  | PD-1/CD279 | LIVE/DEAD |
| Forward Scatter (FSC) | Side Scatter (SSC) |      |      |      |            |           |

22 subsets

**EXPANDED T CELL FLOW CYTOMETRY PANEL (33-PARAMETER; 30-COLOR)**

Panel design: ☒ Panel testing: ☒ Panel optimization: ☒ Panel validation: ☒

| Parameters                                                                          | CD19        | CD25        | CD27                  | CD28               | CD3   | CD38       |
|-------------------------------------------------------------------------------------|-------------|-------------|-----------------------|--------------------|-------|------------|
| CD19 <td>CD25</td> <td>CD27</td> <td>CD28</td> <td>CD3</td> <td>CD38</td> <td></td> | CD25        | CD27        | CD28                  | CD3                | CD38  |            |
| CD4                                                                                 | CD45        | CD45RA      | CD56                  | CD57               | CD6   | CD95       |
| CXCR3/CD183                                                                         | CXCR4/CD184 | CXCR5/CD185 | CXCR6/CD186           | HLA-DR             | LAG-3 | PD-1/CD279 |
| TIGIT                                                                               | TIM-3       | LIVE/DEAD   | Forward Scatter (FSC) | Side Scatter (SSC) |       |            |

58 subsets

## 7. Acknowledgements

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Flow Cytometry and Single Cell Core Facility

Steffanie Sabbaj, PhD  
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