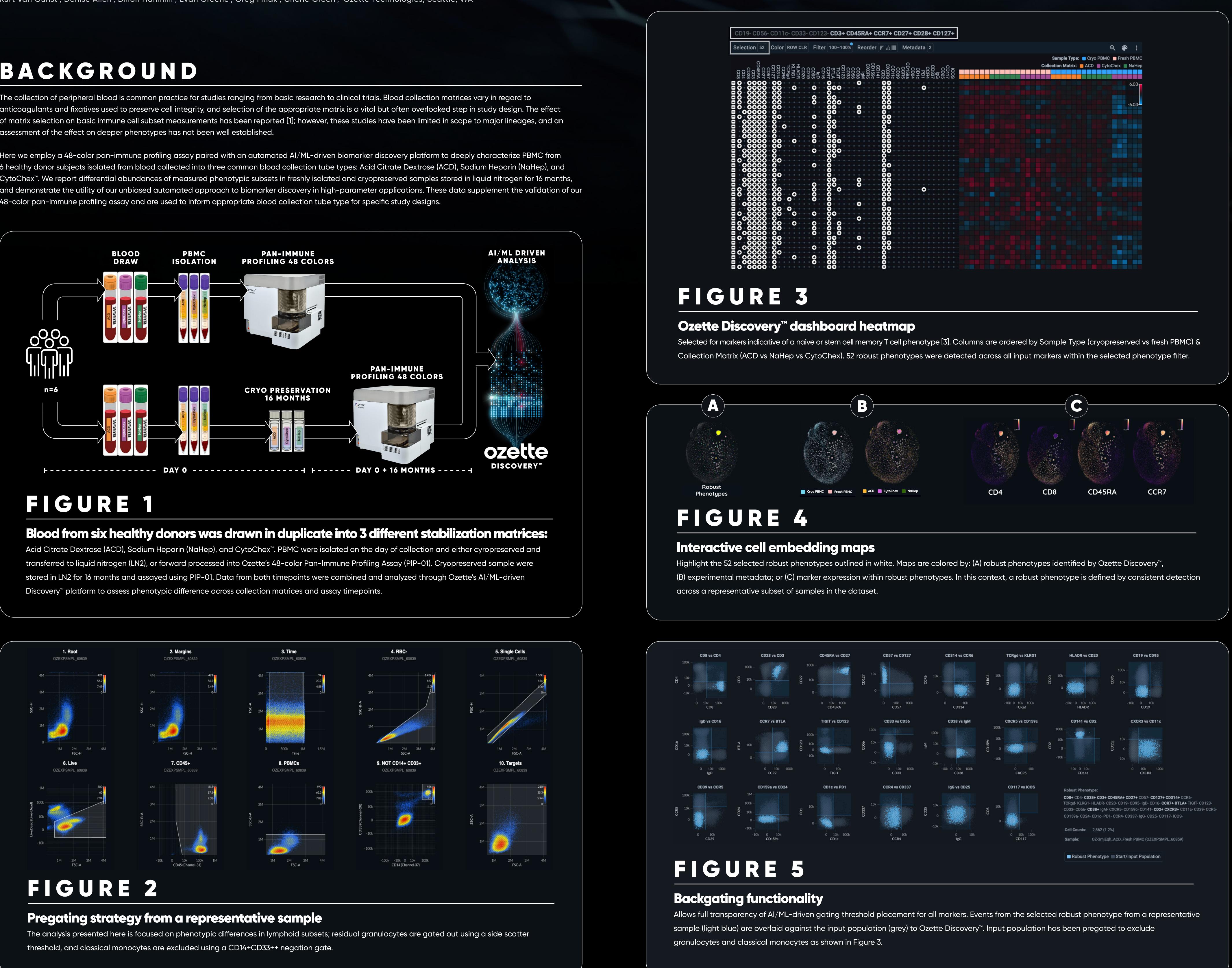
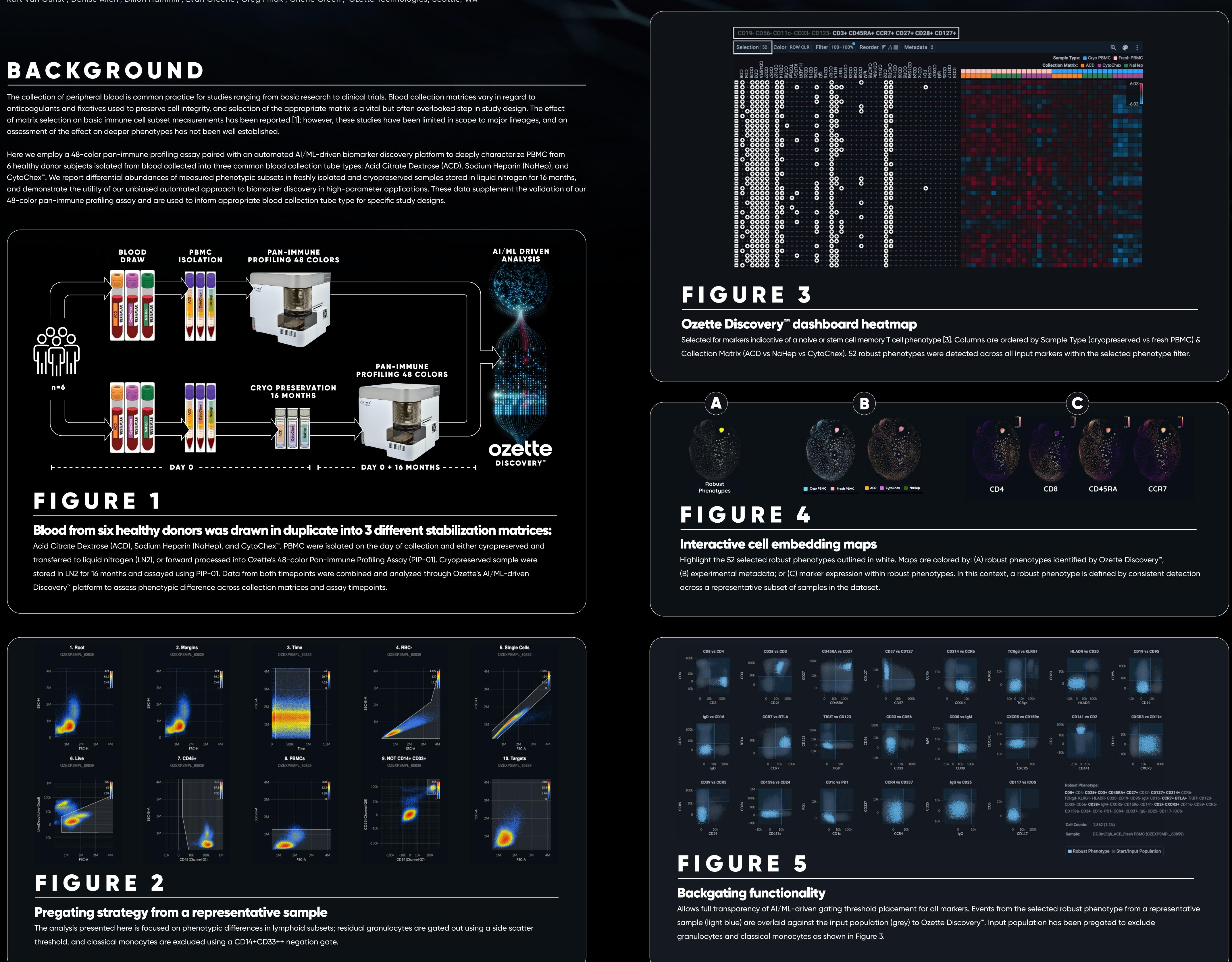
Automated AI/ML-driven biomarker discovery analysis

Elucidates the effect of blood collection matrices and cryopreservation on surface protein expression in peripheral blood samples in the context of a 48-color pan-immune profiling spectral cytometry assay.

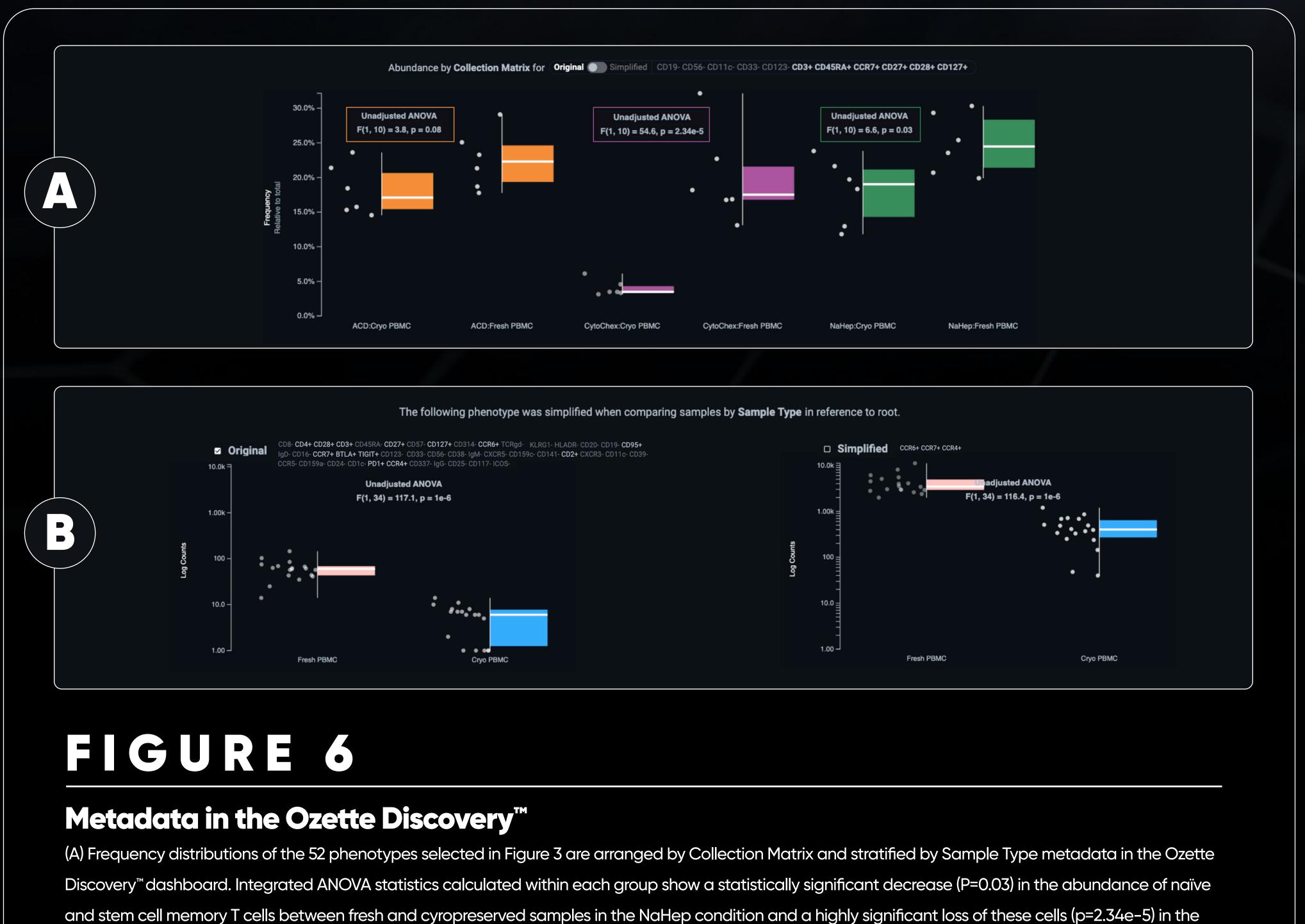
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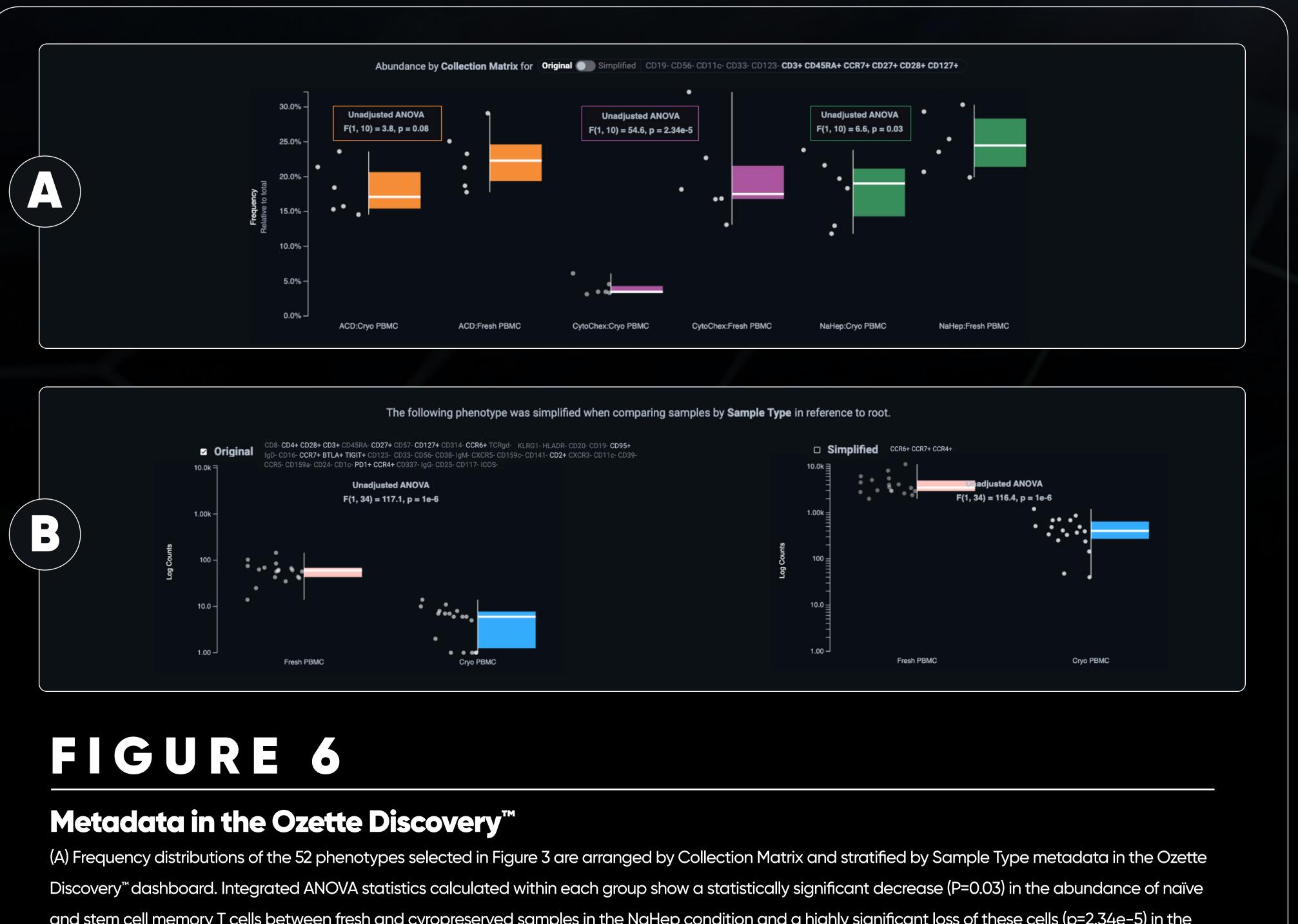
assessment of the effect on deeper phenotypes has not been well established.











CytoChex[™] condition.

(B) Integrated automated phenotype simplification facilitates the identification of critical markers driving differences between selected metadata. In this example, a deep T cell phenotype with differential abundance between fresh and cryopreserved conditions was selected and compared against the simplified phenotype. Statistical analysis shows that cells expressing CCR6, CCR7, and CCR4 are affected by cryopreservation regardless of collection matrix.

DISCUSSION

Peripheral blood is a widely accessible source of material by which to characterize the state of the immune system, enabling studies ranging from basic research to clinical trials. Cryopreservation is often necessary to accommodate the logistics of large scale studies across multiple sites, and the selection of an appropriate sample collection matrix in these studies is a critical factor. By pairing our 48-color pan-immune profiling assay with an AI/ML-driven biomarker discovery platform, we observed a significant decrease in T cells expressing markers indicative of a naïve or stem cell memory phenotype after long term (16 month) cryopreservation across 6 donors and 3 sample collection matrices. Interestingly, cryopreserved PBMC from blood collected into CytoChex[™] tubes showed a near total loss of these cells. CytoChex[™] tubes are marketed for post-collection whole blood stability during transport, up to 14 days at room temperature; however, it is important to note that the naïve T cell compartment is detrimentally affected after PBMC isolation and cryopreservation.

While naïve T cells have been reported to be particularly sensitive to cryopreservation [3], we gain additional insight into this effect across 52 distinct phenotypes within the compartment of undifferentiated T cells defined by the well established co-expression of CD45RA, CCR7, CD27, CD28, & CD127 [2]. Naïve and stem cell memory T cells are important immune cells in many areas of research; and have been reported to have particularly important implications for CAR-T cell manufacturing, with less differentiated phenotypes correlating to increased safety, potency, and durability [4]. While patient/donor blood is not generally collected into individual tubes in manufacturing applications, our findings emphasize the importance of sample handling and its potential effect on immune subsets.



References:

- PMCID: PMC2065759.

Ethics Approval:

All donors provided informed consent using Institutional Review Board (IRB) approved consent forms.





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