

ATELERIX
SAVE YOUR CELLS



CASE STUDY:

VALIDATION OF **ATELERIX** **BLOODREADY™** AND **CYTOSTOR™** FOR WHOLE BLOOD & PBMC PRESERVATION



1.0 INTRODUCTION & BACKGROUND

The transport of blood samples and peripheral blood mononuclear cells (PBMCs), is a critical step in clinical research, diagnostics and translational laboratory workflows. During transport, cellular degradation can compromise sample quality and reduce the reliability of downstream applications such as immunological assays, flow cytometry, molecular diagnostics, genomic studies and cell-based functional assays. For laboratories working across multiple collection sites, delayed processing and variable transport conditions can therefore create a significant barrier to reliable analysis.

Atelerix's technology, BloodReady™ and CytoStor™, are designed to stabilise whole blood samples and isolated PBMCs, respectively, during storage and transport, helping preserve viable cells and support delayed processing between collection sites and central laboratories. This validation study was conducted at the University of KwaZulu-Natal to assess the suitability of these technologies in a research and diagnostic laboratory setting.

2.0 STUDY SUMMARY

This validation study evaluated the performance of Atelerix's BloodReady™ and CytoStor™ technology for the preservation and transport of whole blood samples and subsequently isolated PBMCs. The study assessed sample stabilisation, transport stability, PBMC recovery and comparative preservation performance against conventional storage conditions.

Whole blood samples were tested across four storage conditions: 4°C refrigeration, -80°C cryopreservation, room temperature storage, and Atelerix BloodReady™ stabilisation at 4°C. PBMC preservation was subsequently evaluated using Atelerix CytoStor™ and compared with standard cryopreserved PBMC storage.

The key objective was to determine whether Atelerix preservation technologies could maintain PBMC yield, cellular integrity and viability following storage and simulated transport. The study demonstrated that Atelerix technologies maintained higher PBMC recovery and viability after three days compared with conventional storage approaches.

3.0 MATERIALS AND METHODS

Human whole blood was collected and processed under controlled laboratory conditions. The sample was aliquoted and stored under four conditions: refrigerated storage at 4°C, cryopreservation at -80°C, room temperature storage, and stabilisation using BloodReady™ at 4°C.

Samples were evaluated at Day 0 and Day 3. Following whole blood storage, PBMCs were isolated using SepMate-50 tubes and Lymphoprep™ according to the manufacturer's standard protocol, with total cell counts recorded following isolation. Initial PBMC recovery from whole blood yielded approximately 14.6×10^6 cells from 3 mL whole blood.

For the PBMC preservation assessment, CytoStor™ was compared with standard PBMC storage over the same three-day period. A transport simulation was performed by maintaining samples under their respective storage conditions for three days prior to PBMC extraction, reflecting delayed processing conditions likely to occur during real-world sample movement.



4.0 RESULTS

BLOODREADY™: WHOLE BLOOD LEUKOCYTE PRESERVATION

PBMC recovery following three days' storage of whole blood was assessed as a percentage relative to Day 0 baseline counts. BloodReady™ demonstrated the highest PBMC recovery after three days (Figure 1a), preserving 95.4% of PBMCs compared with 58% at room temperature, 42% at 4°C and 8% at -80°C (Figure 1b). These results indicate that BloodReady™ preserved PBMC recovery substantially better than the conventional storage conditions tested.

Transport Stimulation:

To simulate real-world sample transport conditions, samples were maintained under their respective storage conditions for three days prior to PBMC extraction. BloodReady demonstrated strong stability during the simulated transport period, maintaining high PBMC recovery, high cell viability, and minimal degradation. This suggests that BloodReady is suitable for sample transport between collection sites and central laboratories.

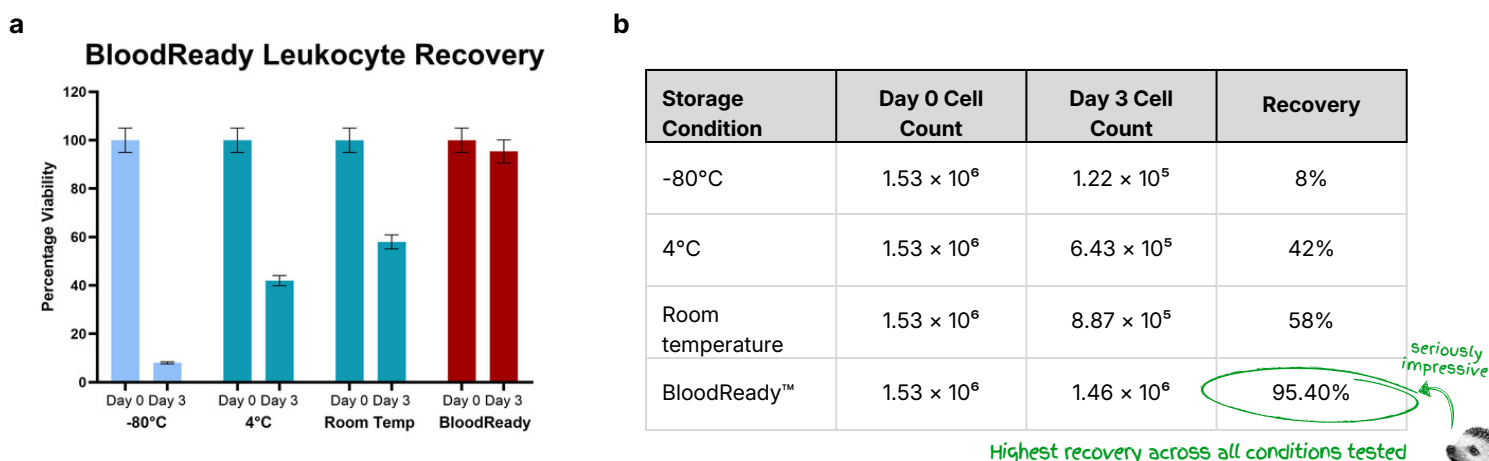


Figure 1. Preservation of leukocytes following storage of whole blood samples under different conditions for three days, including cryopreservation at -80°C, 4°C, room temperature, and BloodReady™ at 4°C. Leukocyte count and viability was assessed via trypan blue exclusion.

CYTOSTOR™: ISOLATED PBMC PRESERVATION

PBMC viability was evaluated using Atelerix CytoStor™ and compared with standard PBMC storage (cryopreserved). CytoStor™ maintained high PBMC recovery after three days (Figure 2a), achieving 91.1% recovery compared with 86.3% for standard PBMC storage (Figure 2b).

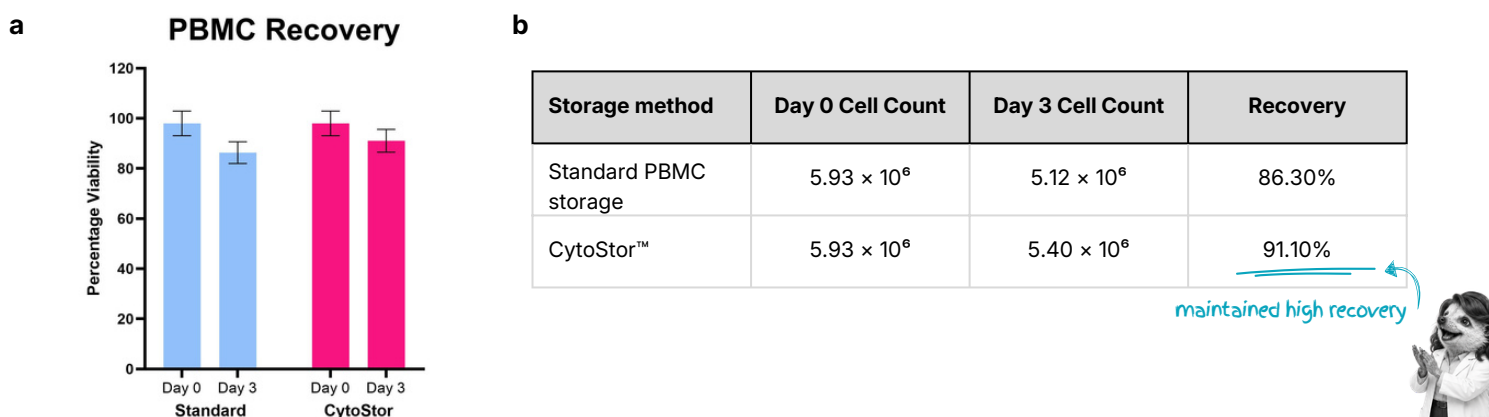


Figure 2. Preservation of isolated PBMCs using CytoStor™. PBMC viability after three days storage was compared between standard PBMC storage (cryopreservation) and Atelerix CytoStor™ preservation.

5.0 DISCUSSION

The study demonstrates that Atelerix preservation technologies can significantly improve the stability of blood samples and PBMCs compared with conventional storage methods. BloodReady™ showed particularly strong performance in whole blood preservation, maintaining 95.4% PBMC recovery after three days, outperforming refrigeration, freezing and room temperature storage.

CytoStor™ also maintained high PBMC recovery during storage, achieving 91.1% recovery after three days, supporting its use for PBMC preservation workflows. Together, these findings suggest that Atelerix technologies can help reduce sample degradation, support delayed processing and improve the reliability of biological sample transport.

This has clear relevance for multi-site research studies, biobanking, remote clinical sampling and workflows where biological samples need to be moved from collection sites to central laboratories without immediate processing.

6.0 CONCLUSION

The validation study conducted at the University of KwaZulu-Natal demonstrates that Atelerix BloodReady™ effectively stabilises whole blood samples and preserves PBMC recovery during storage and simulated transport. CytoStor™ maintained high PBMC viability during PBMC storage, further supporting the use of Atelerix preservation technologies in research workflows requiring sample stabilisation, transport and delayed processing.

Overall, the results indicate that BloodReady™ and CytoStor™ offer practical preservation solutions for maintaining blood sample and PBMC quality across transport and storage workflows.