



Room temperature preservation of

Monocytes & Hemangioblasts

iPSC-derived microglia are differentiated via mesoderm induction and formation of a hemangioblast which releases microglia-like cells, producing $>10^9$ cells over a period of 2 months. BeadReady™ was used to encapsulate and store both hemangioblasts and microglia-like cells for 5 days at room temperature and, upon release, were compared to their non-encapsulated counterparts.

5 Day Storage

Following recovery microglia-like cells had over 85% viability, retained expression of key cell surface markers, and were able to uptake fluorescently labelled beta amyloid, demonstrating no detrimental effect on cell function. Hemangioblasts continued to release microglia-like cells for 8 days following recovery, and cells produced had a similar cell surface expression profile, of CD14, CD16 and CD11b, to cells which had not been encapsulated. This technology offers a novel method of storing and transporting microglia and hemangioblasts without the need for cryopreservation, thus avoiding cell activation or loss of cells upon thaw.

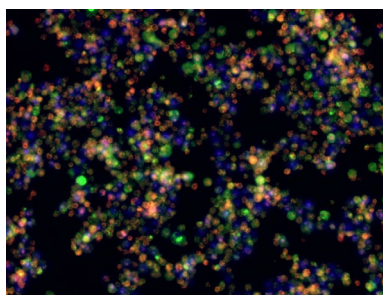


Figure 1. Monocytes/microglia released from BeadReady™ (P2RY12: green, Beta amyloid: red)

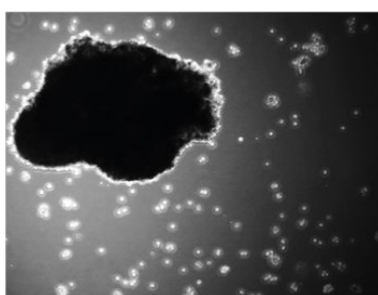


Figure 2. Hemangioblast released from BeadReady™

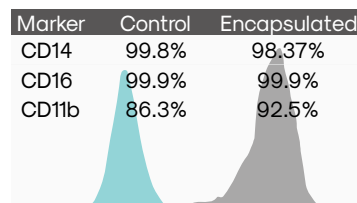
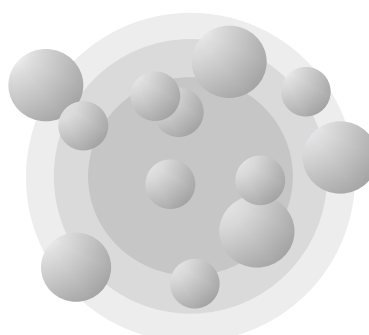


Figure 3. Flow cytometry data showed that monocyte factories maintained markers after encapsulation

BeadReady™

Cells are mixed with a solution of gel and then added dropwise to a gelation solution. As the droplets meet the solution they form into beads that contain the cells. Excess gelation solution is discarded and replaced with your cells' preferred media and the vial is then sealed ready for storage and shipping with no need for further human interaction en route.



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Room temperature preservation of

Limbus-derived Stem Cells

Human limbus-derived stromal/mesenchymal stem cells (hLMSCs) have demonstrated promising therapeutic effects in treating corneal opacification, replacing the need for corneal transplantation. However, complications in safely storing and transporting hLMSCs has reduced the accessibility of this cell therapy. BeadReady™ was used to store and ship hLMSCs for 3-5 days at extreme Indian temperatures (up to 38°C) within controlled room temperature packaging.

hLMSC Viability and Recovery

After release from BeadReady™, hLMSCs exhibited an 82% viable cell recovery when stored at room temperature for 3 days, and 76% after 5 days. This compared to less than 1% recovery of viable cells without BeadReady™ protection. Additionally, BeadReady™-preserved hLMSCs maintained the expression of multiple phenotypic markers at both the gene and protein level. Therefore, this technology represents a novel and essential preservation method of maintaining the viability and properties of hLMSCs to expand the scope of this cell therapy for corneal blindness, and is now entering clinical trials.

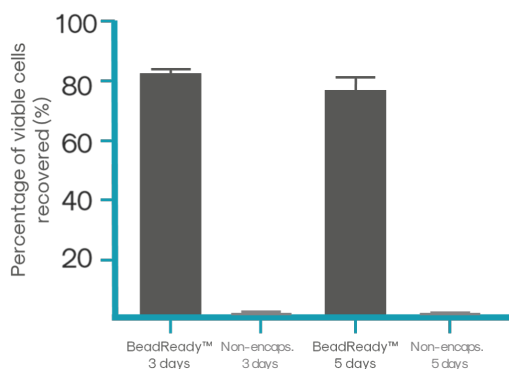


Figure 1. Percentage of viable hLMSCs released from BeadReady™

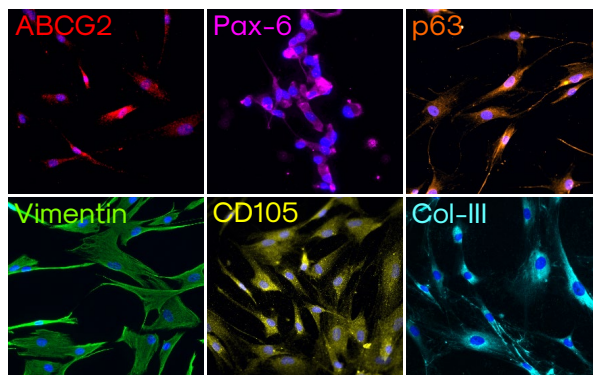
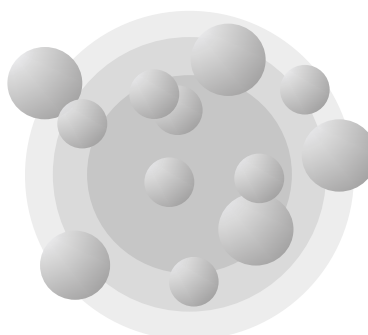


Figure 2. hLMSCs expression of stem (top row) and mesenchymal (bottom row) biomarkers after storage

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Room temperature preservation of

Mesenchymal Stem Cells

Adipose-derived mesenchymal stem cells (ADSCs) are multipotent cells with considerable clinical interest due to their unique ability for growth factor production, immunoregulatory capacity, and differentiation potential. BeadReady™ was used to store ADSCs for 7 days at room temperature in a sealed tube in both serum and serum-free conditions.

7 Day Storage

Following recovery ADSCs cells had over 85% viability in both serum-containing (MesenPro™, Invitrogen) and Atelerix's supplemented serum-free storage medium. In addition to this, cells retained morphology, proliferation, and multilineage differentiation potential.

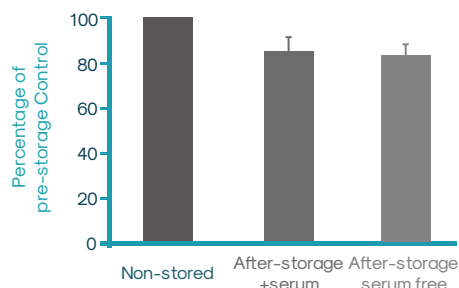


Figure 1. Percentage cell recovery of ADSCs

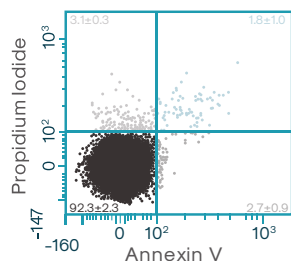


Figure 2. Percentage viability of stored of ADSCs

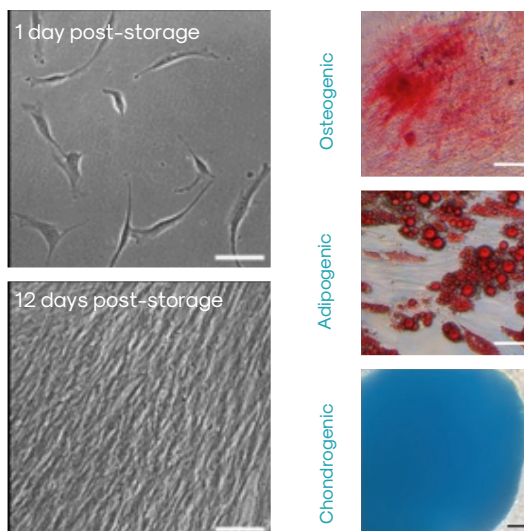
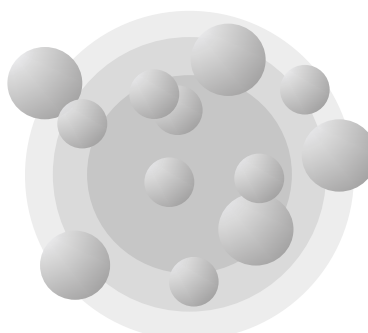


Figure 3. Proliferative and multilineage differentiation potential following storage using BeadReady™ (scale = 50µm)

BeadReady™

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