Cell expansion results after 6 days of culture using the microcarriers are summarized in Tables 1+2. Strong donor-dependent variability was observed in the outcome, with expansion results ranging from 4- to 21-fold increase. However, because the CellBIND® beads are not transparent, cell attachment and harvest efficiency cannot be easily tracked by microscopy and may have also impacted the outcome. Cell attachment and expansion was easier to observe on the dissolvable microcarriers, with clear attachment after four hours and full confluence after four days of culture (Figure 1). MSCs showed 24-26-fold expansion for the three donors (Table 2) using the Corning® dissolvable microcarriers.

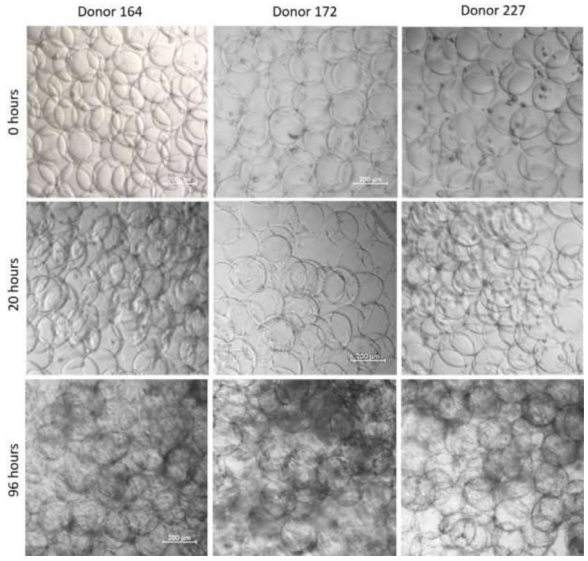

Figure 1. MSC expansion on Corning® Synthemax™ II-coated dissolvable microcarriers in 32-C bags. Shown are microphotographs of MSCs derived from three individual donors adhering onto Corning® microcarriers at the indicated time points. Scale bar indicates 200 μm.

Table 1
Corning® CellBIND® Polystyrene Microcarriers

Donor	Viability	Harvested viable cells/bag	Fold increase
164	96%	12.5×10^6	21
172	96%	3.4×10^6	4
227	95%	5.1×10^6	9

Table 2
Corning® Synthemax™ II Dissolvable Microcarriers

Donor	Viability	Harvested viable cells/bag	Fold increase
164	98%	16×10^6	26
172	98%	15×10^6	26
227	97%	15×10^6	24

MSC surface marker expression levels were not affected by culture on either microcarrier system in VueLife® bags and comparable to expression in T-175 flasks, as shown by flow cytometry. To support further expansion towards clinically-relevant doses, additional beads and media may be added to the bags. In summary, MSC expansion can be facilitated using microcarriers in VueLife® FEP bags for patient specific therapies.

Results of MSC expansion on Corning's CellBIND® and Synthemax™ II-coated microcarriers after 6 days in culture in Saint-Gobain VueLife® 32-C bags. Results are shown for three tested MSC donors (#164, #172 and #227).

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Expansion and characterization of mesenchymal stem cells and other anchorage-dependent cell types in fluoropolymer bags treated for adherent cell culture

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Background & Aim Modern cell based therapies continue to gain momentum as demonstrated by the growing number of clinical trials and cell therapy commercialization centers. A growing shift towards closed manufacturing systems to replace conventional functionally open systems such as tissue culture polystyrene (TCPS) flasks has prompted the development of various oxygen-permeable cell culture bags made from materials such as fluorinated ethylene propylene (FEP). However, hydrophobic materials such as untreated TCPS or FEP do not support adequately the growth of anchorage-dependent cells. For this reason, most TCPS vessels sold for adherent culture undergo plasma or liquid based surface treatments which increase surface wettability and cell adhesion. Unlike TCPS, the effect of FEP vessels treated for adherent culture on cell adhesion is poorly documented. This is a major obstacle for the production of anchorage-dependent cell based therapies in a closed setting. The objective of this study was to investigate the impact of the treated form of FEP on adherent cell cultures.

Methods, Results & Conclusion Different types of anchorage-dependent cells, including mesenchymal stem cells (MSCs), mouse insulinoma 6 (MIN6) cells and human embryonic kidney (HEK) cells, were cultured in treated-FEP (VueLife® AC Series) bags and their biological properties were analyzed in comparison to cells seeded on untreated-FEP (VueLife® C Series) and/or treated-TCPS (Nunclon™ Delta-treated T-flasks). Light microscopy revealed that surface treatment enhanced adhesion on FEP, but final adherent cell yields after expansion remained lower than on treated-TCPS. Additionally, we observed that surface treatment of FEP did not affect the differentiation status of expanded MSCs or MIN6 populations. As expected, the removal of proteins from the medium or integrin inhibition reduced cell adhesion. Overall, our results demonstrate that a wide range of anchorage-dependent cells, including primary cells (MSCs) and immortalized cell lines (anchorage-dependent HEK cells, MIN6) can be successfully expanded in VueLife® AC bags. As an increasing number of adhesion cell based therapies are ready to enter the clinic, there is a pressing need to find the appropriate cell culture vessels and materials for better clinical outcomes.

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Quarantine Time Validation for UC-MSC Isolation

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Background & Aim Umbilical cord tissue is a potential source of Mesenchymal Stem Cells (MSCs). These cells have been widely used especially in pre-clinical and clinical applications resulting its various effectiveness. Banking process of umbilical cord involves transportation from the hospital where the cord is received to the banking facility to be processed further. Prior to processing, pre-sterility test must be conducted and while waiting for the result, the umbilical cord is quarantined. This quarantine process has to be carried out carefully to maintain cell's recovery and viability. Suitable range of time should be chosen to deliver high quality cells.

In this study, we aim to determine the maximum time for quarantined umbilical cord to be processed.

Cytotherapy, 22 (2020) S196-S197. doi:10.1016/j.jcyt.2020.04.061