Optimization of culture and conservation parameters of clinical grade progenitor cells for plastic surgery use in scar and wound management

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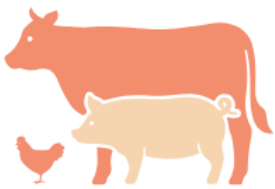
Objectives



There is high pressure from authorities to abolish animal-origin products for cell culture sources destined for patient use. Processes and materials for cell expansion as well as the use of DMSO for long-term conservation of cell banks are concerned. Herein, we evaluated the use of a non-animal supplement (human platelet lysate, hPL) instead of fetal bovine serum (FBS) for cell culture and also evaluated various cryopreservation formulations to be used with the clinical FE002-SK2 cell bank.

Methods

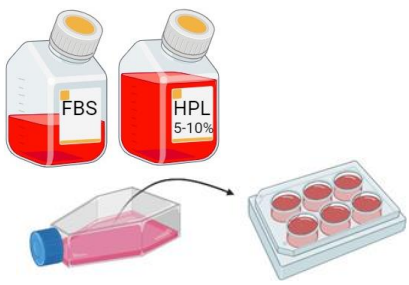


***Figure 1**: Evaluation of cell culture medium (DMEM with either 10% FBS, 5 or 10% hPL) by seeding FE002-SK2 cells in 6-well plates and quantifying cell growth at 4, 5, 6, 7, 10, 11 and 14 days.*

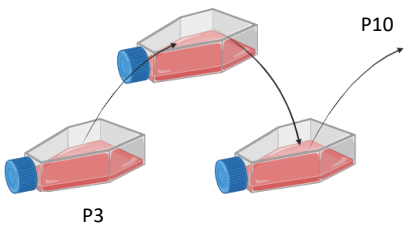


***Figure 2**: Evaluation of the impact of different culture media on cellular passages, FE002-SK2 cells were seeded in T25 culture flasks and counted on day 7 from passages 3 and up to passage 10.*

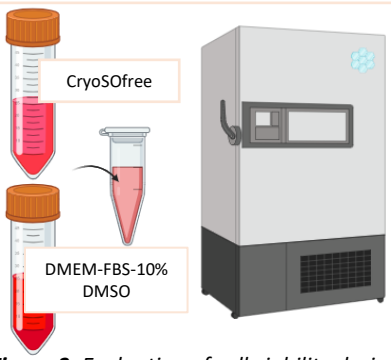
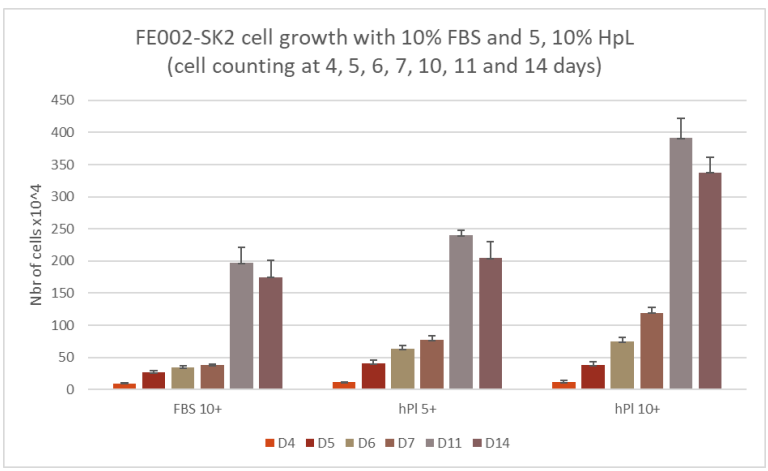


***Figure 3**: Evaluation of cell viability during cryopreservation using either CryoSOfree or the gold-standard formulation.*

Results



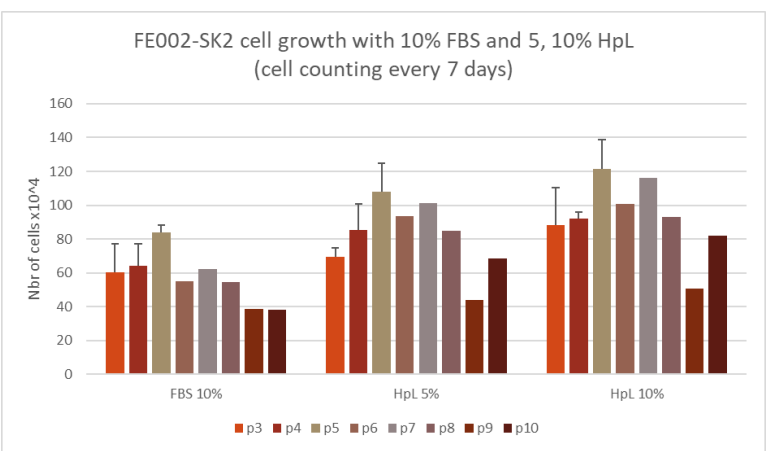


***Figure 4**: Cells cultured in medium with 5% or 10% hPL showed a higher growth rate compared to those in 10% FBS medium.*

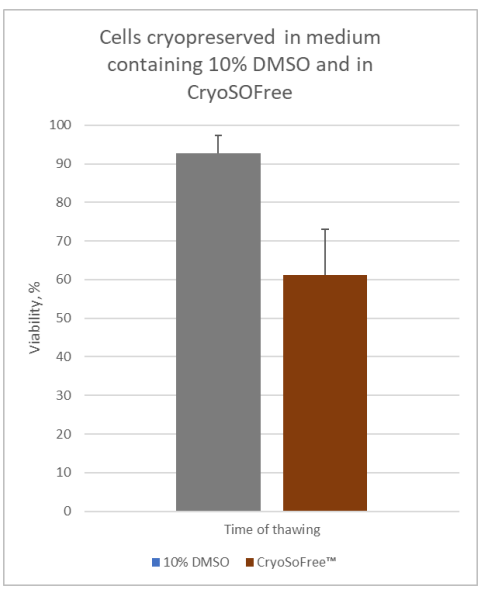


***Figure 5**: Cells cryopreserved in medium containing 10% DMSO showed more than 95% of viable cells after thawing whereas CryoSoFree displayed only 60% viable cells.*

***Figure 6**: Cells cultured in medium with 5% and 10 % hPL showed higher growth with different cellular passages, hPL showed more variability in total cell yields.*

Conclusion

HPL-supplemented medium showed a significant increase in cellular growth compared to the medium with 10% FBS, but the increased cell physiology over passage and cell behavior would need more analysis to approve these mediums to ensure finished product quality and patient safety. For the evaluation of the cryopreservation protocol, it is clear that the gold-standard medium with 10% DMSO provides excellent viability of the cells after thawing, confirming that this cryopreservation medium is the best to date as it has a proven long-term stability of the progenitor cell sources used in the clinic.

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