Insights from the NCS Neonatal Stem Cell Lab – NCS Project 2-18

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Introduction: We tested the influence of elapsed time from delivery and storage temperature on the resilience of neonatal stem cells. As these samples are meant to be included in a large-scale NCS research archive rather than a transplant bank, we began to explore alternative processing strategies aimed at reducing personnel effort and overall cost without compromising specimen integrity.

Methods: Cord blood, placenta, and umbilical cord were obtained from three sites. Paired external specimens were maintained at 4 and 20°C and shipped to UCD for processing according to standardized procedures at 48/96h. Pre-pilot testing was performed with minimal processing and cryopreservation of heterogeneous cell populations including MSC.

Results: Contamination was common in vaginal birth placental samples, prompting an experiment of effects of antibiotic use on cell function. There were no differences in *in-vitro* functional capacities that we tested of MSC grown in media enhanced with penicillin and streptomycin. We also recognized that tissue dissociation and prolonged culturing to obtain a homogenous population of MSC before cryopreservation, which commonly requires 3-4 weeks, might not be necessary. Preliminary results of minimal tissue processing and cryopreservation at time points prior to passage 3 are promising. Comparisons of feasibility and cost savings for various methods will be presented.

Conclusions: Early experimentation with minimal processing and early cryopreservation suggest that simplified options for cell archiving should be explored in the pilot study. These changes would result in substantial savings to any plan for targeted or broad-scale cell archiving during the main phase of the NCS.