3.22 Investigating the role of the Acute Respiratory Distress Syndrome disease microenvironment on human bone-marrow derived Mesenchymal Stromal Cells.

Courteney Tunstead[1,2], Hazel Dunbar[1,2], Ian Hawthorne[1,2], Evelina Volkova[1,2], Louis McCabe[1,2], Bairbre McNicholas[3,4], John G. Laffey[3,4] & Karen English[1,2]

[1]*Cellular Immunology Lab, Department of Biology, Maynooth University, Maynooth, Co. Kildare, Ireland.*

[2]*Kathleen Lonsdale Institute for Human Health Research, Maynooth University, Maynooth, Co. Kildare, Ireland.*

[3]*Anesthesia and Intensive Care Medicine, School of Medicine, College of Medicine Nursing and Health Sciences, University of Galway, Galway, Ireland.*

[4]*Anesthesia and Intensive Care Medicine, Galway University Hospitals, Saolta University Hospitals Groups, Galway, Ireland.*

Background: Human bone-marrow derived Mesenchymal Stromal Cells (hBM-MSCs) have attracted significant attention as a cell-based therapy for many years. Their immunomodulatory and regenerative properties, in combination with their low immunogenicity, makes them an appealing treatment for a variety of conditions. hBM-MSCs are known to require cytokinemediated activation signals, also known as licensing, in order to be deemed efficacious. This suggests that the highly-inflammatory ARDS patient micro-environment, containing cytokines such as IL-6, TNF-α, IFN-ɣ and MIF, may contribute to hBM-MSC activation.

Methods: hBM-MSCs were cultured at a density of $1x10^5$ in a 12-well plate and exposed to 20% ARDS patient serum for 24 hours. The cells and supernatants were than harvested for gene and protein expression studies, along with various functional assays.

Results: Our data demonstrates that hyper-inflammatory, but not hypo-inflammatory, ARDS patient serum has the potential to license hBM-MSCs, and therefore, enhance their therapeutic efficacy *in vitro*.

Conclusion: This study highlights the importance of ARDS patient stratification prior to treatment identification.

Disclosures

Conflict of interest: The authors declare there is no conflict of interest.

Funding: This project has been supported by the Science Foundation Ireland Award to Prof.

Karen English under the grant number 20/FFP-A/8948.