MRC/BJA Fellowship Abstract

What is the role of microvesicles in the development of acute lung injury?

Patients with Acute Respiratory Distress Syndrome (ARDS) have an unacceptably high mortality, which is confounded by the lack of diagnostic/prognostic biomarkers and effective treatments. As such, there remains an urgent, unmet need for a re-direction in ARDS research elucidating new insights into its complex pathophysiology.

Microvesicles (MVs) contain elements retained from their precursor cells and carry a variety of molecular cargo between cells, providing an alternative yet crucial pathway for inter-cellular communication. Consequently they have been implicated as potential biomarkers and in the pathophysiology of various inflammatory diseases. They have not been well investigated in ARDS, but our preliminary data demonstrate the presence of MVs containing pro-inflammatory mediators in an ARDS model. Based on this, we aim to establish the significance of MVs in ARDS, investigating three central objectives:

1. To explore if patterns of MV release can be used to distinguish between the acute, fibrotic and resolution phases of ARDS.
2. To investigate the inflammatory mediators and biological cargo (e.g. interleukins, chemokines, RNA) ferried by MVs between cells
3. To identify the role of MVs in the pathogenesis, potentially inspiring novel therapeutic targets.

These results will provide crucial information for the scientific community on the pathophysiology of ARDS, potentially identifying a novel, previously unexplored communication pathway between intra-alveolar cells. This may explain why therapies for ARDS to date have proved ineffective and as such the results from this project may allow the development of new opportunities for therapeutic strategies for ARDS.

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