Study shows potential of stem cell therapy to repair lung damage

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A new study has found that stem cell therapy can reduce lung inflammation in an animal model of chronic obstructive pulmonary disease (COPD) and cystic fibrosis. Although, still at a pre-clinical stage, these findings have important potential implications for the future treatment of patients.

The findings were presented in Estoril, Portugal today (25 March, 2017) at the European Respiratory Society's Lung Science Conference.

Lung damage caused by chronic inflammation in conditions such as COPD and cystic fibrosis, leads to reduced lung function and eventually respiratory failure. Mesenchymal stem cell (MSC) therapy is currently being investigated as a promising therapeutic approach for a number of incurable, degenerative lung diseases. However, there is still limited data on the short and long-term effects of administering stem cell therapy in chronic respiratory disease.

The new research investigated the effectiveness of MSC therapy in a mouse model of chronic inflammatory lung disease, which reflects some of the essential features of diseases such as COPD and cystic fibrosis.

Researchers delivered stem cells intravenously to β-ENaC overexpressing mice at 4 and 6 weeks of age, before collecting samples tissue and cells from the lungs at 8 weeks. They compared these findings to a control group that did not receive the MSC therapy.

The results showed that inflammation was significantly reduced in the group receiving MSC therapy. Cells counts for both monocytic cells and neutrophils, both signs of inflammation, were significantly reduced after MSC therapy. Analysis of lung tissue revealed a reduction in the mean linear intercept and other measures of lung destruction in MSC treated mice. As well as reducing inflammation in the lung, MSC therapy also resulted in significant improvements in lung structure, suggesting that this form of treatment has the potential to repair the damaged lung.

Dr Declan Doherty, from Queens University Belfast, UK, commented: "These preliminary findings demonstrate the potential effectiveness of MSC treatment as a means of repairing the damage caused by chronic lung diseases such as COPD. The ability to counteract inflammation in the lungs by utilising the combined anti-inflammatory and reparative properties of MSCs could potentially reduce the inflammatory response in individuals with chronic lung disease whilst also restoring lung function in these patients. Although further research is needed to improve our understanding of how MSCs repair this damage, these findings suggest a promising role for MSC therapy in treating patients with chronic lung disease.

Professor Rachel Chambers, ERS Conferences and Research Seminars Director, commented: This paper offers novel results in a pre-clinical model which demonstrates the potential of MSC stem cell therapy for the treatment of long-term lung conditions with exciting potential implications for the future treatment of patients with COPD and cystic fibrosis. Although, still at an early stage in terms of translation to the human disease situation, this paper is one of many cutting-edge abstracts from the Lung Science Conference, which aims to provide an international platform to highlight novel experimental lung research with therapeutic potential. We rely on high quality basic and translational respiratory science, such as these latest findings, to develop novel therapeutic approaches for the millions of patients suffering from

devastating and often fatal respiratory conditions.

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