

European Respiratory Society Annual Congress 2012

Abstract Number: 1850

Publication Number: 3101

Abstract Group: 3.3. Mechanisms of Lung Injury and Repair

Keyword 1: ALI (Acute Lung Injury) **Keyword 2:** Cell biology **Keyword 3:** Pharmacology

Title: Adrenaline stimulated mesenchymal stem cells modulate inflammation in lipopolysaccharide induced lung injury

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Body: Introduction: Bone marrow derived mesenchymal stem cells (BMSCs) could modulate inflammation. Adrenergic receptor agonists could increase DNA synthesis and protect oxidative stress in mesenchymal stem cells. We investigated the potential role of adrenaline stimulated BMSCs on lipopolysaccharide (LPS) induced lung injury in vitro. Methods: BMSCs from rats were cultured with adrenaline at 0-100 μ M, followed by determination of CCK8. The optimal concentration was chosen for latter study. BMSCs and lung cells from normal or LPS injured rats were co-cultured in a Transwell system (8 μ m pore size) for 36h. The migrated BMSCs were stained by Giemsa. BMSCs and alveolar macrophages were co-cultured with LPS or adrenaline in Transwell (0.4 μ m pore size) for 6h. The supernatant was collected for cytokines (TNF- α , IL-1beta, IL-6, IL-10, IL-13, angiopoietin-1, KGF and IL-1ra) analysis by ELISA, and the mRNA expression levels in BMSCs were determined by PCR. Results: Adrenaline at 10 μ M promoted proliferation and migration of BMSCs towards injured lung. Adrenaline could enhance the inflammation modulation effects of BMSCs by decreasing TNF- α , IL-1beta and IL-6, and increasing IL-10. Adrenaline could also increase angiopoietin-1 mRNA expression of BMSCs. Conclusions: Adrenaline could help BMSCs modulate LPS induced lung injury in vitro, probably through promotion of proliferation, migration and angiopoietin-1 secretion.