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Stem cells in pulmonary disease and regeneration

Rohan R. Nadkarni, Soumeya Abed, Jonathan S. Draper

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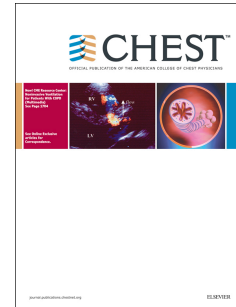
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Title**Stem cells in pulmonary disease and regeneration****Authors****Rohan R. Nadkarni^{1,3}, Soumeya Abed^{1,2}, and Jonathan S. Draper^{1,2,3*}****Affiliations**

¹ **McMaster Stem Cell and Cancer Research Institute, Michael G. DeGroote School of Medicine, McMaster University, Hamilton, ON L8N 3Z5, Canada.**

² **Department of Pathology and Molecular Medicine, McMaster University, Hamilton, ON L8N 3Z5, Canada.**

³ **Department of Biochemistry and Biomedical Sciences, McMaster University, Hamilton, ON L8N 3Z5, Canada.**

*** Corresponding author. Electronic address: draperj@mcmaster.ca**

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Abstract

The epithelial cells lining the mammalian lung are subjected to constant interaction with the external environment, necessitating robust regeneration strategies to deal with cell loss due to natural turn over or damage arising via inhaled agents or disease. Since lung epithelium function extends beyond respiratory gas exchange to include roles such as immune defense and mucociliary clearance, a diverse complement of epithelial cell types exists that are regionally distributed along the respiratory tree and extensive surface area of the alveolar interface. Although steady-state turnover of the epithelium appears to be relatively low in ideal situations, the vital role of the lung requires stem and progenitor cell populations that can promptly respond to the loss or damage of epithelial tissues. The identity and role of stem cell populations that carry out repair and replacement within the lung has started to clarify in recent years, lead by cell lineage tracking experiments in the mouse lung, revealing a complex interplay of differentiation, trans-differentiation and de-differentiation between lung stem cell and functional respiratory cell populations. In this review article, we present the current understanding of the stem cell populations within the pulmonary epithelium, and describe ongoing efforts to use these stem cell populations to generate models for exploring lung function and disease.

Introduction

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