

US researchers identify first human lung stem cell

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For the first time, researchers at Brigham and Women's Hospital (BWH) have identified a human lung stem cell that is self-renewing and capable of forming and integrating multiple biological structures of the lung including bronchioles, alveoli and pulmonary vessels. This research is published in the May 12, 2011 issue of the *New England Journal of Medicine*.

"This research describes, for the first time, a true human lung stem cell. The discovery of this stem cell has the potential to offer those who suffer from chronic lung diseases a totally novel treatment option by regenerating or repairing damaged areas of the lung," said Piero Anversa, MD, director of the Center for Regenerative Medicine at Brigham and Women's Hospital and corresponding author.

Using lung tissue from surgical samples, researchers identified and isolated the human lung stem cell and tested the functionality of the stem cell both in vitro and in vivo. Once the stem cell was isolated, researchers demonstrated in vitro that the cell was capable of dividing both into new stem cells and also into cells that would grow into various types of lung tissue. Next, researchers injected the stem cell into mice with damaged lungs. The injected stem cells differentiated into new bronchioles, alveoli and pulmonary vessel cells which not only formed new lung tissue, but also integrated structurally to the existing lung tissue in the mice.

The researchers define this cell as truly "stem" because it fulfills the



three categories necessary to fall under stem cell categorization: first, the cell renews itself; second, it forms into many different types of lung cells; and third, it is transmissible, meaning that after a mouse was injected with the stem cells and responded by generating new tissue, researchers were then able to isolate the stem cell in the treated mouse, and use that cell in a new mouse with the same results.

"These are the critical first steps in developing clinical treatments for those with lung disease for which no therapies exist. Further research is needed, but we are excited about the impact this discovery could have on our ability to regenerate or recreate new lung tissues to replace damaged areas of the lungs," said Joseph Loscalzo, MD, PhD, chair of the Department of Medicine at BWH and co-author.

Provided by Brigham and Women's Hospital

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