Researchers describe unique genetic identity of primordial lung progenitors

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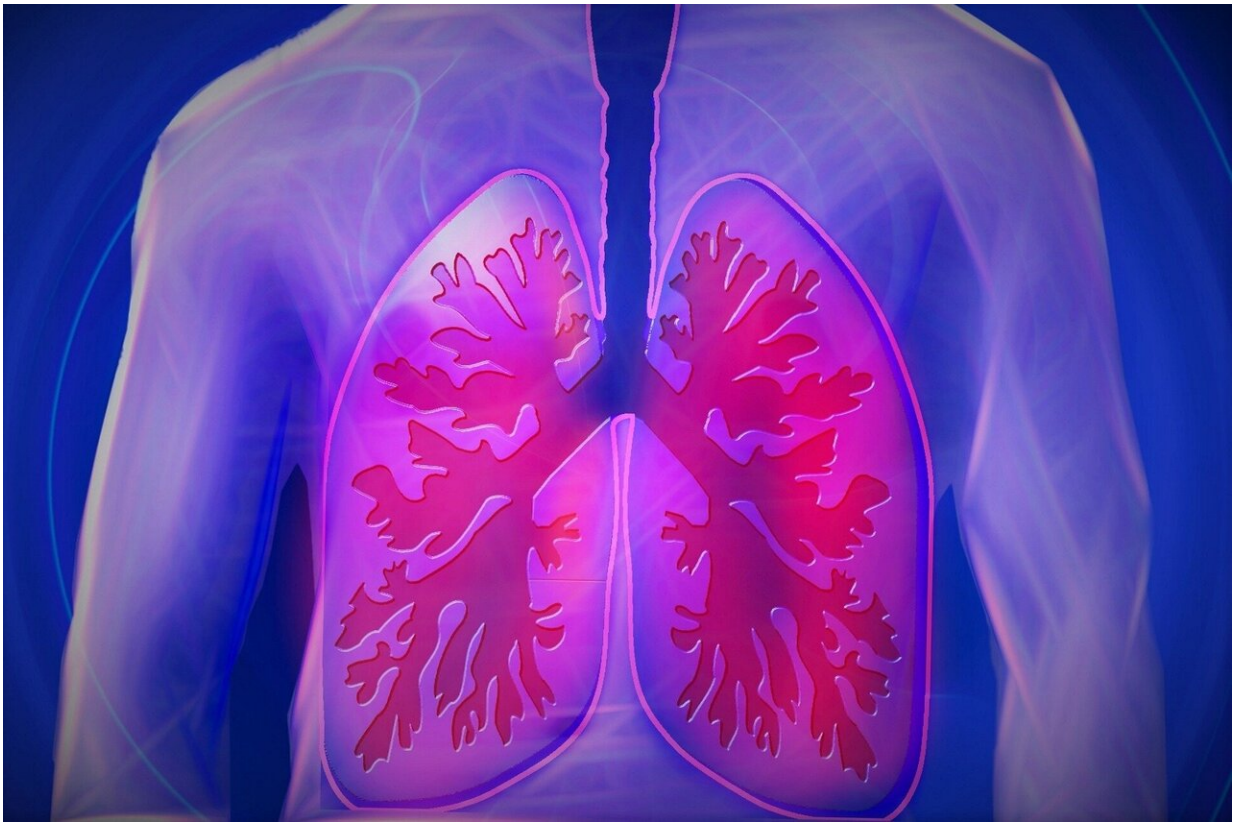

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For the first time, researchers describe the genetic program behind primordial lung progenitors—embryonic cells that give rise to all the cells that form the lining of the respiratory system after birth. They

believe this study has long-term implications for the treatment of diseases affecting the respiratory system, such as chronic obstructive pulmonary disease (COPD), alpha-1 antitrypsin deficiency and cystic fibrosis.

Diseases affecting the lungs are not easily treatable and result in significant morbidity and mortality worldwide. Specialized stem cells with the potential to self-renew have been proposed as a critical component of tissue homeostasis for many organs, including the lung. Similar cells can be engineered in vitro and used in the future in cell replacement therapies for respiratory diseases.

Using a genetically modified experimental model, researchers from the Center for Regenerative Medicine (CReM) of Boston University and Boston Medical Center, were able to isolate and describe the genetic program of the earliest lung progenitor cells and understand the signals that instruct them. They then used computational methods that helped them define how similar their engineered lung cells are to the in vivo progenitors.

"Our findings define in great detail a rare, transient cell, namely the primordial lung progenitor. The knowledge generated from this study will be of great value in the derivation of human primordial lung progenitors in culture, since the equivalent stage in human lung development is not accessible," explained corresponding author Laertis Ikonomou, Ph.D., assistant professor of molecular and translational medicine at Boston University School of Medicine.

Respiratory system diseases, such as COPD, cystic fibrosis and lung interstitial disease severely affect quality of life. "We hope that our findings will eventually lead to more protocols for, transplantable lung epithelial cells for treatment of such diseases and for drug development," added Ikonomou.

These findings appear online in the journal *Nature Communications*.