

New research finds novel method for generating airway cells from stem cells

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Researchers have developed a new approach for growing and studying cells they hope one day will lead to curing lung diseases such as cystic fibrosis through "personalized medicine."

Researchers at the Center for Regenerative Medicine (CReM) at Boston University School of Medicine (BUSM) and Boston Medical Center (BMC) have discovered that one particular signaling pathway, Wnt, helps direct lung development. A signaling pathway is how developing cells get instruction on what types of cell to become, such as a liver cell, a skin cell, a brain cell, etc.

Using this finding, researchers implemented a new way to use [stem cells](#) made from any individual, including cells from patients with cystic fibrosis, and turn them into [airway cells](#), which they then grew into three-dimensional spheres. These airway spheres now can be used to study cystic fibrosis disease activity using a specific test called a swelling assay.

"Because airway spheres from a patient with cystic fibrosis do not swell in our assay but airway spheres from a healthy person do, we can see whether adding a certain drug or combination of drugs causes them to swell more. Finding a drug that causes them to swell might imply that patient would benefit from that treatment," explained corresponding author Darrel Kotton, MD, director of the CReM and Seldin Professor of Medicine at BUSM.

"This study represents our progress towards making airway spheres from any patient with a [lung disorder](#) and learning about that patient's disease from those cells. We hope this leads to the ability to design, study and test new therapies for every patient on their own cells in the lab, leading to new treatments and breakthroughs in personalized medicine for individuals with a variety of lung diseases, including [cystic fibrosis](#)," explained lead author Katherine McCauley, a PhD student at BUSM.

The researchers believe this process can be used to study other [lung diseases](#) such as asthma and emphysema.

The findings are published in the journal *Cell Stem Cell*.

Provided by Boston University Medical Center

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