Lower airways are distinct in cystic fibrosis even at younger ages

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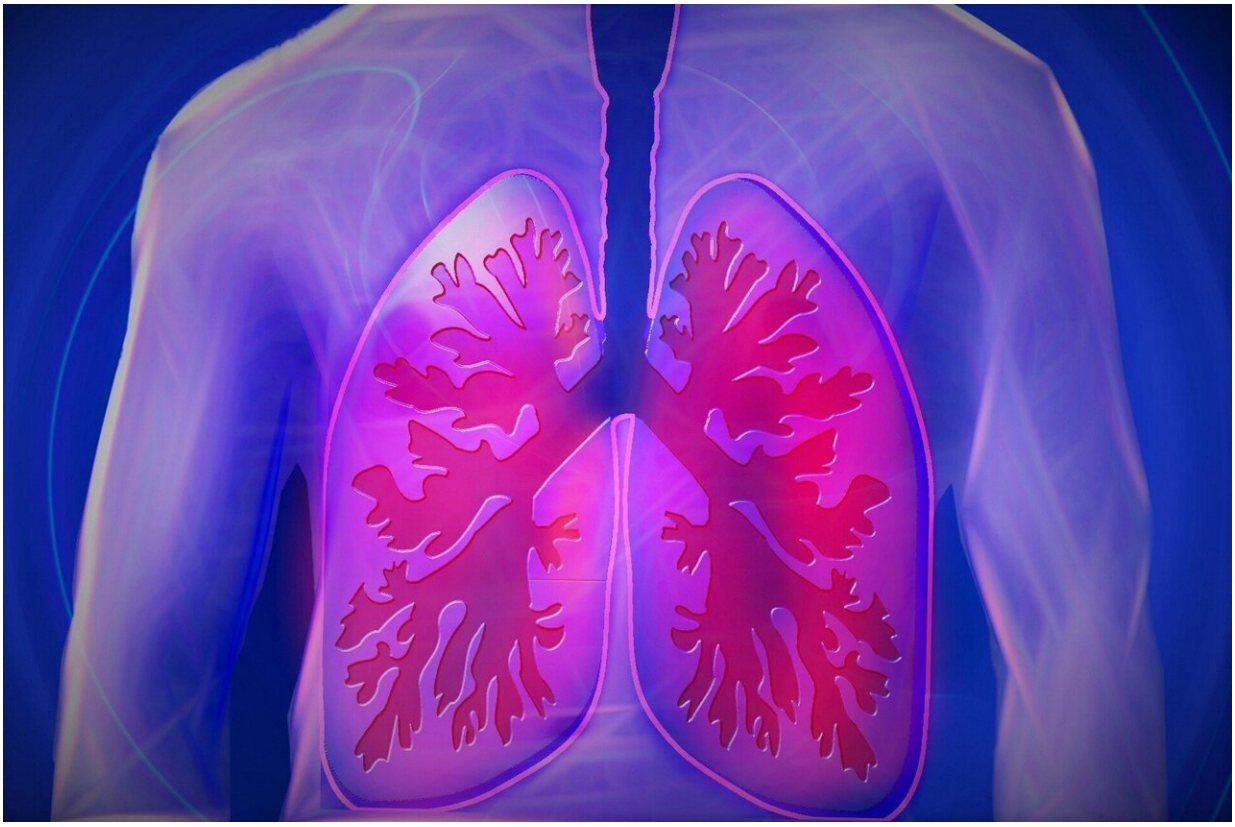

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In the largest study of its kind, researchers found that the lower airways in children with cystic fibrosis (CF) have a higher burden of infection, more inflammation and lower diversity of microorganisms, compared to

children with other illnesses who also have lung issues. They noted a clear divergence in these bacterial communities in toddlers, which is typically before progressive lung disease takes hold in patients with CF. Their findings, published in the journal *PLOS ONE*, could help providers target specific pathogens earlier, treat them and potentially prevent more severe lung disease.

"We compared lower airway samples from bronchoscopy in children with CF and disease controls across the age spectrum, and used genetic sequencing to identify microorganisms, finding that a few common cystic fibrosis pathogens begin to dominate at very early ages," said lead author Jack O'Connor from Ann & Robert H. Lurie Children's Hospital of Chicago. "Such a clear split from disease controls in this young age group has not been shown before. Our findings deepen our understanding of the disease trajectory in cystic fibrosis and could help improve outcomes through earlier intervention."

Chronic airway infection and inflammation resulting in progressive, obstructive lung disease is the leading cause of illness and death in people with cystic fibrosis.

The multicenter study analyzed lower airway samples from 191 patients (63 with cystic fibrosis) aged 0-21 years. The disease controls included patients with diverse conditions, such as cancer, immune deficiency and pneumonia. By using the more sensitive genetic sequencing instead of culture to detect a broader range of microorganisms in the lower airways, researchers were able to identify distinct pathogens that are more dominant at different ages in patients with cystic fibrosis.

"Establishing key age-related differences in lower airway bacterial communities and inflammation in patients with CF, especially during early childhood, may give us a window of opportunity for earlier and more precise treatment," said senior author Theresa Laguna, MD,

MSCS, Division Head of Pulmonary and Sleep Medicine at Lurie Children's and Associate Professor of Pediatrics at Northwestern University Feinberg School of Medicine. "If we can prevent worse infections, we could improve the quality of life and potentially expand the life expectancy of patients with CF."

More information: John B. O'Connor et al, Divergence of bacterial communities in the lower airways of CF patients in early childhood, *PLOS ONE* (2021). DOI: 10.1371/journal.pone.0257838

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