

Cystic Fibrosis Research News

Title:

Short-term Modification of breathprint by Elexacaftor/Tezacaftor/Ivacaftor in a paediatric cohort.

Lay Title:

Kaftrio® quickly modifies the composition of breath in children with CF.

Authors:

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What was your research question?

Like urine and stool, breath is a way for the body to eliminate the waste compounds produced by our cells such as carbon dioxide. In this study, we analysed the exhaled breath of people before and after starting Kaftrio® to better understand how the drug modified the functioning of the lung cells.

Why is this important?

Traditional clinical follow-up of people with CF is based on the analysis of coughed-up mucus and respiratory tests. Yet, young children struggle to cough up mucus and to perform respiratory tests. In addition, people on Kaftrio® now retain a good respiratory function and no longer expectorate mucus. Thus, clinicians need new ways of assessing patients' health and detecting infections. Breath can be collected easily, even from individuals who are asleep, sedated, or infants, and is therefore ideal to evaluate children's health.

What did you do?

Eleven children with CF between 6 and 12 years old, participated in this one-month study. They breathed in medical air and their exhaled breath was collected using a specifically designed device called a ReCIVA®, before starting Kaftrio®, after one week and then one month of treatment. Breath samples were analysed by powerful technologies employing mass spectrometry and artificial intelligence to identify and quantify the compounds exhaled in breath.

What did you find?

Using this methodology, we identified 12 gaseous compounds that were significantly increased or decreased in breath after starting Kaftrio®. These changes were visible after only one week of treatment. Several of these compounds correlated to improvements in traditional lung function tests.

What does this mean and reasons for caution?

Kaftrio® leads to rapid changes in the composition of breath; the study of these compounds could help us better understand the impact of the drug on cells. Furthermore, the correlations between breath compounds and respiratory tests suggest that breath might be useful in evaluating lung function when traditional tests fail. However, this preliminary study included a small number of children, and the experiment must be repeated with more participants observed over a longer period. Further studies should also include comparisons with healthy



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individuals, to determine if Kaftrio® helps restore normal breath composition in people with CF.

What's next?

In the future, breath analysis might become a non-invasive way to follow-up on children with mild symptoms and to quickly evaluate – or maybe predict – the effectiveness of treatments. In addition, the compounds in breath could provide interesting information for diagnosing infections or for better understanding the functioning of cells and drugs.

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