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Cystic Fibrosis Research News

Title:
A Specialized Method of Sputum Collection and Processing for Therapeutic Interventions in Cystic Fibrosis.

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What was your research question?
This study asked whether a new method for processing airway samples from people with CF (PWCF) could make these samples more reliable for the purpose of testing new treatments for CF lung disease.

Why is this important?
The lung disease suffered by PWCF is marked by high levels of inflammation. During this inflammation, white blood cells called neutrophils travel to the lung and release proteins that can damage lung tissue. Measuring levels of these proteins in samples of sputum (phlegm) helps to determine the degree of inflammation in the CF lung, and enables us to assess the response a CF patient has to an anti-inflammatory therapy. This is important, both for monitoring a patient's progress on currently available medications and for development of new treatments in the future.

What did you do?
Many currently available methods of processing sputum use a chemical called DTT that may interfere with commonly used laboratory tests. This means that, for some important proteins, the levels detected may be less reliable. In this study, we developed a method of processing sputum without DTT, called the TETRIS method. 'TETRIS' stands for **Te**mperature-controlled **T**wo-step **R**apid **I**solation of **S**putum. We wanted to know if sputum samples processed by this method would produce reliable measurements, and if those measurements would be comparable to measurements from other samples types.

What did you find?
We found that using TETRIS processing resulted in consistent measurement of important proteins found in the CF lung. We also found that the levels of the proteins measured in a patient's sputum also closely mirrored that patient's lung function and overall lung health. Samples processed by the

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TETRIS method were stable over time, and displayed consistent protein levels before and after freezing. We were also able to reliably assess the effect of an anti-inflammatory treatment in TETRIS sputum samples. In samples processed by a different method, this reliability was lost.

What does this mean and reasons for caution?

This study proves that sputum can be effectively processed without using DTT. This stands to improve the quality of future studies looking at new therapies for PWCF. Secondly, it shows that sputum can be used to monitor the progress of PWCF. This suggests that fewer PWCF may need to go for bronchoscopies (camera tests of the airway) to get samples for analysis, which saves patients the ordeal of what can be a challenging procedure. Finally, it highlights the importance of early treatment, since some of the damaging proteins measured were elevated even before lung function started to fall.

What's next?

We have already started multicentre studies looking at several new therapies for adult CF lung disease using this method, and presented some of the early results at the American Thoracic Society (ATS) meetings recently. Further studies evaluating the TETRIS method in samples from children are still to come.

Original manuscript citation in PubMed

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