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Cystic Fibrosis Research News

Title:

Impact of storage conditions on metabolite profiles of sputum samples from persons with cystic fibrosis

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What was your research question?

Complex communities of bacteria can be found in the airways of persons with CF. However, we know little about how the activity of these communities impacts lung disease. “Metabolomics” refers to a method of analysing this activity by measuring all of the metabolites produced by the bacteria in a respiratory specimen. We wanted to understand how sample storage conditions might impact metabolomic measurements on CF sputum samples.

Why is this important?

If certain sample storage conditions allow bacteria in the sample to continue to produce metabolites or if certain metabolites are degraded at some temperatures, then we would need to take storage conditions into account in order to reliably perform metabolomic analyses.

What did you do?

To determine the impact of sample storage conditions on metabolomic studies, we stored sputum samples for various lengths of time at three different temperatures (room temperature, 4˚C, -20˚C). We then looked at all of the metabolites in these samples, which

are indicators of the level of change in bacterial activity, and compared these to what was found in the original sample that had been stored at -80oC.

What did you find?

We found that the levels of some metabolites changed significantly when sputum samples were stored at room temperature or at 4oC for longer than one day. In contrast, metabolites were stable in sputum samples that had been stored at -20oC for up to 28 days. We also found that some specific metabolites where much more affected by sample storage conditions than were others.

What does this mean and reasons for caution?

This study is important because it means that we can collect samples, store them frozen, and analyse them some time later. This information is necessary to reliably measure the activity of bacteria in sputum samples. This, in turn, will provide important new information about how the behaviour of bacteria in the airways relates to health or disease. For example, we may learn that certain activities of Pseudomonas are associated with worsening lung health. This could open the door to new therapies.

What's next?

Metabolomic studies are the next step in understanding the complex ecology of bacteria in the CF airway. By correlating the activity of bacteria in the airways with lung disease progression, we hope to develop new strategies to fight airway infection in CF.

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