Cystic Fibrosis Research News

Title:
Role of viable but non culturable (VBNC) bacterial forms in CF patients in a clinical setting: a translational research

Lay Title:
Role of dormant bacteria in people with cystic fibrosis patients

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What was your research question?
People with cystic fibrosis (pwCF) can develop chronic infections if bacteria persist in the lungs. Bacteria can have different levels of activity depending on their environment or any trigger for change"
In this study we developed a new method of detecting dormant bacteria which are not detected with routine diagnostic methods.

Why is this important?
It is important to monitor chronic lung infections to reduce the number of pulmonary exacerbations experienced by pwCF and preserve their lung function. Some bacteria are more dangerous for pwCF than others. In this study we focused on 5 species of bacteria which typically lead to chronic lung infections in pwCF: *Pseudomonas aeruginosa (PA)*, *Achromobacter xylosoxidans (AXE)*, *Stenotrophomonas maltophilia (SM)*, methicillin sensitive

(MSSA) and resistant (MRSA) *Staphylococcus aureus*. We used two different approaches to search for active bacteria, that we could growth on a culture, and dormant bacteria, respectively.

What did you do?

We enrolled more than 90 pwCF, including both those who started treatment with CFTR modulators and those who didn't, and followed them up to 12 months. We collected sputum samples from pwCF and processed them to identify viable bacteria present in the lungs of pwCF. We applied the routine method to detect the culturable forms that can be grown and a new DNA-based test to reveal dormant bacteria, that cannot be grown on a culture. We enrolled both pwCF who started treatment with CFTR modulators and pwCF who never started this therapy. We compared the clinical features of these two groups taking into account the presence of dormant and culturable bacteria in the lungs.

What did you find?

We found that pwCF who harbored dormant bacteria in their lungs showed significantly lower lung function (FEV1) and a greater promptness to develop pulmonary exacerbations more frequently compared to pwCF not harboring dormant bacteria.
Treatment with CFTR modulators seemed to improve FEV1 values in pwCF receiving treatment, whether or not they were harboring dormant bacteria, but did not seem to influence intermittent/chronic lung infections - in fact bacteria remained in the lungs and become dormant.

What does this mean and reasons for caution?

The results of this pilot study highlight the urgent need to use both routine cultural methods with more reliable tests independent of culturing bacteria to efficiently detect all the viable bacteria in the lungs of pwCF and also to evaluate how well routinely adopted antibiotic treatments work.

What's next?

Further studies are needed to confirm these results and clearly establish the effect of modulators to eradicate bacteria in CF lungs.

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