Journal of Cystic Fibrosis
The Official Journal of the European Cystic Fibrosis Society

Cystic Fibrosis Research News

Title:
Theranostics vs Theratyping or Theranostics Plus Theratyping?

Lay Title:
What is the best approach to bring drugs to all people with CF?

Authors:
Margarida D. Amaral, Ines Pankonien

Affiliations:
BioISI- Biosystems & Integrative Sciences Institute, Faculty of Sciences, University of Lisboa, Lisboa, Portugal

What was your research question?
We evaluate how two different methods, *theratyping* (using lab-grown cell lines) and *theranostics* (using patient-derived samples), can be used to improve treatment with CFTR modulators for people with CF (pwCF). We discuss strengths and weaknesses of these methods, and if combining them can help develop better therapies for all pwCF.

Why is this important?
Highly efficient CFTR modulator therapies (HEMT), which help the faulty protein work better, have been highly successful in improving the quality of life of pwCF. However, they do not work for everyone, because they are only able to rescue some CFTR variants. It is crucial to find personalized treatments that work for all pwCF, not just some. By adopting new methods that test how treatments work on different individuals with CF, we can help make therapies more targeted and effective, which can significantly improve quality of life for more pwCF.

What did you do?
We analysed and compared two approaches: theratyping, which tests potential CFTR modulators on lab-grown cells, and theranostics, which uses samples directly obtained from pwCF. Theratyping is simpler and cheaper to do in the lab but does not always reflect how the treatments will work in real individuals with CF. Theranostics gives more personalized insights since it uses pwCF-specific samples, but it is more complex, requires more resources, and is not always easily available. We explored how using these two approaches together could give a more complete understanding of how to bring CFTR modulators to a wider number of pwCF.

What did you find?

We found that theratyping is easier, cheaper, offering standardized results. However, it does not fully capture how treatments will work in real-life for pwCF since it only analyses single variants. It thus misses the combined effects on two CFTR variants and lacks the specific complexities of unique genetic backgrounds. Theranostics, though harder and more resource-intensive, gives more accurate, pwCF-specific results because it uses real samples derived from each individual. Both methods have their own strengths, and combining them could help bridge the gap between basic lab studies and real-world personalized treatments for CF.

What does this mean and reasons for caution?

Combining both theratyping and theranostics may bring better treatments to more pwCF, if not all. Theratyping helps us conduct broad testing quickly and cheaply, while theranostics gives us more detailed, individual-specific information. However, theranostics is harder to apply widely as it requires specialized resources and access to samples from pwCF, so it may not be available to everyone right away. Although this combined approach shows promise, practical and logistical challenges need urgent regulation, such as cost (who pays for the theranostics?), expertise (who carries out analyses?), and how to ensure access to samples (sent to a few centralised centres?).

What's next?

We recommend that these two approaches are combined to maximize CF treatment. We thus aim to further explore with stakeholders (from pwCF-associations to regulators) how combining these approaches can be used in real-world clinical practice, towards developing more personalized and effective therapies for more, if not all, pwCF.

Original manuscript citation in PubMed

https://pubmed.ncbi.nlm.nih.gov/39327193/

cfresearchnews@gmail.com