

Evolving insights into cystic fibrosis lung infections

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Recent research progress into how bacteria adapt and evolve during chronic lung infections in cystic fibrosis patients could lead to better treatment strategies being developed, according to a new review by the

University of Liverpool.

Cystic fibrosis (CF) is a life-shortening inherited disease, affecting over 10,000 people in the UK. Patients with CF often suffer from a build-up of mucus in the airways, which traps bacteria and makes them more susceptible to lung infections.

Pseudomonas aeruginosa is usually harmless to healthy humans, but in people with CF it can cause infections that are resistant to antibiotics and become impossible to eradicate from the lungs.

Published in the journal *Trends in Microbiology*, in collaboration with the University of York, the review highlights how the advent of affordable high-throughput genome sequencing has allowed rapid progress in our understanding of how *P. aeruginosa* adapts and evolves in chronically infected CF patients.

Professor Craig Winstanley, from the University's Institute of Infection and Global Health, said: "Currently we know that populations of *P. aeruginosa* that infect CF lungs harbour huge amounts of diversity, including variation in antibiotic resistance and secretion of toxins. This diversity is dynamic over time, making accurate diagnosis and treatment challenging.

"Experimental work is now beginning to provide insights into what drives this evolution during infections, including the role of social interactions."

P. aeruginosa presents a particular challenge because of its ability to develop resistance to antibiotics rapidly over several generations.

Professor Winstanley, added: "Given the limited efficacy of current antibiotics, we now need to establish how this bacterial evolution and

dynamic diversity affects patients, in order to design alternative treatment strategies.

"One potential area of future work is to see whether the evolutionary trajectory of *P. aeruginosa* in CF [lung infections](#) could be manipulated to minimise symptoms and improve patient outcomes."

More information: Craig Winstanley et al. *Pseudomonas aeruginosa* Evolutionary Adaptation and Diversification in Cystic Fibrosis Chronic Lung Infections, *Trends in Microbiology* (2016). [DOI: 10.1016/j.tim.2016.01.008](#)

Provided by University of Liverpool

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