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Longitudinal sampling of the aerodigestive microbiome in people with cystic fibrosis

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Introduction: The importance of researching gastrointestinal pathophysiology, lung infection and non-tuberculosis mycobacterium (NTM) are universally recognised by carers, healthcare professionals and people with CF. We studied the aerodigestive microbiome in CF, providing the first longitudinal data of which we are aware.

Methods: Bacterial communities were collected from sputum and gastric juices from thirteen CF patients who were fed with a PEG tube; these samples were cultured then identified using the 6S rRNA gene sequencing technique. Symptoms of extraoesophageal reflux were recorded and after six months, further samples were collected. Models simulating gastric and lung environments were used to evaluate the effect of varying the levels of bile acids, pepsin and pH on *Pseudomonas aeruginosa* (Pa) isolated from patients.

Results: Identical strains of Pa and NTM were identified in gastric and lung samples from patients with symptoms of extraoesophageal reflux. Temporal repeated samples showed variability in overall bacterial diversity, which was more pronounced in sputa compared to gastric juice. Gastric bile and pepsin levels were associated with Pa biofilm formation.

Discussion: While identical microbiology in sputum and gastric juice can be accounted for by expectorate being swallowed, the aerodigestive microbiomes in patients who test negative for Pa and NTM in sputum, can test positive for these pathogens in the gastric compartment. This indicates the stomach can be a pathogenic reservoir. The route of transmission may be facilitated by reflux and potential aspiration of gastric juice. This gut to lung transfer of pathogenic organisms requires further research.

Biography

Hafez Al-momani is an Assistance Professor of Microbiology at Hashemite University in Zarqa, Jordan. He obtained his undergraduate degree in Medicine from Jordan University of Science and Technology in 2006. He has received his MRes and PhD in Medical Sciences at Institute of Cell and Molecular Bioscience (ICaMB)/Newcastle University and Freeman Hospital Microbiology department/Newcastle, UK in 2017 under the supervision of the Professor Jeffery Pearson and Dr. Ward. His research interests include microbiology of cystic fibrosis patient, especially *Pseudomonas aeruginosa* and non-tuberculous mycobacterium and the interaction between these pathogens and the gastric environment. His future plan to set up experimental studies on the effect of different gastric juice component on different microorganism related to cystic fibrosis patient.

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