Canterbury Medical Research Foundation

Final report for Grant in Aid 2016 GIA2

Grant recipient

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Grant details

GRANT TYPE	Grant in Aid	FUNDING ROUND	2016 GIA2
GRANT REFERENCE	2016 GIA2	GRANT AMOUNT	$4,724

Final report

1. Scientific Assessing Committee report

Project Title

Early detection of bacteria in the lungs using a non-invasive breath test. We had a set of objectives that were needed to be completed prior to us moving forward with the development of this breath test. The grant in aid allowed us to purchase all items necessary to complete the main objective. ***Objective 1.*** *Detection and identification of a volatile profile or suite of "specific" microbial volatile organic compounds (mVOC's) from in vitro cultures of Pseudomonas aeruginosa, comparing mucoid and non-mucoid strains. Culture conditions including free cells, biofilms and oxygen tension alongside the interaction of the bacteria with neutrophils and macrophages will be investigated.* The purchase of these supplies has allowed us to complete full scan analysis of both mucoid and non-mucoid *P. aeruginosa* cultures. Ten clinical strains of each mucoid type were grown in synthetic sputum in triplicate. Varying conditions were imposed on the bacteria such as growth as free cell cultures and as biofilm cultures. Analysis of this data is now underway and will take a couple of months for all the chromatograms to be analysed and volatiles of interest to be determined. Unfortunately our machine broke down before I could complete the oxygen tension experiment and the incubation with neutrophils and macrophages. ***Objective 3.*** *Analysis of breath samples from patients colonised with non-mucoid and mucoid strains of P. aeruginosa.* While running the *in vitro* work we collected patient samples which were also run in full scan. Once volatiles of interest have been identified in our *in vitro* chromatograms we will look for these volatiles in the *in vivo* breath samples. ***Objective 2.*** *Determine the best sampling parameters for sensitive detection of the mVOCs discovered in Objective 1.* This objective became less important as we moved away from MS/MS analysis to full scan analysis. In full scan analysis we use a gas chromatography column suited for the overall detection of all volatiles and a solid phase micro-extraction (SPME) fibre that is "universal" meaning it can be used for the isolation of many different compounds from one sample. It is expected that with our new machine we will dedicate research into full scan analysis followed by principal component analysis (PCA). Once the analysis of all chromatograms is completed and the final experiments looking at oxygen tension and the incubation of *P. aeruginosa* with neutrophils and macrophages are performed we will look at the robustness of this test by analysing more patient breath samples. Prior to this a biostatistician will be consulted in order to establish the requirements to report a 95% confidence interval alongside determining sensitivity and specificity of the test.

3. Feedback

Being awarded this grant in aid meant I was able to complete all my current objectives towards the development of a breath test for P. aeruginosa. I can now plan future experiments based on these results. Applying for this grant via the portal was nice and easy and your support very much appreciated.