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RACP Foundation Research Awards

FINAL REPORT

Project / Program Title		Host immunity and immune response in patients with Staphylococcus aureus bacteraemia
Name		Dr Natasha Holmes
Award Received		2014 Robert and Elizabeth Albert Travel Grant
Report Date		22 August 2016
Funding Period	Start Date:	1 April 2014
	Finish Date:	24 April 2014

PROJECT SUMMARY

People continue to die from serious bacterial infections in spite of effective antibiotic therapy. It is becoming apparent that factors within a given individual are important when assessing risk factors for poor outcomes. We are investigating differences in the immune system response in patients who have developed Staphylococcus aureus ("Golden Staph") bloodstream infection, and whether these differences can help us to predict which individuals may benefit from more individualised supportive therapy or inform potential vaccine designs.

PROJECT AIMS / OBJECTIVES

The broad research aim was to investigate host immunity and the immune response during acute infection with Staphylococcus aureus bacteraemia (SAB). In more detail, this project involved performing experiments to quantify anti-Staphylococcal IgG antibodies during the acute and convalescent stages of SAB using a multiplex bead-based array. Patient serum samples had been collected during a prospective, multi-centre cohort of patients with SAB hospitalised in Australia.

I had no prior experience in performing these experiments and required the assistance of scientists working in the laboratory of A/Prof Willem van Wamel. These experiments comprised several sequential stages. All experiments required testing in duplicate in order to quantify inter-test variability. At the completion of the study visit, I had performed experiments on 470 individual samples (940 samples in duplicate) for 19 different IgG antibodies. There are approximately 164 samples requiring further testing in duplicate to complete the 1st 19 different IgG antibodies, however all samples require testing for a 2nd set of 19 different IgG antibodies (so that the collection will contain results for a total of 38 different anti-Staphylococcal IgG antibodies).

Whilst the study visit was successful in learning new techniques and performing testing on a large number of samples, there were unexpected delays in completing training in the various stages of the experiments, particularly as one vital staff member became ill and was absent from work for almost two weeks. The two remaining qualified staff members attempted to accommodate me within their own research schedules but due to their prior commitments, I often experienced a

delay in several days. Without knowing all of the various stages I was unable to complete experiments unsupervised. The instrument required for the final step of the experiment belonged to another research department within the hospital, and there were issues with access to the instrument due to prior bookings. Therefore the delays in the required training and ability to perform experiments independently meant that I was unable to complete testing of the entire cohort of samples.

I secured additional funding to support testing for the remainder of the samples in order to complete this project and commence data analysis. However there were further delays in the availability of a local scientist who could complete the additional testing.

SIGNIFICANCE AND OUTCOMES

At this stage, there are no finalised results as the experimental work is not yet complete. Once the remaining samples have been tested, we still anticipate significant findings from this study as this research has never been performed in such a large multi-centre cohort. It is difficult to postulate what the final results will reveal, but any results from this study will be eminently publishable and inform future research. For example, the results of the anti-Staphylococcal immune profile of patients during the acute and convalescent stages of SAB can be linked to a variety of different clinical parameters and outcomes measured in the study. We anticipate that these results may lead to innovations or insights into vaccine design, and may open the way for more targeted specific therapy for patients. We are already discussing several other hypotheses that we would like to investigate as a collaborative effort in the near future (particularly by combining data from different populations of different countries around the world).

PUBLICATIONS / PRESENTATIONS