

The Molecular Epidemiology of Australian Orbiviruses

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As an undergraduate Medical Science student my time spent in the lab is mostly confined to 1-2 hour slots, the experiment laid-out with little chance of failure. Toward the end of my 2nd year this was getting to me. Although part-time work in a bacteriology lab was giving me a taste of clinical science I felt the need to experience what research work could offer. After all, it was day dreams of someday un-locking the mysteries of some biological phenomenon that had led me to undertake university study. Thankfully David Williams and Cheryl Johansen came to my rescue, offering me the opportunity to develop my laboratory skills and indulge my curiosity.

My vacation project was centred on a selection of arboviral isolates collected as part of the Arbovirus Surveillance and Research Program at the University of Western Australia. Serological work had previously typed these isolates as 'Non-alphavirus, Non-flavirus' and tentatively as belonging to either the Wallal or Warrego serogroup of orbiviruses. Though on the radar of Australian viral surveillance programs, due in part to their implication in an epidemic of blindness in kangaroos, the Wallal and Warrego species remain poorly characterised. My goal then was to extract, amplify and sequence a portion of the VP3 gene of these isolates to help shed some light on their origins and epidemiology.

The project began by inoculating monolayers of insect and mammalian cells with stocks of the viral isolates. I would monitor the cells daily for changes in morphology and when a good amount of cytopathic effect was observed, harvest virus from the cell culture. This process introduced me to a whole new level of aseptic technique, every one of my movements and actions scrutinized to ensure that no contamination of the cell cultures occurred. But when my time and patience paid off, the cells obliterated by virus, I was one happy researcher! I had good, fresh stocks of virus to work on and I could begin the molecular work.

My experience with molecular biology was, to that point, purely theoretical but the project gave me the opportunity to put theory into practice. I was shown fundamental techniques such as nucleic acid extraction, reverse transcription, PCR, agarose gel electrophoresis and DNA purification, then left to hone my skills and report back with the results. What struck me most about the molecular work was the vast number of variables in a given reaction. More often than not a result would be less than optimal or just fail and I was left puzzling over which variable was the culprit, 'Welcome to research' I was told. Despite such frustrations, I developed a real passion for the molecular world that I plan to indulge in my future studies and work.

Those reactions that were a success eventually made it to the post-box, to be sent for DNA sequencing. When the sequences were returned I was tasked with trimming the raw data into meaningful sequence, but my time on the project had run out and using this data to establish phylogenetic relationships among the isolates would have to be left to someone else. Still, it was a good feeling to know that the work I had done would contribute to a better understanding of these Australian orbiviruses.

My thanks to the AB-CRC for their support during the project and encouraging students like myself to pursue their interest in science. It's a unique and rewarding experience that cannot be found in undergraduate study. Huge thanks also to my supervisors David and Cheryl for their patience, wisdom and encouragement.