

## **P5**

### **AN UPDATE ON THE MOLECULAR EPIDEMIOLOGY OF MURRAY VALLEY ENCEPHALITIS VIRUS**

*Sinéad Diviney<sup>1</sup>, Belinda Herring<sup>2</sup>, Jane Oakey<sup>3</sup>, Cheryl Johansen<sup>4</sup>, John Mackenzie<sup>1</sup> and  
David Williams<sup>1</sup>*

<sup>1</sup>*Curtin University of Technology*

<sup>2</sup>*Discipline of Infectious Diseases and Immunology, University of Sydney*

<sup>3</sup>*Biosecurity Queensland, Department of Primary Industries and Fisheries*

<sup>4</sup>*Arbovirus Surveillance and Research Laboratory, Discipline of Microbiology and Immunology,  
University of Western Australia*

#### **Abstract**

Murray Valley encephalitis virus (MVEV) is an encephalitogenic mosquito-borne flavivirus endemic to Australia and Papua New Guinea (PNG). The virus was first isolated from human samples in 1951 during an epidemic in the Murray Valley, Australia. *Culex annulirostris* is the main vector mosquito of MVEV, while various species of waterbirds are considered the major vertebrate hosts. Humans are generally thought to be dead-end hosts. Epidemics are thought to occur due to either infected birds or mosquitoes migrating from endemic areas to non-endemic areas. The increased activity of this virus in Australia in 2008 has renewed concerns regarding its potential to spread and cause disease. Four genotypes (GI-GIV) of MVEV have been previously recognized: GI and GII contain strains from the Australian mainland (with the exception of two PNG isolates from 1998), while single earlier PNG isolates comprise each of GIII and GIV. Phylogenetic analyses were performed on complete preM-Env gene sequences from 41 MVEV strains from different regions around Australia and PNG, isolated at different times. These included 2008 strains from a fatal human case in the Kimberley region of Western Australia, a fatal equine case from Monto, Queensland, and nine mosquito isolates from Leeton and Griffiths in NSW. All 2008 strains belonged to GI. The human strain showed highest levels of nt identity with the prototype strain MVEV 1-51 (96.5%). The horse isolate and mosquito isolates showed high levels of nt identity with each other (>98.3%) and with a 2002 strain from Burketown, Qld (>98.9%). The lower level of identity between the WA human strain and the Eastern Australian isolates (93.4-94.7%) suggests they have distinct origins. While the human strain most likely originated in the Kimberley region, where MVEV is enzootic, questions remain regarding the origin of the 2008 eastern Australian viruses. These viruses may have originated from cryptic foci in NSW or Queensland. Alternatively, they may have been re-introduced into these areas by migratory viraemic waterbirds from northern Australia.

#### **Personal Profile**

Sinéad Diviney is a Curtin Research Fellow at the AB-CRC group located at Curtin University of Technology, Perth, Western Australia. Her research interests are characterization of viral entry, replication and evolution of emerging viruses.