

Dr Jill Carr
BSc (Hons)(Adelaide), PhD (Adelaide)
Affiliate Senior Lecturer



Dr Jill Carr

Location	Microbiology and Infectious Diseases Laboratories, SA Pathology, Frome Rd
Email	Jill.carr@imvs.sa.gov.au
Telephone	+61 8 82223574
Facsimile	
Research	Virus Research

Jill Carr was awarded her BSc (Hons) from John Wallace's lab in the Department of Biochemistry, University of Adelaide in 1989 and worked briefly with the late Professor Bob Symons in Plant Virology before completing her PhD in the Wallace lab in 1995. She returned to Virology and joined the Institute of Medical and Veterinary Science (now SA Pathology) in 1995 in HIV research. Jill is currently involved in the Diagnostic management of drug resistance in HIV positive patients and has research projects investigating factors that modulate HIV infection. Jill also has an active area of Dengue virus research, investigating the host cell responses to dengue virus infection.

1. **Carr, J. M.**, Hocking, H., Bunting, K., Wright, P. J., Davidson, A., Gamble, J., Burrell, C. J. and Li, P (2003) Supernatants from Dengue virus type-2 infected macrophages induce permeability changes in endothelial cell monolayers. *Journal of Medical Virology* **69**: 521 – 528
2. **Carr, J. M.**, Davis, A. J., Coolen, C., Cheney, K., Burrell, C. J. and Li, P. (2006). Vif-deficient HIV reverse transcription complexes (RTCs) are subject to APOBEC3G-mediated structural changes and mutation of RTC associated reverse transcription products. *Virology* **351**: 80-91
3. **Carr, J.M.**, Cheney, K. M., Coolen, C., Davis, A., Shaw, D., Ferguson, W., Chang, G., Higgins, G., Burrell, C. and Li, P (2007). Development of methods for co-ordinate measurement of total cell associated and integrated HIV-1 DNA forms in routine clinical samples: levels are not associated with clinical parameters but low levels of integrated HIV-1 DNA may be prognostic for continued successful therapy. *Journal of Clinical Microbiology* **45(4)**: 1288-97.
4. Wati, S., Li, P., Burrell, C. J. and **Carr, J. M.** (2007). Dengue virus (DV) replication in monocyte-derived macrophages is not affected by tumor necrosis factor alpha (TNF- α) and DV infection induces altered responsiveness to TNF- α stimulation. *Journal of Virology* **81(18)**: 10161-10171.
5. **Carr, J. M.**, Coolen, C., Davis, A. J., Burrell, C. J. and Li, P (2008). Human immunodeficiency virus 1 (HIV-1) virion infectivity factor (Vif) is part of reverse transcription complexes and acts as an accessory factor for reverse transcription. *Virology*, **372**: 147-156.

Project 1. The host response to Dengue virus (DENV) infection. DENV is a mosquito borne human virus that causes dengue fever or in some cases the more severe dengue haemorrhagic fever/dengue shock syndrome and is widespread in many parts of the world. The disease is believed an immunopathogenesis – caused by the host response to DENV infection. We are currently investigating two lines of research related to the host response to DENV infection, the role of (i) the heat shock protein, GRP78 which is up-regulated during DENV infection and (ii) the enzyme sphingosine kinase (SK), which is inhibited during DENV infection. Both projects will

investigate the mechanisms by which DENV alters these host proteins using experiments to determine if the changes are post-translational, translational or at the transcriptional level and if they can be mediated by specific viral proteins and this project will involve cloning of the DENV NS3 protein, which has particularly been implicated in regulation of SK in BVDV infection (Yamane et al., 2009, JBC 284:13648). Additionally we will investigate the outcomes for viral replication of DENV-induced changes in host cell proteins, by techniques such as over-expression of GRP78 or SK and analysis of viral replication. The project will involve cell culture, handling of infectious DENV virus, molecular cloning, RT-PCR, Westerns and DENV plaque assays. Both projects will involve input from Dr Michael Beard and potential comparisons with the related Hepatitis C virus. The SK project will involve collaboration with Dr Stuart Pitson, Hanson Institute.

Project 2. Enhancement of HIV infection by fibril protein forms. Recent work has demonstrated that HIV infection can be enhanced by a peptide fragment from semen, termed SEVI, that forms protein fibrils – the same kind of protein structures associated with Alzheimers or Parkinsons disease (Munch et al., 2007). We will assess if small molecule inhibitors, such as polyphenols, or novel compounds that we have developed and that have been shown to reduce fibril formation of other proteins, can also negate the SEVI fibril formation and enhancement of HIV infection. The project will involve generation and analysis of fibrils formed by the SEVI peptide and analysis of the ability of various agents to negate fibril formation *in vitro*. After establishing this important data we will perform HIV infections in the presence of SEVI and anti-fibril agents and infection will be quantitated using a reporter system. The formation of fibrils, disruption of fibrils and enhancement of infection by SEVI will be compared to that seen with other fibril forming proteins α -synuclein and RMC κ -casein. HIV infections will be performed by trained staff members only. This project is a collaboration with Dr Ian Musgrave, University of Adelaide Medical School, Prof John Carver, School of Chemistry and Dr Heath Ekroyd, University of Wollongong.