MassTag PCR: a highly multiplexed system for pathogen detection

Dr David Williams

MassTag PCR is a novel technology for the rapid, sensitive and simultaneous detection of multiple (>20) gene sequences. This technique, developed by the Lipkin Laboratory at Columbia University, utilises a library of unique Masscode tags, each differing in their molecular weight. MassTags are conjugated to oligonucleotide primers using a UV-cleavable linker that enables separation of primer and tag. Primers are labelled with a unique molecular weight tag and are used to amplify target nucleic acids in a multiplex RT-PCR. After removing unincorporated primers, tags are released by UV irradiation and analysed by mass spectrometry. Thus, amplification of the gene target produces a unique dual signal in mass spectrometry analysis that allows its identification. MassTag PCR offers an inexpensive and sensitive diagnostic platform suitable for high-throughput testing, and that can be adapted to suit diagnostic needs (e.g., syndrome-, vector-based). To date, MassTag PCR panels have been developed for the detection of respiratory pathogens and viruses that cause haemorrhagic fever. A third MassTag PCR assay is being developed to identify microbial agents that cause neurological disease in a North American diagnostic setting. In collaboration with the Lipkin group and PathWest Laboratory Medicine WA, we have recently begun developing and modifying this assay to address pathogens relevant to the Australasian region. Preliminary research experiences will be addressed in the accompanying presentation.

Rapid diagnostic tests - are the new technologies as good as they say?

Dr Stuart Blacksell

Rapid point of care tests (POCT) offer a great deal of promise to medical and veterinary practitioners, laboratory diagnosticians and disease control authorities to provide accurate disease diagnosis. Disease diagnosis is required for the treatment or management of patient or a disease outbreak however, many infections have similar clinical presentation with a broad differential diagnosis that necessitate laboratory diagnosis has the potential to provide a rapid and accurate diagnosis in a low-technology setting however there are still a number of issues that need to be addressed before POCT receive wide acceptance. The most familiar rapid POCT format is the lateral flow device or “wick” style test however more recently, the advent of portable PCR machines and novel diagnostic approaches designed for use in the field have expanded the definition of POCT. POCT Many of the POCT that are currently commercially available, especially lateral flow devices, have not been independent evaluated leading to inflated accuracy claims by manufacturers. There is a clear role for regulator agencies and international organisations such as WHO and OIE to evaluate new and existing POCT. The future of rapid POCT is most likely in the development and evaluation of microfluidic devices applying nanotechnology for miniaturised PCR for disease recognition and characterisation.