VIRAL PATHOGEN VACCINES

AN INTERVIEW WITH PROFESSOR PAUL YOUNG, DR KEITH CHAPPELL AND DR DAN WATTERSON, AUSTRALIAN INFECTIOUS DISEASES RESEARCH CENTRE, THE THE UNIVERSITY OF QUEENSLAND

Professor Paul Young and his team from the Australian Infectious Diseases Research Centre at the University of Queensland, heads a laboratory with expertise in molecular virology. They are currently exploring the underlying mechanisms of severe disease caused by the dengue virus, and developing both therapeutic and vaccine control strategies for a range of viral pathogens.

Professor Paul Young, Dr Keith Chappell and Dr Dan Watterson

Australasian BioTechnology speaks with Professor Young (PY), along with research team members Dr Keith Chappell (KC) and Dr Dan Watterson (DW), about the research and its future potential.

What viruses are you currently studying?

PY: Dengue virus and the diseases it causes have been the primary focus of our research for many years, and continue to be so; however, we have recently developed a generic platform approach to the presentation of sub-unit viral antigens that significantly enhance their potency as vaccine candidates. So, our interests have expanded to encompass a wide range of additional viruses; Zika, influenza, the Ebola virus and others.

What stage are you at, and what are the next steps?

KC: Our approach involves fusing a molecular clamp to viral proteins during recombinant protein expression. This has now been applied to influenza virus proteins, which has led to exciting results in mouse immunisation experiments and provided early proof-of-principle evidence for our technology.

Our goal is to now progress this work through pre-clinical studies, involving ferret immunisation and protection, paving the way for phase I clinical trials.

Does this clamp technology provide potential benefits in the study of treatments for a wide range of diseases?

DW: The clamp technology is easily translated to all 'class I' viral-fusion proteins. As well as influenza viruses, this class includes a wide range of other viruses of medical and veterinary significance, including respiratory syncytial virus, measles virus, Ebola virus, coronaviruses and bovine ephemeral fever.

We are also adapting this technology to 'class III' viral fusion proteins, which include herpes viruses and rabies virus.'

What are the challenges and opportunities of developing new vaccines in Australia?

PY: Innovative vaccine development has been a feature of Australian biotech for some time—the HPV vaccine is an obvious example. Coupled with Australia's research strengths in virology and immunology, we are in the ideal collaborative environment to progress our work through the pre-clinical and phase I clinical stages. The challenges will arise in progressing our vaccine further along the development pipeline, when we will likely need to partner with the international biotech industry.'

What are the potential ramifications of an influenza vaccine?

DW: Current influenza vaccines are far from optimal in terms of providing complete protection, with 250,000—500,000 deaths annually from seasonal influenza. If the efficacy of the flu vaccine can be improved, the spread of influenza could be dramatically reduced, and many lives could be saved.

KC: There is the ever-present potential for the emergence of new pandemic strains. Current influenza vaccines provide very little cross-reactivity to other strains of influenza that circulate within avian species.

Our goal is to improve the current seasonal flu vaccine so it can simultaneously provide improved protection from the circulating strains, and also provide cross-protection from future potential strains.

Paul Young will be speaking at the 17th International Biotechnology Symposium (IBS 2016).