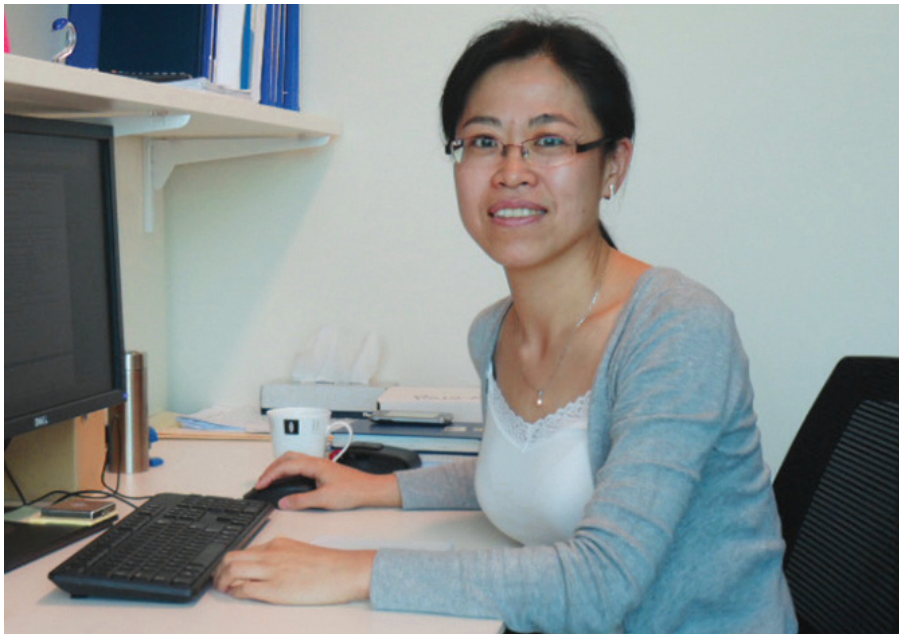
The Australian Society for Parasitology Inc.

ASP Interviews

Hong You

Hong You graduated in 2010 with a PhD from her research on *Schistosoma japonicum* vaccine (IJP, August 2012*) and has recently won an NHMRC Fellowship and ASP Network for Parasitology Researcher Exchange Travel Award. Hong You talks to Lisa Jones about her research.



Hong You tell us the story about your work on *Schistosoma japonicum* vaccine?

My research is focusing on characterization and vaccine efficacy of *Schistosoma japonicum* insulin receptors. My previous studies suggest that host insulin is essential for schistosome growth, development and maturation. Schistosomes exploit host hormones and nutrients for their survival; indeed, schistosomes consume their dry weight of glucose every 5 hours. We found *S. japonicum* insulin receptors (SjIRs), can bind human insulin, which is postulated to result in downstream signal transduction which modulates schistosome glucose uptake. Encouragingly, in murine vaccine/challenge experiments, vaccination of mice with SjIRs resulted in consistently significant reduction in faecal eggs (56-67%), stunting of adult worms (12-42%), reduction in liver granuloma density and reduction in the numbers of mature intestinal eggs. Based on the fact that schistosome eggs are responsible for both pathology and disease transmission, a vaccine targeting parasite fecundity within the definitive host and/or egg viability, is an entirely relevant vaccine approach.

Your IJP publication reports your results from vaccine development work. Tell us what happens next in this vaccine research?

As now recognised, bovines are the major animal reservoir host for *S. japonicum* in China, being responsible for up to 90% of environmental egg contamination. A mathematical model of schistosome transmission has predicted that schistosome vaccines capable of reducing water buffaloes' fecal egg output by 45%, alone or in conjunction with praziquantel treatment, will lead to a significant reduction in transmission of schistosomiasis. The development of a vaccine based on rSjIRs as a transmission blocking vaccine for preventing transmission of zoonotic schistosomiasis targeting bovines is feasible. My next aim is to do vaccine /challenge against *S. japonicum* infection in water buffalo in China or Philippines as in the Chinese setting.

You have recently won a Peter Doherty - Australian Biomedical Fellowship "Identifying Genes Associated with Parasitism, and Novel Drug and Vaccine Targets?" what will you be doing as part of your Fellowship?

My previous research showing that the host-parasite interaction involves very important pathways enabling parasites to survive in their mammalian hosts. In this project, through the use of bioinformatic methods, I will focus on the initial *in silico* identification of gene functions and pathways important in the host-parasite interaction and aims to reveal novel potential drug and vaccine targets against schistosomes.

You have also recently won an ASP Network for Parasitology Researcher Exchange Travel Award for a trip to Prof. Francois Villinger's laboratory at Yerkes National Primate Research Centre, Emory University, Atlanta, USA, tell us about this trip?

I have finished the exchange trips. I visited Prof. Francois Villinger's laboratory twice this year during 1 June -22 June which was

Hong You continued

supported by ACVD (Australian Center for vaccine development) and 4 Nov to 16 Dec which was supported by an ASP Network for Parasitology Travel Award.

The reason for the travel was for me to visit Prof. Francois Villinger's laboratory to conduct research. The primary research interests of the Villinger laboratory focus on infectious diseases and immune responses to pathogens, including immunopathological mechanisms and the exploration of protective vaccines. Importantly, the technologies they are using in their current projects are highly relevant and complementary with my own interests in immunology and vaccinology.

I also under took some bench work in Villinger Lab including reconstruction *S. japonicum* insulin receptors into pMT vectors for further expression of the secreted recombinant protein in the S2 cell system. There are great features in this insect expression system including higher protein yields than mammalian systems, easy high-density cell culture, and non-lytic expression for reduced degradation. This technique will be very useful in my future protein and vaccine work. The aims of the proposed travel also included: To investigate the immune response of mouse co-infected with HIV/Schsitosoma by identifying of unique chemokine/cytokine biomarker signatures for schistosoma/ HIV mono-infections vs. co-infection. To investigate the cytokine analysis (such as ELISPOT, proliferation assays) generated by *S. japonicum* insulin receptors which I have shown are encouraging vaccine candidates. During my visit, I was able to speak with each member of the Villinger team on a one-on-one basis, gaining valuable tips for investigating further the immune response generated by *S. japonicum* insulin receptors which I have shown are encouraging vaccine candidates. I received a lot of good suggestions for future work including how to undertake ELISPOT, proliferation assays for cytokine analysis in my future planned animal studies.

We wish Hong You all the best during her Fellowship and look forward to hearing about how her research progresses.

* **Hong You, Geoffrey Gobert , Mary Duke , Wenbao Zhang, Malcolm Jones and Donald McManus** Queensland Institute of Medical Research (QIMR) and **Yuesheng Li**, Hunan Institute of Parasitic Diseases, Yueyang, China and QIMR, published their article "The insulin receptor is a transmission blocking veterinary vaccine target for zoonotic Schistosoma japonicum" in the August 2012 edition of International Journal for Parasitology (42:09). Hong You graduated with a PhD from this research in 2010.

This publication can be downloaded from http://www.sciencedirect.com/science/article/pii/S0020751912001543

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