OMICS Group Conferences
Accelerating Scientific Discovery
3rd International Conference on
Vaccines & Vaccination
July 29-31, 2013 Embassy Suites Las Vegas, USA

RNAi-based characterisation of tegument annexin as a novel vaccine candidate againt schistosomiasis

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Abstract

Efforts to develop potential vaccines against schistosomes have focused on the identification of parasite surface antigens which can trigger protective immunity in the host. In this study, RNA interference (RNAi) was applied to investigate the gene function of tegument-associated annexins in *S. mansoni*. Expression of five annexin genes was found to be up-regulated upon transition from cercariae to schistosomula and adult worms. Silencing of annexins was facilitated by electroporation with target-specific-dsRNA then the isolated RNA was quantified for gene expression. Gene expression for adult parasites and schistosomula treated with annexin-specific-dsRNA resulted in 80 – 96% and 87 – 95% reduction in transcription levels, respectively. Silencing of each annexin did not affect the parasite survival rate but conversely reduced their growth size and motility significantly at schistosomula and adult stages. Anx(*Sm*)3 was selected and engineered to be a recombinant chimeric peptide (rChimeric-AT) harbouring the linker region of Anx(*Sm*)3 and *Sm*-TSP-2. HLA-DR binding prediction showed that Anx(Sm)3 linker and Chimeric-AT were capable to bind with 11 alleles (21.6%) and 20 alleles (49%), respectively. Sera from mice infected with S. *mansoni* reacted strongly with synthetic Anx(*Sm*)3 linker peptide and rChimeric-AT, showing that they are both immunogenic. rChimeric-AT delivered in alum induced high IgG1/IgG2a ratio, implying Th2 type response was dominant. Mice vaccinated with rChimeric-AT showed 40.4% significant reduction in intestinal egg burden as compared to the control group. Taken together, our results show that rChimeric-AT conferred a high level of antibody production and suggests this multi-antigen construct would be a potential vaccine candidate against schistosomiasis.

Biography

Yee obtained his BSc (Honours) and MSc in Biotechnology from Universiti Sains Malaysia. Since 2006, he has been working as a lecturer in a Malaysian government institution. In 2009, he accepted a scholarship under ASTS Fellowship from Universiti Sains Malaysia to pursue his doctorate degree in vaccinology in University of Queensland under the supervision of A/Prof. Malcolm Jones. His research focus is on investigating the potential vaccines targeting against schistosomes. In 2011, he was awarded an Edward Jenner PhD Scholarship through Australian Centre for Vaccine Development. He is recently completing his doctorate thesis and projected to graduate in 2013.