Schistosome insulin signaling pathway

Schistosomiasis remains one of the most prevalent and serious of the tropical parasitic diseases. Improved understanding of how schistosomes exploit host nutrients, neuro-endocrine hormones and signalling pathways for parasite growth/development/fecundity may provide novel insights for schistosomiasis control. We discuss the potential intervention value of insulin signalling, which plays an important role in glucose uptake in schistosomes, a major nutrient essential for worm survival. Previous microarray analysis demonstrated that host insulin is crucial in schistosome insulin signalling by stimulating glucose metabolism through upregulation of the PI3K sub-pathway and in worm fecundity by activation of the MAPK sub-pathway. We identified an endogenous insulin-like peptide (ILP) in schistosomes which possesses conserved features of the insulin/insulin-like family proteins. The oriental schistosome, *Schistosoma japonicum*, ILP has stronger bind affinity with its insulin receptors (SjIRs) compared with human insulin, but the SjIRs function in a similar role in activating the MAPK pathway of the parasite. We had previously identified two types of insulin receptors in *S. japonicum* (SjIR1 and 2) that can bind to both schistosome ILP and human insulin. We used the purified recombinant protein of the ligand domains of SjIR1 and 2 in independent murine vaccine/challenge trials. Encouragingly, we found the recombinant SjIRs conferred highly significant reductions in fecal eggs (56-67%), stunting of adult worms (12-42%), and a reduction in the numbers of mature intestinal eggs (75%) compared with placebo controls. These data emphasize the potential of the SjIRs as veterinary transmission blocking vaccine candidates against zoonotic schistosomiasis japonica in China and the Philippines.

Biography

Hong You has completed her PhD in 2010 at University of Queensland and is undertaking postdoctoral studies at QIMR Berghofer Medical Research Institute, Brisbane, Australia. She is a current Australian National Health and Medical Research Council (NHMRC) Early Career Fellow. As CIA, she obtained a NHMRC project grant and an Australian Infectious Diseases Research Centre (AID) seed grant in 2014 and 2015. She has published 25 papers in peer-reviewed international journals.

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