Functional characterization of *Schistosoma japonicum* acetylcholinesterase

Hong You[1], Geoffrey N Gobert[1, 2], Xiaofeng Du[1], Gabor Pali[1], Pengfei Cai[1], Malcolm K Jones[3] and Donald P McManus[1]

[1]*QIMR Berghofer Medical Research Institute, Australia*

[2]*Queen's University Belfast, UK*

[3]*The University of Queensland, Australia*

Abstract

Acetylcholinesterase (AChE) is an important metabolic enzyme of schistosomes present in the musculature and on the surface of the blood stage. As both target for the antischistosomal drug metrifonate and as a potential vaccine candidate, AChE has been characterized in the schistosome species *Schistosoma mansoni*, *S. haematobium* and *S. bovis* but not *S. japonicum*. In this study, we report the full-length cDNA sequence and describe phylogenetic and molecular structural analysis to facilitate understanding of the biological function of AChE (*Sj*AChE) in *S. japonicum*. The protein has high sequence identity (88%) with the AChEs in *S. mansoni*, *S. haematobium* and *S. bovis* and has 25% sequence similarity with human AChE, suggestive of a highly specialized role for the enzyme in both parasite and host. We immunolocalized *Sj*AChE and demonstrated its presence on the surface of adult worms and schistosomula, as well as its lower expression in parenchymal regions. The relatively abundance of AChE activity (90%) present on the surface of adult *S. japonicum* when compared with that reported in other schistosomes suggests *Sj*AChE may be a more effective drug or immunological target against this species. We also demonstrate that the classical inhibitor of AChE, BW285c51, inhibited AChE activity in tegumental extracts of paired worms, single males and single females by 59%, 22% and 50%, respectively. These results build on previous studies in other schistosome species indicating major differences in the enzyme between parasite and mammalian host and provide further support for the design of an anti-schistosome intervention targeting AChE.

Biography

Hong You has completed her PhD in 2010 from University of Queensland and Postdoctoral studies from 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 has obtained NHMRC project grant and Australian Infectious Diseases Research Centre (AID) seed grants in 2014 and 2015. She has published more than 25 papers in reputed journals.

Hong.You@qimrberghofer.edu.au