

Molecular Epidemiology of Egyptian Biomphalaria Snail: The Identification of Species, Diagnostic of the Parasite in Snails and Host Parasite Relationship

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Abstract : Biomphalaria snails play an integral role in the transmission of Schistosoma mansoni, the causative agent for human schistosomiasis. Two species of Biomphalaria were reported from Egypt, Biomphalaria alexandrina and Biomphalaria glabrata, and later on a hybrid of B. alexandrina and B. glabrata was reported in streams at Nile Delta. All were known to be excellent hosts of S. mansoni. Host-parasite relationship can be viewed in terms of snail susceptibility and parasite infectivity. The objective of this study will highlight the progress that has been made in using molecular approaches to describe the correct identification of snail species that participating in transmission of schistosomiasis, rapid diagnose of infection in addition to susceptibility and resistance type. Snails were identified using of molecular methods involving Randomly Amplified Polymorphic DNA (RAPD), Polymerase Chain Reaction, Restriction Fragment Length Polymorphisms (PCR-RFLP) and Species - specific- PCR. Molecular approaches to diagnose parasite in snails from Egypt: Nested PCR assay and small subunit (SSU) rRNA gene. Also RAPD PCR for study susceptible and resistance phenotype. The results showed that RAPD- PCR, PCR-RFLP and species-specific-PCR techniques were confirmed that: no evidence for the presence of B. glabrata in Egypt, All Biomphalaria snails collected identified as B. alexandrina snail i-e B alexandrina is a common and no evidence for hybridization with B. glabrata. The adopted specific nested PCR assay revealed much higher sensitivity which enables the detection of S. mansoni infected snails down to 3 days post infection. Nested PCR method for detection of infected snails using S. mansoni fructose -1,6- bisphosphate aldolase (SMALDO) primer, these primers are specific only for S. mansoni and not cross reactive with other schistosomes or molluscan aldolases Nested PCR for such gene is sensitive enough to detect one cercariae. Genetic variations between B. alexandrina strains that are susceptible and resistant to Schistosoma infection using a RAPD-PCR showed that 39.8% of the examined snails collected from the field were resistant, while 60.2% of these snails showed high infection rates. In conclusion the genetics of the intermediate host plays a more important role in the epidemiological control of schistosomiasis.

Keywords : biomphalaria, molecular differentiation, parasite detection, schistosomiasis

Conference Title : ICEBESE 2016 : International Conference on Environmental, Biological, Ecological Sciences and Engineering

Conference Location : London, United Kingdom

Conference Dates : August 25-26, 2016