Regular Mass drug administration of Praziquantel to boost anti-schistosome immunity: Preclinical and clinical evidences

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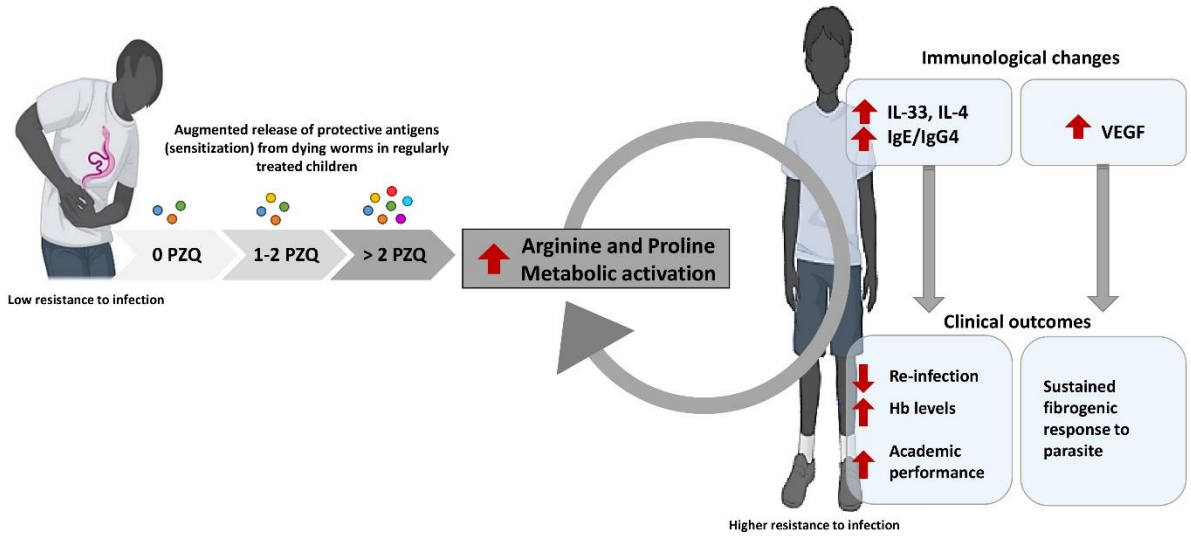
Graphical Abstract of the Talk



Abstract

Background:

Schistosomiasis remains a significant public health challenge in endemic regions, leading to substantial morbidity, in the absence of a functional vaccine until date. While regular mass drug administration (MDA) of praziquantel (PZQ) is a cornerstone of schistosomiasis control programs in endemic areas, emerging evidence suggests that its benefits, not fully harnessed, may extend beyond mere parasite killing, orchestrating a chemotherapeutically-induced immunity in treated hosts. We aimed to address this possibility.

Methods:

We examined schistosomiasis in school-aged children from affected areas who received different cumulative numbers of annual PZQ treatments. We monitored reinfection rates and health effects, like anaemia, cognitive impairment and liver fibrosis. A mouse model was also used to analyse, beyond association, the likelihood of causality in how the numbers of infection-PZQ treatment cycles might affect susceptibility to reinfection, pathologies and immune responses.

Results:

Analysis of data and samples from SAC showed that regular use of PZQ in endemic area activated more rapidly arginine/proline metabolism and increased protective IgE levels and type-2 cytokines in these SAC. This lowered the chance of subsequent high parasite levels (AOR = 0.16) and improved haemoglobin (AOR = 2.58) and academic performance (AOR = 2.39). Similarly, in the mouse model, repeated cycles of infection/treatment boosted immune responsiveness, particularly of the type-2 arm (parasite-directed IgE and IgG1, Arginase-1) and translated into increased resistance to reinfection.

Conclusion

The study shows that regular treatment with PZQ can improve protective immune responses in children from schistosomiasis-endemic areas, reducing the risk of reinfection and associated sequelae.