

## SHORT COMMUNICATION

## Antibody Isotype Responses to Egg Antigens in Human Chronic Schistosomiasis *Mansoni* Before and After Treatment

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*In the present communication we analyzed the levels of IgG1, IgG2, IgG3, IgG4 and IgE isotypes to soluble egg antigen of Schistosoma mansoni by ELISA in individuals from an endemic area for schistosomiasis in Northeast Brazil. The analysis was performed before and after treatment to evaluate the age-dependent pattern, and to identify differences in the reactivities to antigens. Our results suggest that schistosomiasis treatment would not interfere with this sort of immune response.*

Key words: schistosomiasis - antibodies - treatment

Analysis of antibody responses to different antigens in patients' sera shows that the slow development of immunity to reinfection after treatment of *Schistosoma* infection is partially attributable to the continued presence of blocking antibodies in susceptible individuals, particularly IgG4 and IgG2 (Demeure et al. 1993). The role of IgE in several immune mechanisms against the parasite has been described in vitro, suggesting that these mechanisms might be involved in protection against human schistosomiasis (Capron et al. 1999). The levels of IgE antibodies to *S. hematobium*, mainly against adult worms, increased progressively with the age of the patient and were related to resistance to reinfection after chemotherapy (Hagan et al. 1991). The influence of IgE in immunity to *S. mansoni* reinfection has also been reported by other authors (Dunne et al. 1992, Rihet et al. 1992, Demeure et al. 1993).

We have previously evaluated the influence of antibodies of the isotypes IgE and IgG4 on the resistance and susceptibility to infection by *S. mansoni* in human populations living in two contiguous endemic villages (Itapinassu and São Joaquim) in Northeast Brazil by using soluble egg antigen (SEA) and soluble worm antigenic preparations (SWAP) in a immunoenzymatic assay (ELISA). An association between age and levels of IgE schistosome-specific antibodies was found. The age-IgE profile followed that expected for an antibody involved in resistance to infection (Gomes et al. 1998).

In the present communication we extended our previous studies, analyzing the levels of IgG1, IgG2, IgG3, IgG4 and IgE isotypes to SEA, in 58 patients from São Joaquim village, in order to evaluate the patterns of antibodies responses before and after treatment. The procedures followed were in accordance with the ethical standards on human experimentation.

Parasite burden was measured in stool specimens by the Kato-Katz method, and water contacts were evaluated by a specific questionnaire. Blood was obtained by venipuncture, before treatment and six months after treatment with oxamniquine (15 mg/kg for adults and 20 mg/kg for patients under 15 years old), and serum stored at -20°C until use. SEA was obtained using standard procedures (Gazzinelli et al. 1983). This preparation was dialyzed against distilled water and the protein concentration determined by the method of Lowry et al. (1951). IgG1, IgG2, IgG3, IgG4 and IgE antibody response to SEA was evaluated by ELISA (Hagan et al. 1991) using mouse monoclonal anti-human IgG1, IgG2, IgG3, IgG4 and IgE (Fc fragments). Assays were developed using horseradish peroxidase-conjugated rabbit anti-mouse IgG. Statistical analysis was performed using the software EPIINFO V 6.04.

Before treatment, IgE and IgG4 anti-SEA antibody levels were more elevated than IgG1, IgG2, and IgG3 (Fig. 1). These antibody levels tended to increase after treatment (Fig. 2) suggesting stimulation of the antibody response due the drug effects or antigens exposure due to parasite damage. Although the intensity of the antibody response apparently increased after treatment, the age-dependent pattern of antibody response was very similar. The peaks of IgE and IgG4 antibody response were clearly in the 10-19 year age group. In contrast, changes in the levels of the other isotypes analyzed were not so apparent. We have also analyzed antibody responses before and after treatment, using SWAP (data not shown). In general, the response was similar to that observed against SEA: IgG4

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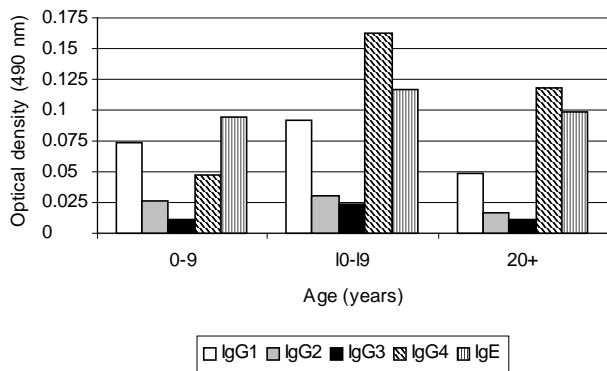


Fig 1: antibody isotype responses to soluble egg antigens of *Schistosoma mansoni* before treatment in patients living in an endemic area.

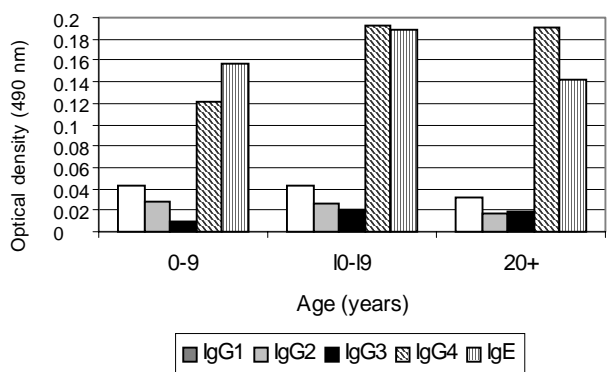


Fig. 2: antibody isotype responses to soluble egg antigens of *Schistosoma mansoni* after treatment in patients living in an endemic area.

antibodies were the most elevated, and the levels of antibodies were maximal ( $p < 0.05$ ) in young adults (15-19 years). Nonetheless, before treatment the first peak of IgG4 occurred at a younger age range (10-14 years), in comparison to the humoral response observed after treat-

ment, suggesting that treatment interferes with the production of IgG antibodies.

As IgE anti-parasite antibodies have been implicated as protective, our results suggest that schistosomiasis treatment would not interfere with IgE dependent protective immunity. Nevertheless, one should notice that, in addition to IgE antibodies, potentially blocking IgG4 antibodies, were also increased after treatment, peaking at the same age-group.

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