Mem. Irst. Oswaldo Cruz, Rio de Janeiro, Vol. 82, Suppl. IV: 217-218, 1987
Intern. Symp. on Schistosomiasis

SCHISTOSOMIASIS MANSONI: IMMUNODIAGNOSIS ASPECTS AND SEARCH FOR AN IMMUNOLOGICAL MARKER RELATED TO THERAPEUTIC EFFICACY

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The recent findings on immunodiagnosis of schistosomiasis mansoni have shown that purified Schistosoma mansoni *antigens do not provide maximum positivity. Therefore, the authors suggest the use of semi-purified antigens for diagnostic purposes. So far, no serological marker for cured patients as shown by negative stool examination was found. However, a tendency of IgG antibody titre decrease was observed, when egg antigen was used.*

The immunological diagnosis of schistosomiasis mansoni is particularly valuable in cases of low intensity infections, and in this respect the serological techniques present several practical advantages (Hoshino-Shimizu et al., 1986). Immunoenzimatic assay (ELISA) shows a high degree of sensitivity (Table), when compared to the other tests. However, a rate of false positive results as high as 16% has been observed with this technique, depending on the type of antigen used (Mott & Dixon, 1982). Our previous experience with immunofluorescence test (IFT) in field studies showed in general high specificity (unpublished data). Because of the ability of ELISA to detect small amounts of specific antibodies, it also amplifies other undesirable non-specific or cross-reactive antibodies. Since sensitive techniques, such as ELISA, require the use of more purified antigens many investigators (Mott & Dixon, 1982) have tried several different antigenic fractions, derived from *Schistosoma mansoni* life cicle stages. But, they concluded that no antigen or serological test was better than the other.

Recently, in a study done with egg and adult worm antigens (Kimura, 1986), by western-blot technique, it was verified there was no single antigenic fraction capable to be reactive to all 24 studied patients' sera. Nevertheless, maximum positivity could be obtained with the association of two or more antigenic fractions.

Hence, it seems that for diagnostic purposes a well defined but semi-purified antigen might be appropriate to provide more reliable results.

In the chemotherapy of schistosomiasis mansoni, there is a lack of an immunological or serological marker related to the classical criterion of parasitological cure. The value of the circumoval precipitin test (COPT), previously pointed out as the most adequate for indicating chemotherapic cure (Oliver-Gonzalez et al., 1955), could not be confirmed (Lambertucci et al., 1983). Our results (Fig.) reinforce this opinion since COPT became negative only in about half of cured patients one year after treatment. Moreover, this test gave poor sensitivity (65%) in patients with low worm load (Table).

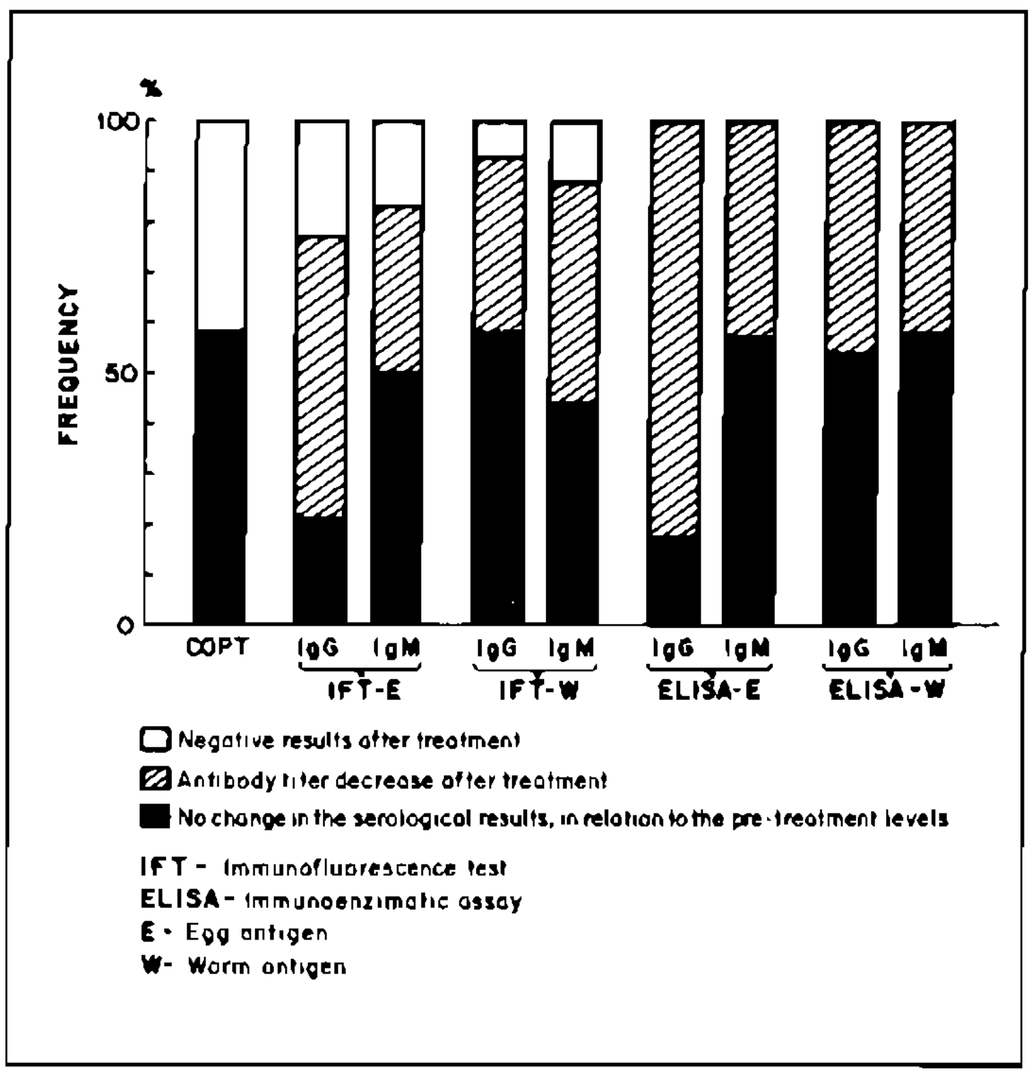

Fig. 1: distribution of frequency of serological results obtained one year after treatment of patients considered as cured according to parasitological criterion.

TABLE

Sensitivity of serological tests*, according to intensity of infection, in sera from untreated schistosomiasis mansoni patients

Group	No. of eggs per gram of faeces	COPT	IFT – E		IFT – W		ELISA – E		ELISA – W	
			IgG	IgM	IgG	IgM	IgG	IgM	IgG	IgM
I	< 100	65% 13/20	87% 28/32	83% 10/12	72% 23/32	100% 12/12	100% 11/11	100% 11/11	100% 11/11	100% 11/11
II	> 100	100% 24/24	100% 72/72	83% 40/48	99% 71/72	98% 47/48	100% 13/13	100% 13/13	100% 13/13	100% 13/13

* Serological tests:
COPT = circumoval precipitin.
IFT-E = immunofluorescence test with egg antigen (cryostat sections of liver containing egg granulomata).
IFT-W = immunofluorescence test with worm antigen (cryostat sections of adult worms).
ELISA-E = immunoenzimatic assay with crude soluble egg antigen.
ELISA-W = immunoenzimatic assay with crude soluble worm antigen.

As seen in the Fig., the follow-up study of IgG antibodies to egg antigens, either by IFT or ELISA, showed titer decays one year after treatment, in most of the cases. In particular, IFT gave negative results in 23% of those cases. Furthermore, the IgM antibodies to worm gut antigen detected by IFT presented some value due to a tendency to titer decays after treatment.

The remainder combinations of tests and antigens provided no additional information related to parasitological cure.

In brief, our findings agree with those reported by Mott & Dixon (1982) in which the egg antigens present better results than worm antigens, by giving several negative results or antibody decrease in ELISA. For the present purpose, further investigation should be performed, testing other parasite cicle stages as antigen in a search for a more convenient serological marker for therapeutic follow-up in schistosomiasis.

It is our feeling that less specific or even ubiquitous antigens should also be studied to be applied in a sensitive technique, in analogy to the serological follow-up of treated patients of syphilis, with a cardiolipin antigen which is the best indicator of therapeutic efficacy.

Acknowledgements: to Almir R. Ferreira for the figure and Lucia Maria Ferreira Rosa for collaboration.

REFERENCES

HOSHINO-SHIMIZU, S.; CAMARGO, M. E.; KANAMURA-KAWADA, H. Y.; SILVA, L. C. & DIAS, L. C. S., 1986. Aspectos sorológicos e soroepidemiológicos da esquistossomose mansônica. p. 67-89. In *Modernos conhecimentos sobre a esquistossomose mansônica.* Supl. An. 1983 a 1984. Biblioteca da Academia Mineira de Medicina vol. 14. Belo Horizonte, MG.

KANAMURA-KAWADA, H. Y., 1985. *Antígenos de diferentes formas evolutivas do* Schistosoma mansoni *para diagnóstico e acompanhamento sorológico de pacientes submetidos a quimioterapia.* Ph. D. Thesis, USP, São Paulo.

KIMURA, E. A. S., 1986. *S. mansoni:* Análise por "Western-blot" dos antígenos envolvidos na resposta humoral de pacientes submetidos ao tratamento. M. Sc. Thesis, USP, São Paulo.

LAMBERTUCCI, J.; MELLO, R. T.; PEDROSO, E. R. P.; GRECCO, D. B. & ROCHA, M. O. C., 1983. The circumoval precipitin test as a control of cure in children with chronic schistosomiasis mansoni. *Rev. Inst. Med. trop. S. Paulo, 25:* 37-41.

LEAL-BACELAR, G. M. J. P.; KANAMURA-KAWADA, H. Y.; SILVA, L. C. da; HOSHIRO-SHIMIZU, S. & AGUILAR, C. M., 1986. Acompanhamento sorológico após tratamento de pacientes esquistossomóticos residentes em uma área endêmica da Venezuela. Anais IV Encontro Norte-Nordeste de Imunologistas e IX Jornada de Parasitologia e Medicina Tropical do Maranhão, p. 29, São Luís, MA.

MOTT, K. E. & DIXON, H., 1982. Collaborative study on antigens for immunodiagnosis. *Bull. Wld. Hlth. Org., 60:* 729-753.

OLIVER-GONZALEZ, J.; RAMOS, F. L. & COKER, C. M., 1955. Serological reations against egg antigens as an aid in the evaluation of therapy in schistosomiasis. *Am. J. Trop. Med. Hyg., 4:* 908-912.