New serological methods for the diagnosis of schistosomiasis and their application

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Studies were carried out of the enzyme linked immunosorbent assay (ELISA) and the thin layer immuno assay (TIA), for the diagnosis of schistosomiasis using different human and animal sera (a) from known human *Schistosoma haematobium* cases (Egypt); (b) from known human *S. mansoni* cases (St. Lucia); (c) normal human sera (negative for schistosomiasis) (Egypt); (d) human hydatid infections (UK); (e) human cercarial dermatitis (UK); (f) human cysticercosis (New Guinea); (g) from known human *S. haematobium* and *S. mansoni* cases before and six weeks after treatment with hycanthone (Sudan); and (h) the animal sera were from baboons infected with *S. haematobium*, treated with a dinitro thiophane derivative (Hoffman La-Roche Limited, Basel) and reinfected with *S. haematobium*. The ELISA test was done by methods used in the Ross Institute. The TIA method was carried out according to the techniques described by ISMAIL, M. *et al.* (1979; *Parasite Immunol.*, **1,** 251-258). All the above sera were examined from adult *S. haematobium* and *S. mansoni* according to the techniques described by CAPLAN, A. (1968; *Path. Biol.*, **16,** 121-138).

The results show that: ELISA and TIA have a great sensitivity in the detection and quantification of anti-schistosome antibodies. TIA produced a small number of false positives with sera from other helminth infections, whereas ELISA gave none.

Both tests (ELISA and TIA) proved to be promising techniques for serological monitoring of chemotherapeutic cure in humans and baboons infected with *S. haematobium* or *S. mansoni*. The baboons showed an unusual rise of antibody levels two weeks after treatment but thereafter declined, reaching almost background levels 22 weeks after treatment. A proportion of treated patients showed a rise of antibody levels six weeks after treatment but the others showed no difference before and after treatment. The percentage showing this increase of antibody levels is higher when homologous rather than heterologous schistosome worm antigen was used.

TIA has the advantage of being simple to perform but the disadvantage of requiring a higher concentration of antigens for coating the plates.

Improvements of the sensitivity and specificity of both techniques, ELISA and TIA, could, however, be achieved by purification of the antigens used.

Litomosoides carinii (Filarioidea) infection in cotton-rats and jirds

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The course of a quantitative *Litomosoides carinii* infection in the natural host (cotton-rat, *Sigmodon hispidus*) was compared with the course of the infection in an experimental host (jird, *Meriones unguiculatus*) for a period of 52 or 40 weeks, respectively. The development of the humoral immune response was examined with indirect haemagglutination and indirect immunofluorescence.

The mean recovery rate of immature and adult worms was 31·0% in jirds and 21·5% in cotton-rats. In both hosts the number of live worms decreased in late infections only. However, signs of physiological ageing and subsequent death of the worms were observed earlier in jirds. In cotton-rats, encapsulation of worms (nodule formation) was related to the elimination of dying worms, whereas nodules in jirds seemed to be mainly a host reaction to live worms.

Peak median microfilaraemia was reached between weeks 20 and 24 p.i. in both host species. Jirds showed a higher microfilarial density and the peak was followed by an abrupt decrease in the number of microfilariae. The decrease coincided with the beginning of ageing of the female worms. Calculations taking into account the difference in size and in worm burden between the two hosts, indicated that roughly the same number of microfilariae gained access to the blood circulation in both hosts, and that microfilaraemia was not more actively suppressed in jirds.

The humoral immune response was generally higher in jirds. The main increase in mean antibody titres was observed during the prepatent period in jirds but only after the onset of patency in cotton-rats. Jirds also showed a higher degree of splenomegaly and a higher mortality rate during peak microfilaraemia. In spite of these stronger reactions of the experimental host to the *L. carinii* infection, worm recovery was not affected and microfilaraemia was not more actively suppressed than in cotton-rats. This may indicate that jirds are less able to cope effectively with the infection.

Distribution of *Bulinus, Biomphalaria* and *Lymnaea* in Kenya

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Our interest in studying the distribution of the freshwater snails of the genera *Bulinus* and *Biomphalaria* arises from studies of transmission of schistosomiasis. Similar studies have been carried out, though to a lesser extent, on *Lymnaea*, intermediate host of *Fasciola*, the liver-fluke of cattle.

The coverage of the snail surveys reported corresponds roughly to 8% of the area of Kenya, but the semi-arid northern and eastern part of Kenya is very poorly represented.

Using the Universal Transverse Mercator Grid as a basis, maps were presented showing the known distribution, in 10 × 10 km squares, of the following species: *Bulinus africanus, B. nasutus, B. globosus, B. ugandae, B. tropicus, B. permembranaceus, B. truncatus, Biomphalaria sudanica, B. pfeifferi, Lymnaea natalensis, L. truncatula* and *L. columella.*

It is suggested that species of the Africanus group are not to be found at altitudes higher than