Title: Schistosome Materials for Vaccine Development
BACKGROUND

The immunological, immunochemical and biochemical investigations carried on for several years at the Naval Medical Research Institute have been directed toward development of a vaccine against schistosomiasis. Until recently, there has been little information on which to build. The immunogenicity of the variety of schistosome materials with which the definitive host comes in contact is not known, nor is there much dependable data on the development of protection by hosts against challenge infections.

This means that basic information must be accumulated before a direct attack on the problem of development of a vaccine can be made. Large quantities of schistosome material are required for these basic investigations. These include, but are not limited to, adult schistosomes, eggs, cercariae, schistosomules, cercarial penetration enzymes, and vertebrate and invertebrate host serum and tissues. It has been the function of this contract to supply these materials in large quantity and prepared as needed.

METHODOLOGY

Provision of these materials required the maintenance of Biomphalaria glabrata snails and of Swiss albino mice. Six 20-gallon aquaria supported about 1000 uninfected snails each. From these, 2 to 3 hundred young snails were collected weekly. These were exposed singly to either 1 or 8 to 10 miracidia each,
or otherwise as necessary for different experimental designs. The miracidial source was minced blended livers of mice with infections of 7 to 8 weeks duration. This exposure schedule maintained a constant level of about 1000 infected snails.

More than 1 million cercariae/day were collected from these infected snails 4 days each week and processed as needed or used immediately for experimental work.

Two hundred and fifty to 300 outbred weanling mice were exposed weekly to about 270 cercariae each. These were kept for 7 weeks, sacrificed and perfused for collection of adult worms.

Schistosomules were collected as needed, averaging several hundred per week. This postpenetration stage was recovered from ear skin of mice exposed in vivo to cercariae or after cercarial penetration of dried rat abdominal epidermis.

Fifty to 100 ml of secreted enzyme solution were harvested two to four days each week from cercariae stimulated to secrete in a temperature gradient over skin surface lipid or the active fraction, linolenic acid. Total protein (Lowry method) and enzyme activity against azocoll (dye-coupled collagen) were established spectrophotometrically for each collection.

RESULTS

Schistosome (Schistosoma mansoni) materials have been provided for investigative use as follows: for immunoparasi-
tological investigations at the Naval Medical Research Institute by Drs. Wilton Vannier, Darwin Murrell, Pat Minard, Verne Schinski, David Dean and Richard Jacobson; for EM studies by Drs. Charles Dorsey (NMRI), M. Stirewalt and C. Cousin (BRI); and for enzyme experiments by M. Stirewalt (BRI). These materials included each week: 4 to 6 million cercariae, 20,000 sexed cercariae, 20 to 25 thousand adult worms, about 100 to 300 schistosomules adjusted to demand, about 400 ml of preacetabular gland enzyme secretion, and excretions and secretions (exoantigens) of cercariae as requested.


Schistosome materials for vaccine development.

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**Abstract:**

Required numbers of eggs, miracidia, cercariae, schistosomules, worms, infected mouse serum and penetration enzyme were produced and supplied in support of the studies of 9 investigators.
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