USE OF SCHISTOSOMES FOR PHARMACOLOGICAL RESEARCH

BURTON J. BOGITSH

Department of Biology
Vanderbilt University
Nashville, Tennessee

I. Introduction ........... 2
II. Microtubules ............ 2
III. Colchicine and Vinblastine .... 5
Conclusions .............. 8
References ............... 8

1 Supported in part by a grant from the Edna McConnell Clark Foundation (No. 275-0041)
I. INTRODUCTION

Human schistosomiasis is an illness that infects and debilitates in excess of 200 million people in more than 70 countries in the tropical areas of the world. It is small wonder that massive amounts of money and time are consumed in seeking means to treat, control, and prevent this widespread scourge upon mankind. Economic conditions in the areas of the world where this condition is most prevalent are such that there is a constant search for less costly, more effective means of treatment. One aspect of that research is the seeking out of new target systems within the schistosomes which may be vulnerable to chemotherapy and, hence, provide another means of attack upon this agent. To date, chemotherapeutic attack has focused on three primary targets in the causative organism: portions of the glycolytic pathway, egg formation, and the nervous system (see Senft, 1969, and Cheng, 1977 for reviews). However, the exact mechanisms by which most drugs affect the particular target systems are not well understood, and are, for the most part, empirical in that effects have been widely observed but only sketchily explained. Ideally, a chemotherapeutic agent should exert an adverse effect upon some critical biochemical mechanism (target) in the parasite but have little or no simultaneous effect upon the human host.

The purpose of this paper is to propose another system within the schistosomes which might serve as a target for chemotherapeutic assault, i.e., the microtubule-dependent secretory system. The structure of the covering of the outer surface, or tegument, of *Schistosoma mansoni* is maintained by materials synthesized in the underlying tegumental cell bodies. The movement or translocation of these materials from the cell bodies where they are produced to more superficial areas apparently is dependent upon microtubules (Bogitsh, 1977).

II. MICROTUBULES

The presence of microtubules has been observed in *S. mansoni* by a number of investigators. Morris and Threadgold (1968) describe microtubules in the tegumental cytoplasmic channels, while Dike (1971) and Rifkin (1971) report the presence of these structures in the folds of the esophageal epithelium and in the tegument of schistosomes, respectively. Wilson and Barnes (1974) present evidence that the cytoplasmic channels of the worm’s tegument are lined by a peripheral ring of microtubules. The position of these microtubules on the inner surface of the plasma membranes of cell ducts and in various spermatozoa leads many investigators to ascribe to them the function of providing cytoskeletal support (Halton and Dermott, 1967; Spence and Silk, 1970; Wikel and Bogitsh, 1974; and others).