THE ROLE OF SNAIL ANTIGENS IN THE IMMUNITY OF SCHISTOSOMIASIS OF THE ALBINO MICE

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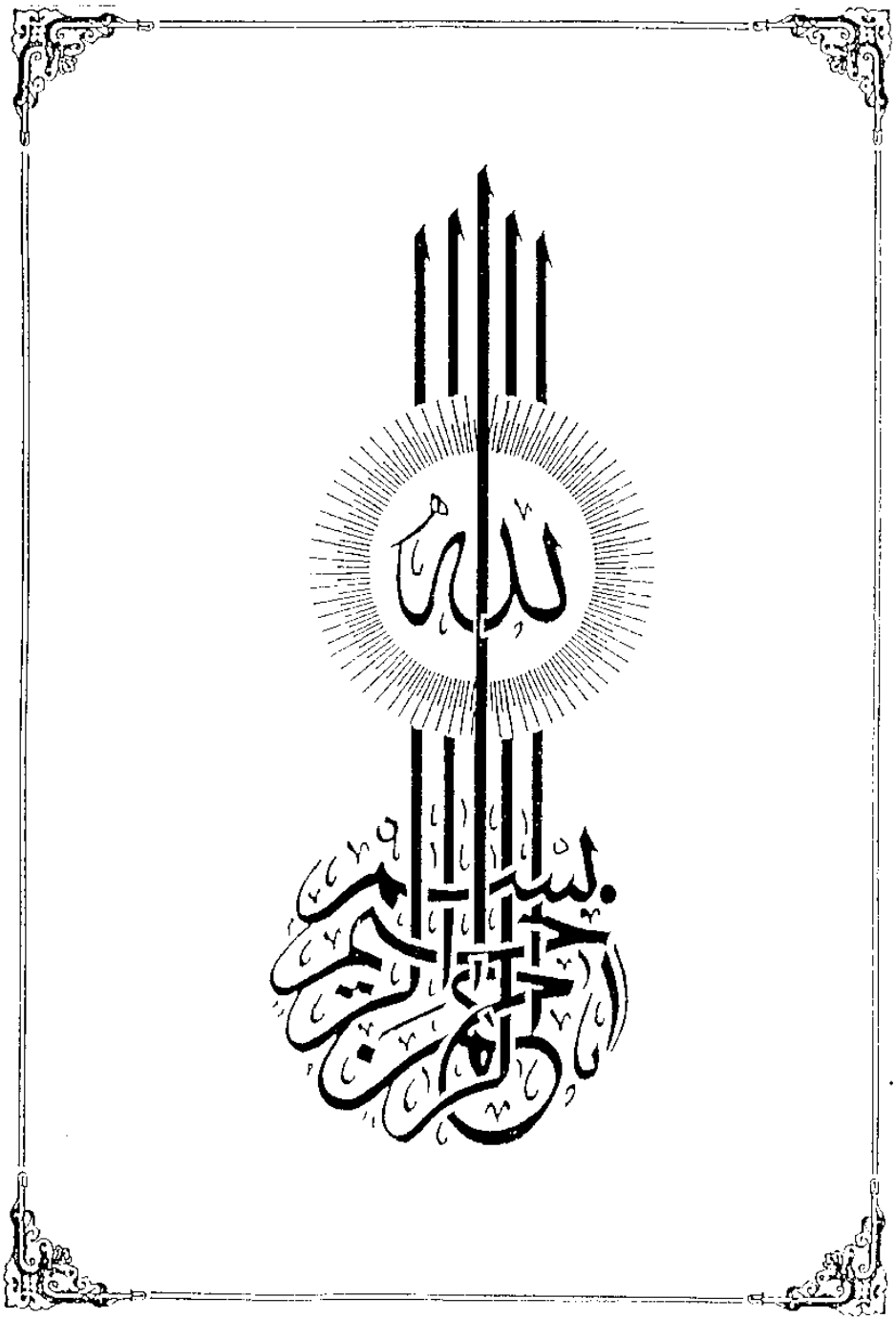
بسم الله الرحمن الرحيم

" وقل رب زدني علما "

صدق الله العظيم

I. Nakib



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CHAPTER I

GENERAL INTRODUCTION

The trematodes, parasitizing the blood stream of man belong to the genus Schistosoma (Weinland, 1858). They cause in man a disease known as schistosomiasis or bilharziasis. The causative agents of this disease were discovered and identified as blood flukes in Egypt (Bilharz, 1852). Leiper (1918) identified and described the life cycle of two species of blood flukes belonging to the genus Bilharzia in Egypt: Bilharzia haematobium and Bilharzia mansoni. Bitter controversy arose about the generic nomenclature of these blood flukes, being either Bilharzia Meckel von Hemsbach, 1856 or Schistosoma Weinland, 1858. By a decision of the International Commission on Zoological Nomenclature (1954), the name Bilharzia has been suppressed while the name Schistosoma is retained (Farooq, 1973).

Despite tremendous achievements in the understanding of many of the epidemiological, biological and pathological characteristics of schistosomiasis, the disease is still considered as one of the most important endemic diseases in many tropical and subtropical countries. Unlike many infectious diseases which have been recently brought under control, schistosomiasis is an increasing problem, especially in developing areas where newly constructed irrigation schemes increase significantly the possibility of infection. Some 200 million people

are probably infected in the world and another 500-600 millions are exposed to the risk of infection (Webbe, 1981).

Schistosomiasis is considered as one of the most important endemic diseases in Egypt and its effects on the health and economy is tremendous (Farooq and Samaan, 1967). Despite the use of chemotherapy and molluscicides in the control of the disease for decades, this problem is still given high priority in national health plans. Many authorities of the subject believe that more attention should be paid to other unclassical methods of disease control, particularly the development of vaccination against the disease through the proper understanding of schistosomiasis immunology.

The understanding of the immunology of schistosomiasis means an indepth knowledge of the nature of one vital aspect of the host-parasite relationships (Smithers and Terry, 1969). Findings and interpretations in this field have a strong impact on the practical aspects of controlling the disease.

For more than 65 years, and since the pioneering observations of Fujinami (1917) on acquired immunity to Schistosoma japonicum, the problems of immunity to schistosomes have puzzled parasitologists. Undoubtedly, man and animals

acquire immunity to schistosomes, and it is believed that this immunity is similar to that found in other infectious diseases (Smithers and Terry, 1969). In human schistosomiasis, however, we do not see the classical situation of an immunological crisis occurring during the primary infection, with a massive destruction of the invading organisms and the development of a strong immunity to subsequent re-infection as in antibacterial or antiviral immunity (Mousa, 1975). Instead, the resistance to schistosomes appears to develop only gradually, and may take several years to become absolute.

The host-parasite relationship in schistosomiasis is highly specific and is genetically controlled (Webbe, 1971). Sprent (1959) suggested that during the evolution of this host-parasite relationship, dual modification acting through natural selection resulted in reduced antigenic disparity between the parasite and its natural hosts. Dineen (1963 a, b), reported that because of this reduced antigenic disparity, natural hosts will not produce antibodies harmful to the parasites as readily as will unnatural hosts.

The presence of antigens in extracts of homogenized schistosomes, indistinguishable from antigens of the vertebrate hosts, had been reported by Damian (1962, 1964 and 1967). Capron

et al, (1965 and 1968) used a sensitive immunoelectrophoretic method and identified five antigenic fractions common to Schistosoma mansoni and the liver cells from the hamster in which these worms were grown and two of these antigens were also identified in man. They were also able to demonstrate common antigenic fractions existing between the adult Schistosoma mansoni and its intermediate host Biomphalaria glabrata.

It has been found, that, all stages of the life cycle of schistosomes which occur in the mammalian host like eggs, schistosomulae and adult worms, are exposed to recognition by host leucocytes as foreign tissue, thus all stages are potentially immunogenic (Smithers and Terry, 1969).

Many trials have been done to vaccinate experimental animals against schistosomiasis using egg antigens (Crandall and Hunter, 1961; Lichtenberg and Raslavicius, 1967 and Colley, 1975), irradiated cercariae (Ghandour and Magid, 1978; Murrell et al, 1979; Taylor and Bickle, 1980; James et al, 1981; Stek et al, 1981; Sher et al, 1981; Ford et al, 1984 and Bickle et al, 1985), and adult worm antigen (Silva and Ferri, 1968; Murrell et al, 1975; Boyer and Kalfayan, 1978; Maddison et al, 1978; Dean et al, 1981 and Messines and Scarpin, 1983).