CELL MEDIATED IMMUNITY BEFORE AND AFTER SPLENECTOMY IN PATIENT WITH ENLARGED SPLEEN

THESIS

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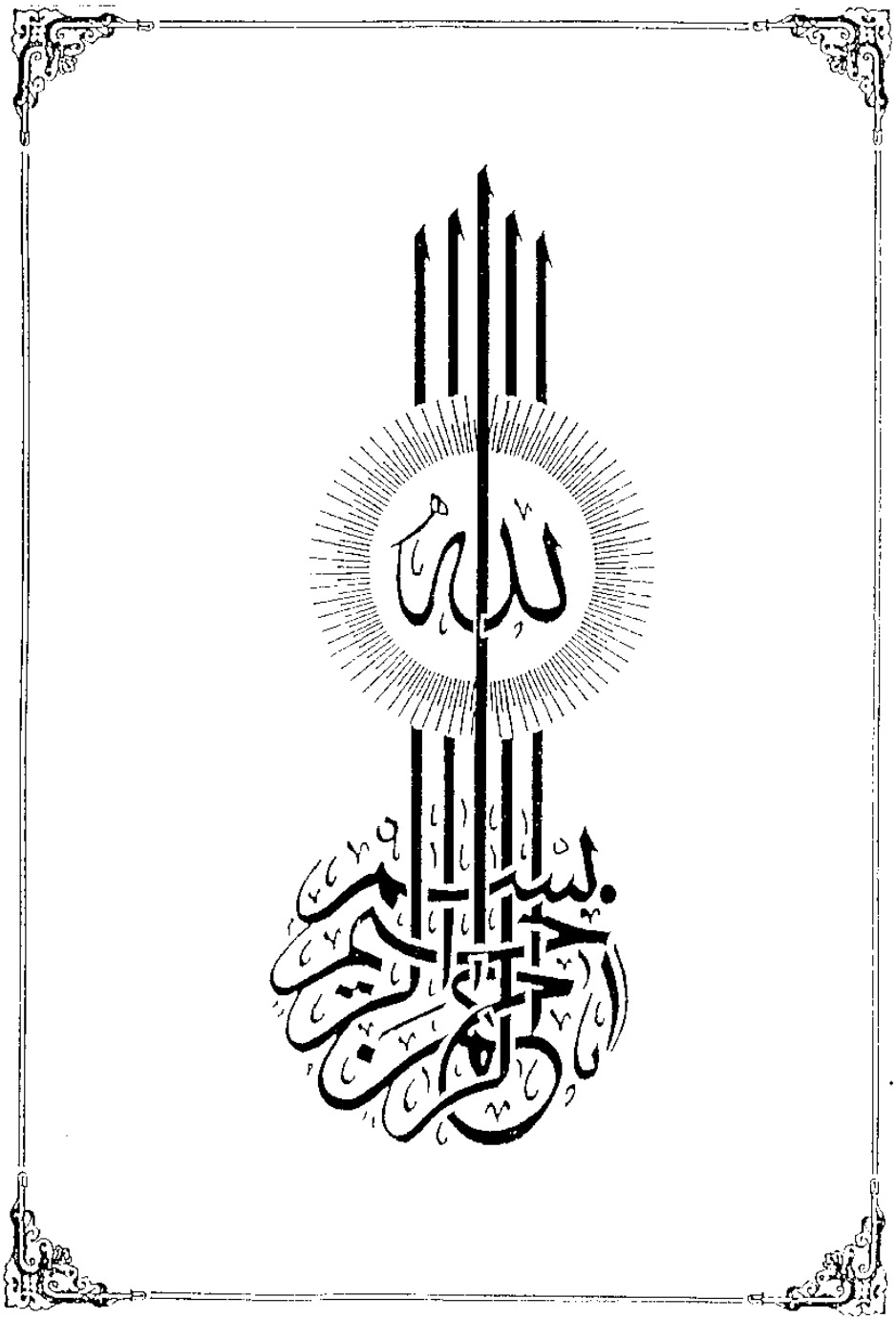

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The spleen, acting as a filter to the blood stream, plays an essential role in immunity both humoral and cell mediated. It represents the meeting point between antigenic informations transported by the blood stream and the immune apparatus responsible for mounting the host response. (Lockwood, 1983).

On these basis it is not surprising that splenectomy has been found to disturb the immunological response of patients and splenectomy was followed by increased incidence of infection (Singer, 1973, O,neal, and Mac Donald, 1981).

However, in cases of Egyptian hepatosplenic schistosomiasis some authors depoted finding and reported no increase in the incidence of infection after splenectomy. Moreover, there are some evidence that many of the parameters of the immune response may be corrrected after splenectomy (Saleh, 1972, Ekladios et al., 1978 and Makled et al., 1987).

The aim of the present work is to study the effect of splenectomy on cell mediated immunity in patients with Bilharzial splenomegaly.

REVIEW OF LITERATURE

IMMUNITY

Immune is a term derived from latin word immunis which orginally means exemption from military service or paying taxes. *Immunity* includes the mechanism dealing with the adaptive response of an individual to infective agents, and it is divided into two main types:

I. Non specific or innate immunity

Innate immunity also termed natural immunity and constitutional immunity. It depends on a number of very effective mechanisms which do not depend upon having previous experience of any particular antigens (Weir, 1981).

II. Specific or acquired immunity

This type of immunity depends upon exposure to a foreign configuration with the subsequent recognition

and reaction to it. It may be active or passive (Hood et al., 1978 and Weir, 1981). Passive immunity is produced by giving the individual already formed antibodies or immunocomptent cells. This may be natural that the mother gives to her foetus through antibodies transferred by the placenta or via colostrum during lactation. It may be also artificial in the form of artificial injection of gammaglobulins that were obtained from animals or other humans and injection of antitoxic sera. Active immunity in which the body builds its own immunity following exposure to antigens.

MECHANISM OF IMMUNE RESPONSE

There are two types of effector mechanisms responsible for the specific immune responses: humoral and cell-mediated immunity (Pierce and Benacerraf, 1975). Humoral immune response mediated mainly by antibodies, and cell mediated immune response by specifically sensitised lymphocytes.

PHYSIOLOGY OF IMMUNE RESPONSES

Both cellular and humoral immune responses have

been arbitrarily divided into three physiological limbs:

(1) Afferent limb:

This comprises all processes involved in the transport of antigen to the immunity system.

(2) The central limb:

This includes all processes culminating in production of the effectors of immunity (i.e. sensitized cells or humoral antibodies).

(3) The effector limb:

Comprises all processes occuring between the release of effectors and their ultimate action upon the initiating antigen. (Gowans et al., 1962).

Cell mediated immune response:

Cell mediated immune responses are the domain of

the thymus-derived lymphocytes (T-cells) which recognize antigen by membrane receptors specific for the antigen (Warner, 1974).On exposure to an antigen small lymphocytes differentiate into large cells and divide to give rise to daughter small lymphocytes referred to as activated T-lymphocytes (Sprent and Miller, 1971).

After activation T- lymphocytes are differentiated into cytotoxic killer cells, helper cells facilitating antibody response by B-lymphocytes and suppressor cells capable of inhibiting antibody production (Gershon, 1974). Activated T-lymphocytes produce lymphokines which are non specific effectors of cellular immunity. Lymphokines are responsible for various effects on macrophages, monocytes, polymorphonuclear leucocytes and lymphocytes (Lawrence and Landy, 1969).

Humoral immune response:

The humoral immune response is dependent upon B-lymphocytes. B-lymphocytes arise in the bone marrow as stem cells which udergo a process of division and

functional maturation into B-lymphocytes in the mammalian equivalent of the bursa of fabricious of chicken.(Cooper and Lawton, 1974).B-lymphocytes upon interaction with the antigen are transformed to plasma cells which synthesize and secrete a large amount of antibodies (Moller, 1975).

IMMUNOGLOBULINS

Gamma globulins were first recognised and designated as a distinct group of serum proteins by Tiselius (1937), and be termed these proteins gammaglobulins because they migrated more slowly in an electric field than globulins of two other groups called alpha and beta.

The term immunoglobulin is commonly used to describe serum proteins with antibody characteristics (Hermans et al., 1959).This includes the gamma globulins and also extends to include beta globulins (Chodirker and Tomasi, 1963).

Evans, (1984), described immunoglobulins as being globular proteins containing carbohydrates and by definition are glycoproteins. Immunoglobulins occur as monomers and polymers and are divided into several classes and subclasses based on antigenic differences in various constituent polypeptides.

Biochemical studies have revealed striking similarities in the structure of these immunoglobulins

despite of many dissimilarities detected by physical and immunologic studies. In humans there are five molecular classes of immunoglobulins. These are designated as IgG , IgM ,IgA , IgD and IgE.

Role of cell mediated immunity in Vivo:

- Cell mediated immunity plays a vital role in protecting the host against intracellular parasites (Kimball, 1983).

- Induce delayed hypersensitivity reactions e.g. rejection of tissue transplants.

- Elimination of spontaneously arising neoplastic cells (Weir, 1983).

- The production of antibodies by B-lymphocytes is under the control of two subsets of T-lymphocytes, the T helper cells which help antibody formation by B-lymphocytes in response to certain antigens (Roitt, 1977), and the T-suppressor cells which regulate antibody formation by B-lymphocytes.

CELLS OF IMMUNE RESPONSE

Lymphocytes

Lymphocytes are derived from lymphoblast in the bone marrow and are dispersed into the blood lymphocytes average about 7 um in diameter and have a large rounded nucleus surrounded by a small rim of cytoplasm. It is feebly motile. A pseudopod-like structure, the uropod, is the means by which lymphocytes establish a firm contact with macrophages, tumour cells, or other cell types. life span of lymphocytes divides them into two fractions- those with a short life span (mostly large lymphocytes) of 5-7 days and the small lymphocytes with a life span measured in months or even years. (Barret, 1980).

Mammals have two independent lines of lymphocytes, thymus derived or T-lymphocytes and Bursa-equivalent-derived or B-lymphocytes.

T-lymphocytes are involved in cellular immunity and B-lymphocytes are involved in humoral immunity (Weir, 1983).