IMMUNOLOGICAL PROFILE IN THE SYNDROME OF RHEGMATOGENOUS RETINAL DETACHMENT WITH UVEITIS, CILIOCHOROIDAL DETACHMENT AND SEVERE HYPOTONY

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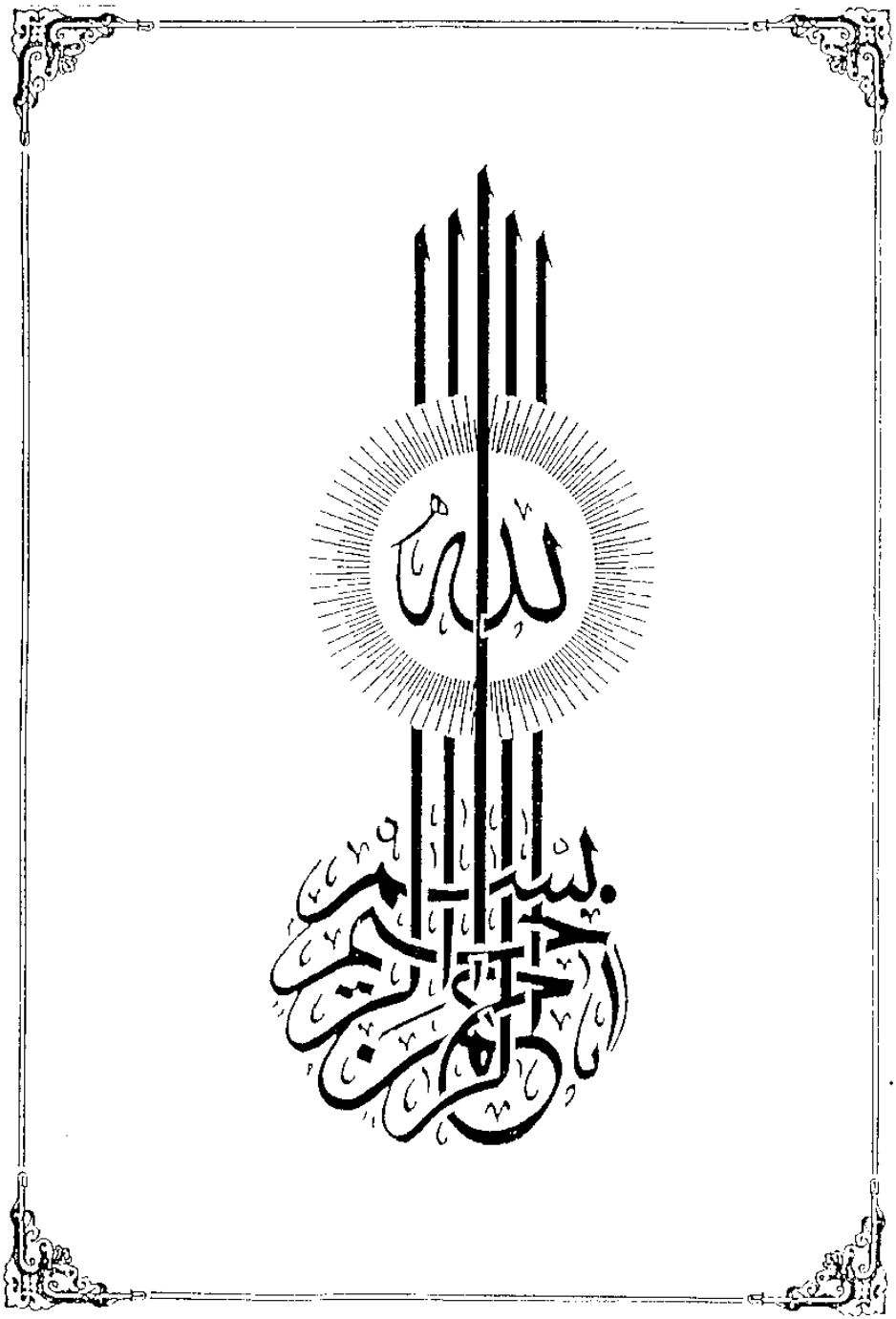
صدق الله العظيم



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INTRODUCTION

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The Hypotony syndrome is a unique presentation of rhegmatogenous retinal detachment. It has received scant attention and has been missed by many clinicians (Jarrett, 1981) . The difficult manipulations during surgery (Siam, 1984), the stromy post operative course and the very high incidence of redetachment of the retina due to proliferative vitreoretinopathy (Schepens, 1983), did attract the attention of many retinal surgeons.

The hallmark of this syndrome is the extreme hypotony and the severe uveitis. The uveitis is the consequence of the retinal detachment and not its cause (Boke and Hubner, 1972)

The missing link between the rhegmatogenous retinal detachment and the incitement of the severe uveitis might be of immunological basis (Jarrett, 1981).

REVIEW OF LITERATURE

BASIC IMMUNE MECHANISMS

IMMUNITY :

It is the recognition and elimination of non-self materials. The result of the immune response is both recovery and an acquired specific memory. So, on re-exposure to the same specific antigen; there will be a more effective and a more rapid elemination.

(Roitt, 1980)

ANTIGEN :

It is a substance which can induce an immune response. The antigenicity is determined by one or more specific molecular groups on its structure known as antigenic determinants (Irvine, 1984).

MEDIATORS :

The immune response is mediated by humoral or cellular mechanisms. Among the humoral factors are the immunoglobulins secreted by the plasma cells. The cellular component is made up of lymphocytes (Irvine, 1984).

LYMPHOCYTES :

Stem cells originate in the bone marrow and

differentiate to form two main lymphocyte populations known as Thymus dependent (T) and Bursa dependent (B) lymphocytes.

The ability of the lymphocyte to mount a specific immune response is known as the clonal selection theory. **Its basic postulates are as follows** :

1. Lymphoid stem cells differentiate randomly to produce clones of lymphocytes, each of which is committed to respond to a single antigenic determinant.

2. Antigen binding to lymphocyte receptors triggers them to poliferate and differentiate into immunoglobulin producing cells, effector cells and memory cells.

3. The specificity of immunoglobulins produced by a lymphocyte clone is identical to that of its antigenic receptors.

(Tizard, 1984)

1. T-LYMPHOCYTES :

This group of lymphocytes need to pass through the thymus. There, they are acted upon or instructed by thymic hormones produced by the thymic epithelium (Goldstein, 1974).

On emerging from the thymus they are immunologically competent and become seeded in the paracortex of the peripheral lymph nodes and the perivascular regions of the white pulp of the spleen. They are capable of responding to antigens by specific receptors on the cell surface called T-cell antigen receptors (Tizard, 1984).

They can be identified by markers. The markers are surface proteins that mark different stages of maturation. These protein molecules mediate or augment specific T-cells functions, e.g. T.4 antigen is a marker of helper/inducer T-cells; while T.8 antigen is a marker of suppressor and cytotoxic T-cells (Haynes, 1987).

T-LYMPHOCYTES SUBSETS :

1. Effector Cells :

a) Cytotoxic T-cells; which exert a direct cytotoxic effect on the target cells.

b) Lymphokines producing T-cells, which respond mainly to fixed antigens as allografts rather than to circulating antigens. The lymphokines are regulatory glycoproteins released by the activated T-cells. They

have a wide range of biological activities. They attract and activate a wide variety of inflammatory cells as macrophages and eosinophils, (table 1). The lymphokines act only at close vicinity to the antigen. The reaction is then localized; even with granuloma formation around the antigen (Tizard, 1984).

2. Regulatory Cells :

a) Helper/inducer T-cells; which are essential for the effector cells activation and proliferation.

b) Suppressor T-cells which are negative regulators of the effector cells proliferation. The activity of the T-cells is restricted by the human leukocytic antigen (HLA) system (Irvine, 1984).

3. Memory Cells :

They are long lived T-cells. When they are further stimulated by the same specific antigen, there will be a more effective and a more rapid immunological reaction (Irvine , 1984).

ACTIVATION OF THE T-CELLS :

The antigen is processed by a special group of macrophages known as the dendritic cells or the Langerhan's cells. The processed antigen is then

Lymphokines

I. Mediators affecting macrophages
   a) migration inhibitory factor (MIF)
   b) macrophage arming factor (MAF)
   c) chemotactic factor
   d) antigen-dependent MIF

II. Mediators affecting neutrophilic leukocytes
   a) chemotactic factor
   b) leukocyte inhibitory factor (LIF)

III. Mediators affecting basophils
   a) chemotactic factor
   b) migration stimulation factor

IV. Mediators affecting eosinophils
   a) chemotactic factor

V. Mediators affecting lymphocytes
   a) mitogenic factors (LMF)
   b) helper factors
   c) suppressor factors

VI. Mediators affecting other cells
   a) cytotoxic factors
   b) growth inhibitory factors
   c) osteoclast activating factor

VII. Skin reaction factor

VIII. Transfer factor

IX. Interferon

X. Immunoglobulin

Table (1) :Showing the different types of lymphokines.

Adapted after Tizard, (1984).

presented on the macrophage surface in association with certain HLA system products to the specific T-effectors. With the help of the T-helpers, the selected clone of the T-effector will proliferate and subsequently arrive to the source of the antigen exerting their effects. (Tizard, 1984)

II. B-Lymphocytes :

This group of lymphocytes seems to be instructed by the liver and subsequently in the bone marrow. These structures in man are equivalent to the bursa of Fabricus in birds (Raff, 1973).

They form the cortical follicles of the lymph nodes and the periphery of the white pulp of the spleen. They are able to recognize antigens by immunoglobulins produced by the cell and bound into the surface membrane. The specificity ofthe immuncglobulin receptor being determined by the genetic programming of the individual clone of lymphocyte (Haynes, 1987).

They are identified in vitro by the immunoglobulins which are readily demonstrable on their surface by the use of special immunofluorescent technique (Roitt, 1980).

B-LYMPHOCYTES SUBSETS :

1. Effector Cells :

They are able to differentiate into plasma cells forming immunoglobulins specific to the antigen. There are two types of effector cells as regards the need of help of the T-helper cells :

i - B1 Lymphocytes which are dependent on the help of T-helper cells for the formation of immunoglobulins.

ii- B2 Lymphocytes which are T-independent cells and can form immunoglobulins without the help of T-helper cells.

(Playfair, 1982)

2. Memory Cells :

They are the cells with the best fitting receptors with the antigen. They are formed following the response of B1- Lymphocytes only. They are long lived cells (Playfair, 1982).

ACTIVATION OF THE B-CELLS :

The processed antigen is presented on the macrophage surface in association with certain HLA system products to the specific receptors on the surface of the B-cells. This is the clonal selection