HEPATITIS B VIRUS INFECTION

ESSAY

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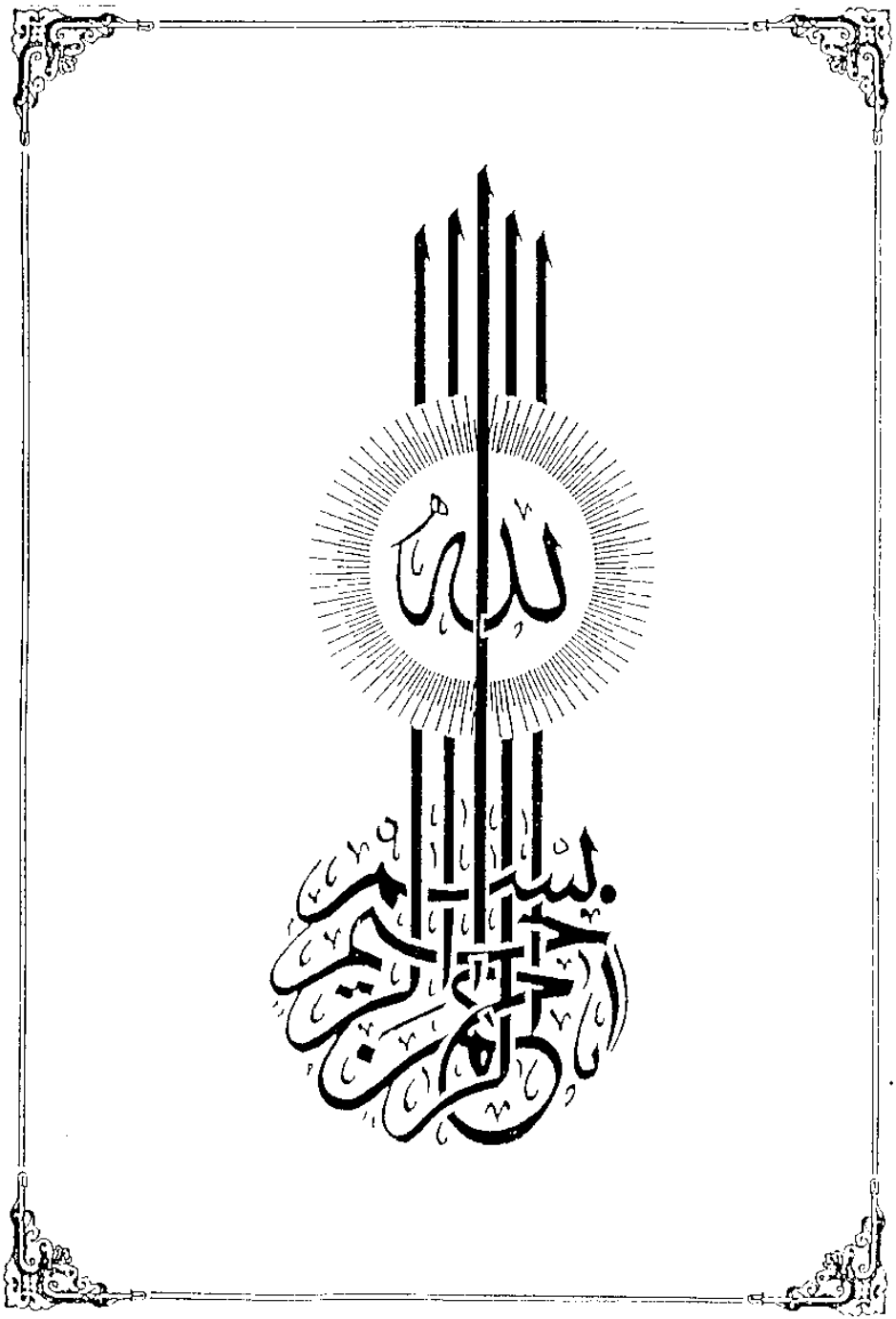
1994

To My Mother, My Father
and My Little Family

Abeer Osman El-khwas
June 1994



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LIST OF ABBREVIATIONS

AGD	: Agarose gel diffusion.
ALT	: Alanine aminotransferase.
anti-HBc	: Anti-Hepatitis B core (Antibody to hepatitis B core antigen).
anti-HBc IgG	: Immunoglobulin C antibody to hepatitis B core antigen.
anti-HBc IgM	: Immunoglobulin M antibody to hepatitis B core antigen.
anti-HBe	: Antibody to hepatitis B e antigen.
anit-HBs	: Antibody to hepatitis B surface antigen.
anti-HCV	: Antibody to hepatitis C virus.
AST	: Aspartate aminotransferase.
B.Fib.	: Bilharzial liver fibrosis.
CF	: Complement fixation.
EIA	: Enzyme immunoassay.
ELISA	: Enzyme linked immunosorbent assay.
HAA	: Hepatitis associated antigen.
HAV	: Hepatitis A virus.
HB	: Hepatitis B.
HBcAg	: Hepatitis B core antigen.
HBeAg	: Hepatitis B e antigen.
HBIG	: Hepatitis B immunoglobulin.
HBIgG	: Hepatitis B immunoglobulin G.

HBsAg	: Hepatitis B surface antigen.
HBV	: Hepatitis B virus.
HBV-DNA	: Hepatitis B virus-deoxyribonucleic acid.
HCC	: Hepatocellular carcinoma.
HCV	: Hepatitis C virus.
HDAg	: Hepatitis delta antigen.
HDV	: Hepatitis D virus.
HEV	: Hepatitis E virus.
HIV	: Human immunodeficiency virus.
HLI	: Human leukocyte alpha interferon.
W.H.O.	: World Health Organization.

LIST OF TABLES

Table No. **Page**

LIST OF FIGURES

Fig. No. **Page**

CONTENTS

INTRODUCTION AND AIM OF THE ESSAY

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Viral Hepatitis is a major health problem in all parts of the world. The term viral hepatitis refers to a primary infection of the liver caused by at least five etiologically and immunologically distinct viruses : Hepatitis A, Hepatitis B, Hepatitis C, Hepatitis D and Hepatitis E. However, new types of hepatitis viruses have been discovered. *(Krugman, et al., 1992).*

There is an estimated 300 million Hepatitis B carriers in the world. In some parts of the Middle East 14% of the population may be carriers and in some parts of Africa up to 39% of the population may be carriers. *(Sherlock, and Dooley 1992).*

More than 2 million people die every year from hepatitis B infection either as the result of cirrhosis or liver cancer *(Lee, 1991).*

Hepatitis B virus infection may predispose to the progression of Egyptian endemic hepatosplenomegaly *(Zakaria. 1988).*

The objective of this essay is to write a review about the subject which will include :

* Properties of Hepatitis B virus.
* Pathogenesis of Hepatitis B virus infection.
* Clinical picture, Course and Prognosis of Hepatitis B virus infection.
* Diagnosis of Hepatitis B Virus infection.
* Epidemiology of Hepatitis B Virus infection.
* Prevention of Hepatitis B Virus infection.
* Treatment of Hepatitis B Virus infection.

PROPERTIES OF HEPATITIS B VIRUS

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Hepatitis B virus is a DNA virus belonging to the hepadna viridae family *(Robinsom, et al., 1988).*

Under the electron microscope, three types of particles can be seen in hepatitis B positive serum: Small spheres, tubules and large complex Dane particles. The Dane particles is the complete hepatitis B virus. It is spherical and has a diameter of approximately 42nm. It is enclosed in an outer envelop of 8nm. in width, which is composed of protein, lipid and carbohydrate. It has on its surface the HBs Ag with a characterestic mosiac appearance *(Sherlock, 1989).*

Inside the surface coat of Dane particles is the internal core. It is a 27nm. electron dense hexagonal structure. It contains the core antigen (HBc Ag), the DNA-polymerase and e antigen *(HBe Ag) (Locarnine & Gust, 1988 and Sherlock, 1989).*

The Dane structure of the genome has been characterized and shown to be double stranded and circular. A single stranded gap is present which is repaired by the DNA polymerase.

The hepatocyte nucleus is the site of core formation, whereas the surface antigen and its related particles are produced in the cytoplasm *(Zuckerman, 1988).*

The other two forms are the excess surface viral proteins. *(Dane et al., 1970, and Sherlock 1989).*
The first is small spherical particles, heterogenous in size and appearance. It is about 22nm and the second is filamentous or rod-shaped particles approximately 22 nm wide and up to several hundreds nanometers in length. No nucleic acid has been found in them and they are considered to be incomplete viral envelope particles. *(Sherlock, 1989).*

The HBV has four known viral genomes coding for its proteins. These genes include gene (S) for HBs Ag, gene (C) for HBc-Ag, large gene (P) for hepatitis B virus particle associated DNA polymerase and the gene (X) whose protein HBx Ag and function have not yet been clearly identified *(Di Biscaglie et al., 1988).*

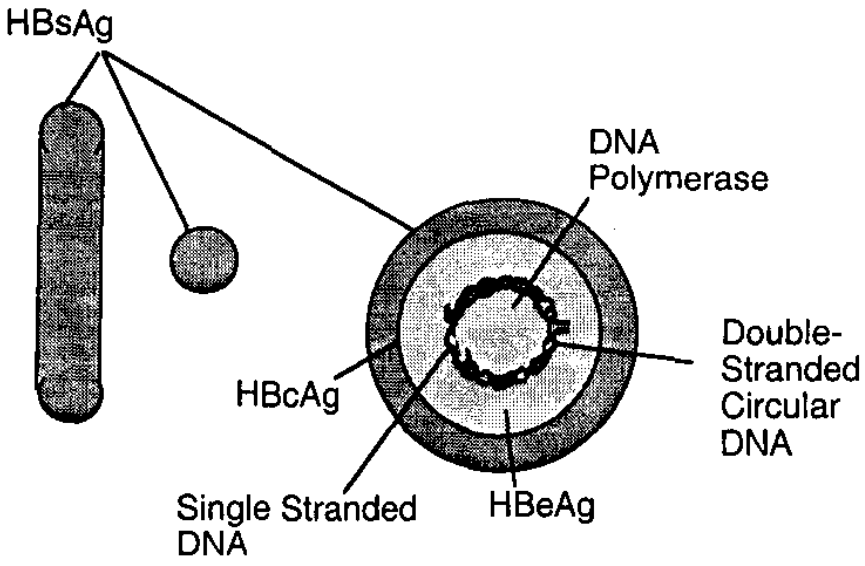

Fig. 1 : Schematic illustration of the hepatitis B virus and its antigens : hepatitis B surface antigen (HBsAg), hepatitis B core antigen (HBcAg), and hepatitis B e antigen (HBeAg). *(Krugman,1992).*