BIOCHEMICAL & SEROLOGICAL STUDIES ON RATS INFECTED BY RIFT VALLEY FEVER VIRUS

THESIS

PRESENTED FOR THE (M.Sc.) DEGREE IN

(BIOCHEMISTRY)

B y

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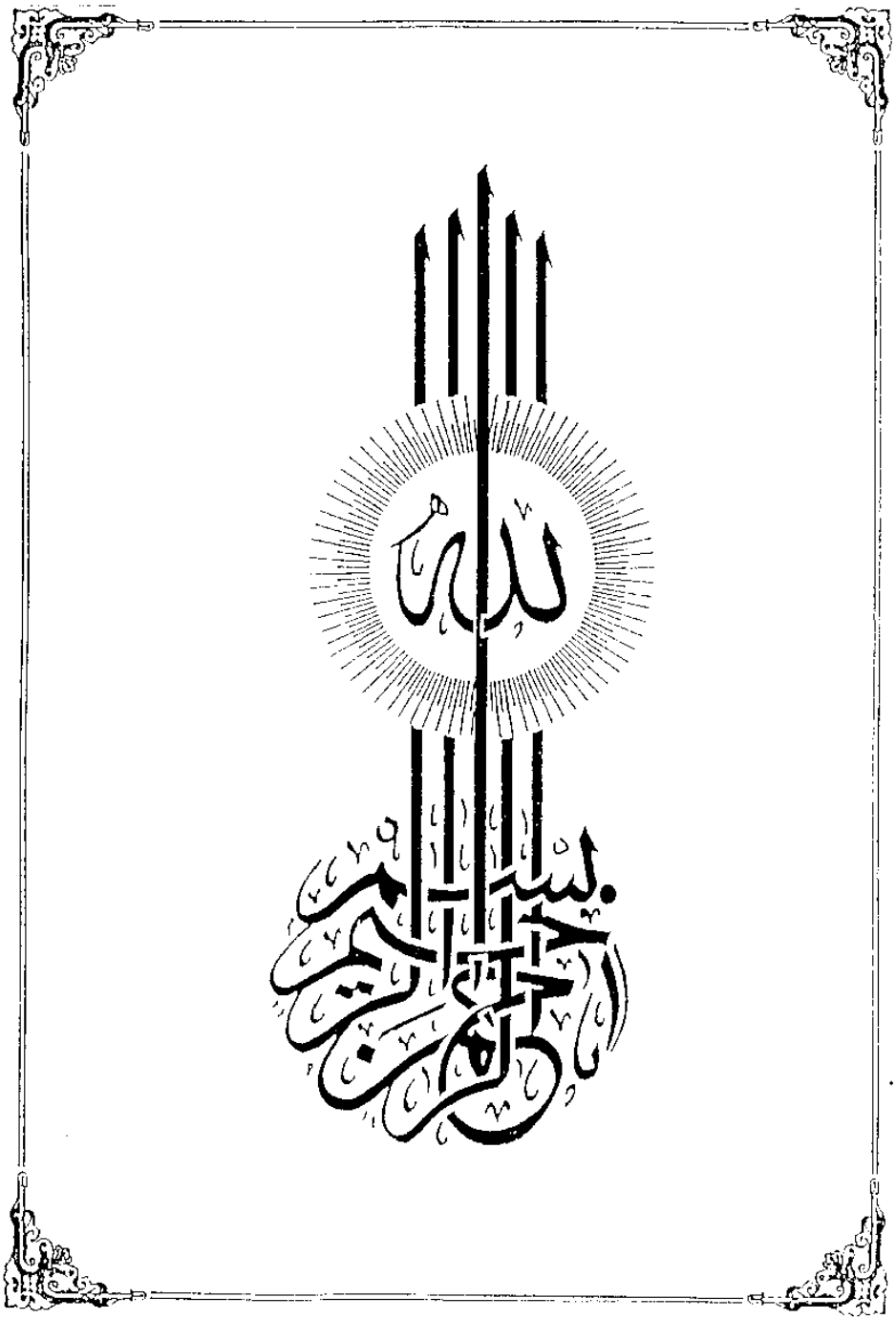
To My Parents



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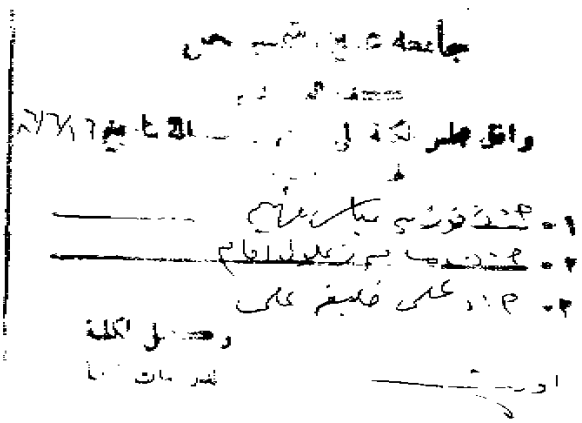

CONTENTS

LIST OF ABBREVIATIONS

199,E	= Eagle's,199.
A.C.D.	= Acid citrte dextrose.
A/G	= Albumin-globulin ratio.
AGPT	= Agar gel precipitation test.
Ag	= Antigen.
BHK	= Baby hamster Kidney.
BS	= Borate saline.
BABS	= Bovine albumin-borate solution.
CER	= Chicken emberyo fibroblast-hamster kidney
CF	= Complement fixation.
CF-Ag	= Complement fixation-antigen.
CFT	= Complement fixation test.
CPE	= Cytopathic effect.
D.G.V.	= Dextrose gelatine veronal.
ELISA	= Enzyme linked immuno sorbent assay.
FRhL-2	= Fetal rhesus monkey lung, also called DBS-103.
gm	= Gram.
HA	= Haemagglutination.
H-Ag	= Haemagglutination - antigen
HI	= Haemagglutination - inhibition.
HIT	= Haemagglutination inhibition test
hrs	= Hours.
IgG	= Immunoglobulin-G.

IF	= Immunofluorescence.
I.U	= International unit.
I.C	= Intracerebrally
I.P	= Intraperitoneally.
I.V.	= Intraveneously.
Kd	= Kilodalton.
L	= Large.
Ib	= Pound.
Ib/in^2	= Pound per inch.(square)
LD_{50}	= Lethal dose 50%.
m	= Medium
Md	= Megadalton.
ml	= Milliliter.
m-RNA	= messanger-ribo-nucleic aicd.
$MICLD_{50}$	= Mice intracerebral lethal dose 50%.
$MIPLD_{50}$	= Mice intraperitoneal lethal dose 50%
MNT	= Microneutralization test.
µg	= Microgram.
mM	= Millimicrone.
O.D.	= Optical density.
NT	= Neutralization test.
PBS	= Phosphate buffer saline.
PFU	= Plaque forming unit.
PRN	= Plaque-reduction neutralization

PAGE	= Poly-acrylamide gel electrophoresis.
Q.S	= Quantum sufficit.
RIPLD$_{50}$	=Rat intraperitoneal lethal dose 50%.
RBC's	= Red blood corpuscles (Erythrocytes).
RNA	= Ribo-nucleic acid.
RVF	= Rift Valley fever.
rpm	= Revolution per minute.
S	= Small.
SNT	= Serum neutralization test.
S.C	= Subcutaneous.
TCID$_{50}$	= Tissue culture infected dose 50%.
U.S.A.	= United State of American.
VAD	= Adjusting diluent.
Vero	= African green monky kidney.
ZH-501	= Zagazig-human-501.

Introduction

INTRODUCTION

Rift Valley fever (RVF) is an acute viral disease infecting sheep and many other animal species, and transmitted to humans.

The disease was first described by Daubney et al. (1931), in Kenya where many epizootics occurred starting from 1913 with heavy losses in lambs and abortions in pregnant ewes.

RVF is confined to the African continent. Accidental Laboratory Infections have occurred in human beings in the United States, England and Japan but there have been no outbreaks of the disease in animals kept on a farm in those countries or other countries outside Africa.

Findlay et al. (1936), reported finding RVF antibodies in serum collected from human beings in several areas of Central Africa. The positive samples came from Uganda, Sudan, French West Africa and Middle Congo and Gabon. None of a 154 samples of serum from Gambia, Nigeria, Sierra, Leone, Liberia and the Gold Coast was positive.

Smithburn et al. (1948), isolated RVF virus from

6 lots of mosquitoes caught in the uninhabited semliki-forest in Western Uganda in 1944. They stated that, the isolation of the virus from 6 lots of mosquitoes over a period of 39 days was evidence of viral activity in epidermic proportions. If there was an epidemic, human beings, sheep, and cattle were involved as the area was uninhabited. RVF antibodies were not found in the serum of mosquito catchers and residents of the near by semlikiplain.

Subsequently RVF appeared in the Union of South Africa in the summer of (1950-1951). Schulz (1951), reported that the first tangible evidence of the disease in South Africa was late in the year 1950. A positive diagnosis was made in 1951, during the same year it was known that the disease had spread through the pan-veld region of the Western Orange Free State, the north Western Cape province, and the South Western Transvaal (Gear, 1951).

In 1953 another out break of the disease was reported in the Luck of district of the Orange Free State, an area not involved in the epizootic of 1951 (Van der Linde, 1953; Gear et al., 1955), how and where the infections were maintained was not yet determined.

Weiss (1957), reported that outbreaks were also observed in South West Africa in 1955 and in the Orange Free State in 1956.

Pellissier and Rousselot (1954), found RVF antibodies in the serum of subhuman primates from the Middle Congo region of French Equatorial Africa.

Kokernot et al. (1956), and Smithburn et al. (1959), reported the presence of neutralizing antibodies in human beings and animal in the Union of South Africa.

Scott et al. (1956), reported the prevalence of RVF in cattle in Kenya.

Shone (1958), described the first isolation of the virus in Southern Rhodesia. He reported it to be important as a cause of bovine abortions and considered that brain tissue from an aborted fetus was superior to liver tissue for the isolation of virus.

Weinbren (1958, 1959), reported RVF antibodies in man in East Africa.

Williams et al. (1960), reported an outbreak of the disease near Entebbe (Uganda).

Kokernot et al. (1961), detected neutralizing antibodies in quadrupeds in Tongoland.

Scott (1963), found antibodies in camels in Kenya.

Van Velden et al. (1977), in South Africa, another epidemic was reported in 1975 with many human cases.

It was reported by WHO (1978), that two weekly epidemiological records of RVF outbreaks affecting mainly sheep, cattle and goats with a high mortality rates in lambs were reported in Sudan (1973) in the White Nile area, South of Khartoum, and the other (1976) in the Khartoum area with some human cases.

The virus was shown to resemble the proposed phlebo-virus genus in its structural protein and RNA composition (Bishop & Shope, 1979, and Rice et al.,1980). Finally, Shope et al. (1980), discovered the cross reaction between RVF and other phleboviruses.

RVF is not well known in the biomedical community of America and Europe, but represents a real threat of these regions, and only laboratory workers infection was reported in England, United States and Japan, because RVF is one of the most infections viral agents. But it is a major public and veterinary health problem in the African continent.