

309

IMMUNE RESPONSE TO NONIDET P-40 EXTRACTED
INFECTIOUS BOVINE RHINOTRACHEITIS VIRUS ANTIGEN IN RABBITS

by

BOONDEE ATIKIJ

B.S., Mahidol University, Thailand, 1977

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Division of Biology

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1980

Approved by:


Major Professor

LD
2.668
.T4
1980
A84
c.2

DEDICATION

To all rabbits who have sacrificed
and contributed so much during the
course of this investigation.

TABLE OF CONTENTS

| | Page |
|---|------|
| ACKNOWLEDGEMENT | ii |
| INTRODUCTION | 1 |
| REVIEW OF LITERATURE | 5 |
| MATERIALS AND METHODS | 27 |
| RESULTS | 39 |
| DISCUSSION | 45 |
| FIGURES AND TABLES | 56 |
| DETAILED METHODOLOGY AND REAGENTS | 73 |
| REFERENCES | 82 |

ACKNOWLEDGEMENT

I would like to express my sincere appreciation to Dr. H. C. Minocha, my major advisor, for his understanding, encouragement and invaluable assistance throughout the course of this study. Appreciation is also extended to Dr. R. A. Consigli and Dr. J. Iandolo, committee members, for their helpful suggestion and reviewing the manuscript. Thanks are due to Dr. E. H. Coles for providing laboratory facilities in the Department of Laboratory Medicine. The technical assistance of Mrs. Patricia L. Oetinger is also appreciated.

INTRODUCTION

INTRODUCTION

Infectious bovine rhinotracheitis (IBR), herpes virus infection in cattle, causes an economic loss of over 200 million dollars every year to cattle industry in the United States. The consequence of IBR virus infection ranges from mild inapparent to adverse clinical manifestations known primarily as respiratory and reproductive forms of the disease (Wilson, 1974; Owen et al., 1964; Madin, 1956). The virus may occur as latent infection in animals and may be reactivated due to physiological and environmental stresses (Kahrs, 1977; Dennett et al., 1976; Sheffy and Rodman, 1973; McKercher, 1968). The ease of transmission, latent nature and ill-defined immune response of this virus make it to be widely distributed among most cattle populations and difficult to be controlled (Lomba et al., 1975; Brunner, 1973; Timoney, 1971, Grieg, 1965).

Both humoral and cell mediated immune (CMI) responses are required for resistance and recovery of IBR virus infection (Johnson and Muscoplat, 1977; Rouse and Babiuk, 1975, 1974). However, recent evidence indicates that cell mediated immune response plays a prominent role in the recovery process (Rouse and Babiuk, 1977, 1975, 1974; Notkins, 1974). Corticosteroids which have been shown to suppress cell mediated immune response (Muscoplat and Shope, 1975; Davies and Carmichael, 1972) and enhance the IBR virus replication (Hall

and Minocha, 1977) are capable of reactivation and recrudescence of the virus (Davies and Duncan, 1973). Interferon, released from cells exposed to the virus has been suggested to be one of the important factors in controlling IBR virus infection (Fulton, 1978; Babiuk and Rouse, 1976; Todd, 1972).

The control of IBR virus infection is primarily based on hygiene, management and vaccination. Adequate immune response with minimum undesirable post vaccinal effects is an important criteria for evaluation of a vaccine. Modified live vaccines (MLV), though providing protection against the disease (Saunders et al., 1972; McKercher, 1971), may produce abortion (Kelling, 1973) and latent infection in vaccinated animals (Casselberry, 1972; Searl, 1971). Administrations of intranasal live vaccines have been reported to provide sufficient protection in cattle without causing abortion (Todd, 1976, 1975, 1972, 1971); however, the problems regarding the latent nature of the virus, post vaccinal reactions and the difficulty of vaccine administration still exist (Kahrs, 1977).

The inactivated vaccines, on the other hand, overcome the concern about post vaccinal undesirable effects and latent infection. However, the efficacy of the inactivated vaccines is controversial, although investigators have reported adequate protection against IBR virus infection in cattle (Haralambiev, 1976; Karadjov, 1976; Judhasz, 1972; Zusccheck and Chow, 1961).

The presence of cell mediated immune response and interferon in vaccinated animals are important criteria for evaluating the efficacy of IBR virus vaccine. However, no serious attempt has yet been made in this regard. The objectives of this investigation are to (1) compare the humoral, cell mediated immune responses and lymphocyte interferon production in rabbits injected with either live or Nonidet P-40 (NP-40) inactivated IBR vaccines and (2) characterize and study the properties of lymphocyte interferon.

REVIEW OF LITERATURE