

**THE EFFECT OF Theileria INFECTION ON THE  
IMMUNE RESPONSES OF CATTLE TO  
RINDERPEST VACCINE \***

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**SUMMARY**

Immune responses to rinderpest virus vaccine were studied in 25 calves (3-months old) naturally infected with Theileria and non-infected 25 calves (3-months old) as control group. The immune responses to rinderpest virus vaccine before vaccination and 21 days post-vaccination were examined by serum neutralization test on tissue culture. The results indicated that calves affected with theileriasis showed diminished level of antibodies after 21 days post-vaccination with rinderpest virus vaccine in comparisons with those of the Theileria non-infected calves.

**INTRODUCTION**

Protozoal infection can suppress the immunological responses of cattle to different bacterial and viral vaccines. Scott et al.,1977 demonstrated that bovine trypanosomiasis causes immunosuppression of Foot and Mouth Disease and Clostridial Vaccines. Whereas Rurangimre et al., 1980 showed that Trypanosoma congolense and Trypanosoma vivax infection in

calves were 32, 64 and 128. Table No. 1 shows the levels of serum neutralization (SN) antibodies to rinderpest virus in Theileria - infected calves, and non-infected calves before vaccination and 21 days post-vaccination.

**Table No. 1 : The levels of AB titers to rinderpest vaccine in Theileria - infected and non - infected before vaccination and 21 days post-vaccination.**

Theileria - infected			Non - infected		
Animal	SN Ab before vaccination	SN Ab after vaccination	Animal	SN Ab before vaccination	SN Ab after vaccination
1	Less 4	16	1	Less 4	32
2	"	64	2	"	32
3	"	32	3	"	64
4	"	64	4	"	64
5	"	16	5	"	32
6	"	64	6	"	32
7	"	32	7	"	128
8	"	64	8	"	32
9	"	16	9	"	32
10	"	16	10	"	32
11	"	16	11	"	64
12	"	32	12	"	128
13	"	32	13	"	32
14	"	64	14	"	32
15	"	32	15	"	64
16	"	16	16	"	64
17	"	16	17	"	32
18	"	64	18	"	32
19	"	32	19	"	128
20	"	64	20	"	32
21	"	32	21	"	32
22	"	64	22	"	32
23	"	16	23	"	64
24	"	64	24	"	32
25	"	16	25	"	64

100 TCID<sub>50</sub> of cell culture adopted Kebe " O " strain of rinderpest virus was used.

cattle causes suppression of humoral antibodies to rinderpest vaccines. Wagner et al.,1975 demonstrated diminished rinderpest neutralizing antibody responses in cattle suffered from East Coast Fever. Sharp & Langley,1983 proved that also Theileria annulata causes lower antibody response to foot and mouth disease vaccine.

This study deals with a field investigation on the effect of natural Theileria infection of calves on the development of immune response to rinderpest virus vaccine.

## MATERIALS AND METHODS

Experimental group : This group includes 25 calves 3-months old (Friesian breed) selected at Al-Futhailia East of Baghdad suffered from theileriasis. The clinical symptoms were recorded and the disease confirmed by microscopic recognition of schizonts in lymph gland biopsy smears and intra-erythrocytic parasite in their blood smears as described by Cole's, 1985. These animals were treated with oxytetracycline at a dose 10 mg / kg body weight for 3-days, after that blood samples were collected and sera separated and stored at -20 °C for subsequent rinderpest serum neutralization assay. Each calf was vaccinated with rinderpest vaccine produced by Vet. Research and Vaccine Production Institute, Abu-Gharaib, Baghdad. After three weeks post-vaccination blood samples were collected and sera separated and stored at -20 °C for subsequent rinderpest serum neutralization assay.

Control group : This group included 25 calves 3-months old (Friesian breed) from Al-Khalis dairy cattle station and all were free from Theileria infection. This was confirmed by microscopic examination of lymph gland biopsy and blood smears as described by Cole's, 1985. Blood samples were collected and sera separated and stored at -20 °C for subsequent rinderpest serum neutralization assay. All these calves were vaccinated with

rinderpest vaccine from the same batch used in the experimental group.

After three weeks blood samples were collected and sera separated, stored at  $-20^{\circ}\text{C}$  for subsequent rinderpest serum neutralization assay.

Serological tests : All sera used in this study were collected and stored at  $-20^{\circ}\text{C}$  till use.

Micro-neutralization tests were performed on all sera at one time by using fixed 100 TCID<sub>50</sub> of Kabete " O " rinderpest vaccine virus against doubling dilution of the tested sera. Calf kidney cell cultures were used in this test and prepared according to Al-Majidi,1988. Reference rinderpest antiserum \* was used in this test as a control positive serum to compare with the tested sera. The neutralization tests of rinderpest antibody activity were carried out as described by Rossiter & Jessette,1982.

## RESULTS

Clinical Examination : All experimental group showed fever  $41-42^{\circ}\text{C}$ , depression, anorexia, pale mucous membranes, lymphadenopathy and Lacrimation with marked increase in both rates of pulse and respiration in comparison with those of the control group, the appetite of the calves were returned gradually during the course of the treatment with oxytetracycline. All control group calves having normal appetite, temperature and lymph nodes.

Response to rinderpest vaccine : The antibody titers after 3-weeks from vaccination with rinderpest vaccine in the experimental calves were 16, 32 and 62 while those of the control

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\* Vet. Research and Vaccine Production Institute,  
Abu Ghriab, Baghdad.

## DISCUSSION

Rinderpest is highly contagious disease which causes severe economical losses with mortality rate 90 - 100 % in susceptible animals. (FAO,1970). Vaccination of cattle against the disease is considered one of the main methods for control of the disease. F.A.O.,1985b. Since the last outbreak of the disease reported by Al-Banna et al.,1986, the disease threatens the cattle population due to different foci of infection appear in different regions of Iraq.

The previous studies about the interference of protozoal infections with vaccination programmes reported by Wagner et al.,1975 on the diminished levels of antibody in vaccinated cattle against rinderpest disease suffered from Theileria parva and Sharp & Langley,1988 on the decrease of the levels of antibody in vaccinated cattle against foot and mouth disease suffered from Theileria annulata encouraged us to study the effect of bovine theileriasis on the immune responses against rinderpest disease. The results of the clinical findings of the experimental group showed increases in the levels of temperature, pulse and respiration and after treatment with oxytetracycline 10 mg/kg body weight they were returned gradually to normal situation. These results were similar to those findings reported previously by Yousif,1969, Erturk et al.,1976, Barnett, 1977. The levels of antibody was estimated after 3 weeks because the peak of humeral response occur at that time Scott et al.,1989. The titers of antibodies recorded in the experimental group were 16, 32 and 64 with average 37.76 while the levels of antibody in control group were 32, 64 and 128 with average 52.48. The result showed marked decrease in the levels of antibody in the experimental group in comparison with the control group. This decrease in the levels of antibody indicated that the suppression of rinderpest neutralizing antibody responses occurs in calves suffered from theileriasis.

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## تأثير الخمج بطفيلي التايلريا على الاستجابة المناعية للقاح الطاعون البقري في العجول

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### الخلاصة

درست الاستجابة المناعية للقاح الطاعون البقري في 25 عجلا بعمر ثلاثة شهور مخمجة طبيعيا بطفيلي التايلريا و 25 عجلا بنفس العمر المذكور غير مخمجة بالتايلريا كمجموعة سيطرة. لقد تم قياس مستوى الضدات المصلية للقاح الطاعون البقري في المجموعتين المخمجة وغير المخمجة قبل التلقيح وبعد 21 يوما من التلقيح بواسطة اختبار التعادل المصلي على الزرع النسيجي. أظهرت النتائج ان هناك انخفاضاً في مستوى الضدات في العجول المخمجة بطفيلي التايلريا بعد 21 يوما من اعطاء اللقاح مقارنة مع المجموعة غير المخمجة.