

Effect of Ciprofloxacin on Humoral Immune Response of Broiler Chicks

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Abstract: Ciprofloxacin was orally administered at 1.25, 2.5, 5 and 10 mg kg⁻¹ body weight doses to different groups of broiler chicks on day 7, 8, 9, 28, 29 and 30 after the priming and booster inoculation with Ranikhet-La Sota and Sheep Red Blood Cells (SRBC) on day 7 and day 28. Haemagglutination Inhibition antibody titre against La Sota antigen and Haemagglutinin antibody titre against SRBC were observed. Ciprofloxacin in all dose levels tested showed significant reduction in antibody titre against SRBC : but did not produce any significant effect against Ranikhet-La Sota antigen.

Key words: Ciprofloxacin, humoral immune response, broilers

INTRODUCTION

The fluoroquinolone group of antimicrobial compounds are used in broilers to counteract certain infections. Though their usage is mainly intended for their antimicrobial action, they also influence the complex entities of the immune system. Earlier studies have proved that quinolones in general produce immunosuppression (Jimenez-valera, 1995). Since the use of this group of compound is increasing day by day, further investigation on the effect of these compounds on immune system would be of great use. In this context, Ciprofloxacin, one of the important members of this group was chosen for the study with a view to know its effect on humoral immune response in broilers.

MATERIALS AND METHODS

Day old sexed male broiler chicks of 'cobb' strain were randomly divided into groups of six chicks each. The chicks were leg banded and reared in three-tier individual cages (12"x12"x18") and reared for 8 weeks. Feed and water were provided individually ad libitum under standard managemental conditions. The broilers were fed with standard broiler starter mash and finisher mash from 0-4 weeks and 5-8 weeks, respectively.

Ciprofloxacin was orally administered at 1.25, 2.5, 5 and 10 mg kg⁻¹ body weight doses to different groups of broiler chicks on day 7, 8, 9, 28, 29 and 30 after the priming and booster inoculation with Ranikhet-La Sota and Sheep Red Blood Cells (SRBC) on day 7 and day 28.

Haemagglutination Inhibition antibody titre against La Sota and Haemagglutinin antibody titre against SRBC were observed. For estimation of Haemagglutination inhibition titre against Ranikhet La Sota antigen, microdilution technique, as described by Giamborne (1982) using "V" bottom microplates was followed. For estimation of Haemagglutination antibody titer against Sheep Red Blood Cells, the method described by Van Der Zipp *et al* (1983) was followed.

Antigens used: La Sota: Ranikhet Disease virus – La Sota Strain was used to produce antibodies against Ranikhet disease virus.

Sheep red blood cells: The Sheep Red Blood Cells (SRBC) were obtained from six Mecheri sheep and washed three times in physiological saline solution and then packed. The 0.25 mL of packed SRBC mixed with 0.75mL of physiological saline was used as antigen. This antigen was injected intramuscularly 0.5mL each in both the thighs of the bird.

RESULTS AND DISCUSSION

Ciprofloxacin treated group did not show any appreciable change in the antibody titer against Ranikhet-La Sota antigen when compared with the control group (Table 1). In the experiment conducted, all the dose levels tested were near the therapeutic dose level of Ciprofloxacin in poultry. It could be said that at these dose levels Ciprofloxacin did not have much influence on the antibody response against Ranikhet-La Sota antigen.

Table 1: Effect of ciprofloxacin on HI titre(log₂) against La sota antigen in broilers

Dose of ciprofloxacin (mg kg ⁻¹ bw)	HI titre							
	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42	Day 49	Day 56
Control	1.09 + 0.13	2.10 + 0.43	1.62 + 0.15	0.60 + 0.28	2.45 + 0.06	2.21 + 0.31	2.17 + 0.28	1.32 + 0.16
1.25	1.03 + 0.24	2.21 + 0.07	2.28 + 0.15	1.70 + 0.25	2.45 + 0.06	2.24 + 0.14	1.84 + 0.13	0.67 + 0.21
2.5	0.76 + 0.26	2.09 + 0.12	2.14 + 0.12	1.86 + 0.09	2.35 + 0.09	2.21 + 0.07	1.98 + 0.10	0.86+0.29
5.0	1.12 + 0.25	2.04 + 0.11	2.14 + 0.12	1.76 + 0.17	2.41 + 0.05	2.09 + 0.12	1.93 + 0.07	1.29+0.13
10.0	1.12 + 0.25	2.11 + 0.07	2.49 + 0.05	2.41 + 0.05	2.61 + 0.07	2.41 + 0.05	2.11 + 0.07	1.12+0.25

Table 2: Effect of Ciprofloxacin on Haemagglutinin antibody titre (log₂) against SRBC in broilers

Dose of Ciprofloxacin (mg kg ⁻¹ bw)	Haemagglutinin antibody titre							
	Day 7	Day 14	Day 21	Day 28	Day 35	Day 42	Day 49	Day 56
Control	0.00 + 0.00	2.60 + 0.10	1.55 + 0.36	0.00 + 0.00	2.40 + 0.09	1.26 + 0.40	0.00 + 0.00	0.00 + 0.00
1.25	0.00 + 0.00	2.10 + 0.28	1.05 + 0.40	0.43 + 0.28	2.04 + 0.11	0.93 + 0.21	0.17 + 0.17	0.00 + 0.00
2.5	0.00 + 0.00	1.97 + 0.14	0.93 + 0.33	0.60 + 0.28	0.86 + 0.39	0.17 + 0.17	0.00 + 0.00	0.00 + 0.00
5.0	0.00 + 0.00	2.51 + 0.34	0.60 + 0.20	0.43 + 0.34	1.63 + 0.64	0.93 + 0.39	0.17 + 0.19	0.00 + 0.00
10.0	0.00 + 0.00	1.61 + 0.17	0.00 + 0.00	0.00 + 0.00	1.55 + 0.13	0.00 + 0.00	0.00 + 0.00	0.00 + 0.00

On the contrary, Ciprofloxacin produced immunosuppression in the antibody response against Sheep Red Blood Cells (Table 2). These findings are in accordance with the immunosuppressive action of Ciprofloxacin reported earlier (Jimenez-valera, 1995; Tawfik *et al.*, 1990).

The results of the experiment are indicative of the fact that immunosuppression was observed in all the doses tested when Sheep Red Blood cells were used: But this response was not observed against Ranikhet La Sota antigen. This might be due to the reason that Sheep Red Blood cell is relatively an unnatural antigen to poultry as compared to Ranikhet La Sota antigen which is very frequently used in routine managerial practice.

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