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CHARACTERISATION OF NEWCASTLE DISEASE VIRUSES OBTAINED FROM OUTBREAKS IN TAMIL NADU*

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ABSTRACT

Thirteen Newcastle disease virus (NDV) isolates were characterised based on mean death time (MDT) and intracerebral pathogenicity index (ICPI). Twelve NDV isolates were obtained from outbreaks among chickens of various age groups in different parts of Tamil Nadu. Ten NDV isolates were velogenic and three were mesogenic based on both MDT and ICPI. One isolate was placed under group D based on binding pattern with monoclonal antibodies (mAbs). The local challenge virus was found to be velogenic and placed under group C_1 based on reactions, with mAbs.

INTRODUCTION

The diagnosis of Newcastle disease (ND) is not always straight forward. Several other disease condition simulate ND. Isolation and identification of Newcastle disease virus (NDV) from an outbreak is not sufficient, for the diagnosis of disease since live vaccines are widely used in the field. Thus, full and accurate diagnosis of ND almost always involves the isolation and characterisation of the virus (Alexander, 1988). This paper described the isolation and characterisation of NDV isolates obtained from outbreaks among chickens in different parts of Tamil Nadu, India.

MATERIALS AND METHODS

Samples

Materials were collected for virus isolation during the year 1992-1994 from the suspected outbreaks on ND in chickens in different parts of Tamil Nadu, India as shown in Table 1. But isolate No. 35 was a local virulent stain of NDV usually used for challenge experiments. The isolate was obtained from the Institute of Veterinary Preventive Medicine (IVPM), Ranipet, India. Materials collected for virus isolation include brain, proventriculus, spleen and intestinal contents.

Antiserum

Antiserum against NDV was produced in six weeks old specific antibody negative (SAN) chickens following the description of Allan *et al.* (1978).

Virus Isolation

Twenty per-cent (w/v) suspensions of tissue materials in phosphate buffered saline (PBS) containing 10,000 Unit Penicillin/ml, 10mg streptomycin/ and 250 µg gentamycin/ml was prepared as described (Alexander, 1988).

Virus isolation in ten days old embryonated hens eggs was done as described (Alexander, 1988).

Haemagglutination (HA) and Haemagglutination Inhibition (HI) Test

HA and HI test for the identification of NDV isolates was done as described (Alaxander, 1988).

Pathogenicity tests

Mean death time (MDT) in ten days old embryonated hens eggs and intracerebral Pathogenicity index (ICPI) in day old chicks were carried out as described (Alaxander, 1988).

Monoclonal Antibody (mAb) Typing

mAb typing of the isolates was done at the Avian Virology, Central Veterinary Laboratory, U.K.

RESULTS AND DISCUSSION

Inoculated embryos died after 24 hours were considered for the harvest of allantoic fluid (AF). AF collected from the embryos following infection with all the 13 isolates were haemagglutinating. The isolates were confirmed as NDV by inhibiting the haemagglutinating activity using the NDV specific antiserum in HI test.

Out of 13 NDV isolates, MDT was less than 60

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Table 1.Characteristics of New castle disease virus isolates obtained from outbreaks in Tamil Nadu

S.No.	Isolate No.	Area	Age of chickens(weeks)	MDT(h)	ICPI	Remarks
1.	45	Namakkal	7	28	1.5	Velogenic
2.	39	Namakkal	13	58	1.6	Velogenic
3.	37	Namakkal	12	40	1.8	Velogenic
4.	36	Namakkal	9	40	1.8	Velogenic
5.	53	Namakkal	4	90	1.08	Mesogenic
6.	606	Namakkal	6	90	0.8	Mesogenic
7.	610	Namakkal	2	48	1.6	Velogenic
8.	584	Namakkal	5	60	2.0	Velogenic
9.	27	Namakkal	36	42	1.81	Velogenic
10.	28	Namakkal	64	42	1.82	Velogenic
11.	25	Dharmapuri	6	90	0.6	Mesogenic
12.	26*	Trichy	5	48	1.71	Velogenic
13.	35*	local challenge strain (IVPM)	-	48	1.80	Velogenic

*Isolate Nos. 26 and 35 were grouped under D and C1, respectively based on binding pattern with monoclonal antibodies.

hours for 10 isolates and more than 60 hours but less than 96 hours for another three isolates. ICPI was more than 1.5 for 10 isolates and more than 0.25 but less than 1.5 for the remaining three isolates (Table 1).

Out of 13 NDV isolated only isolate Nos. 26 and 35 were subjected to mAb typing. Isolate No. 26 was grouped under D and the isolate No. 35 was grouped under C1 (Table 1).

NDV isolates were obtained from chickens of different age groups (Table-1). In this study majority isolates of NDV were obtained from Namakkal, the Poultry Town of India. Out of 12 NDV isolates collected from the field outbreaks 9 were velogenic and 3 were mesogenic based on both MDT and ICPI. It was reported that velogenic isolates showed MDT of less than 60 hours and ICPI of more than 1.5, whereas mesogenic strains showed MDT between 60-90 hours and ICPI between 0.25 to 1.5 (Hanson and Brandly, 1955; Hanson, 1956; Allan, 1974; Alexander, 1988). In the present study mesogenic isolates were obtained from chickens of 4-6 weeks age and this finding is in full agreement with the earlier reports that mesogenic strains kill a high percentage of young chickens (Sinha *et al.*, 1952). Local challenge strain (isolate No. 35) which is a velogenic virus was placed under group C1 with mAbs. This group of isolates were found to be associated with epizootics and outbreaks of virulent ND in Poultry in Mauritius, Saudi Arabia, Morocco, Italy and Australia (Alexander *et al.*, 1987). Isolate No. 26 which was obtained from 5 weeks old chickens were found to be velogenic and placed under group D with mAbs. Group D isolates include neurotropic velogenic USA isolates (Russell, 1988).

In Tamil Nadu vaccination of chickens with live lentogenic and mesogenic vaccines are intensively used but there is no scromonitoring programme. Frequent vaccinations without assessment of antibodies often complicate the situation results in vaccination failure and the prevalent field NDV take the opportunity to roll the flocks. Thus to control ND vaccination followed by monitoring of immunity is essential.

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