

## Short Paper

# Seroprevalence survey on Reovirus infection of broiler chickens in Tehran province

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## Summary

Reovirus infections are actually related to a lot of disease conditions with different clinical manifestations. Reoviruses have been isolated from a variety of tissues in poultry, suffering from different disease conditions including viral arthritis/tenosynovitis, stunting syndrome, respiratory disease, enteric disease, immunosuppression and malabsorption syndrome. Economic losses related to reoviral infections are frequently associated with increased mortality, viral arthritis/tenosynovitis and general lack of performance, including diminished weight gains, high feed conversions, uneven growth rates and reduced marketability of the affected birds. The aim of this survey was to study the prevalence of reoviral infection of broiler chickens in Tehran province. The samples were selected by cluster sampling method from sera in Razi Vaccine and Serum Research Institute. The selected sera had been collected from different slaughterhouses of Tehran province during 2004 to 2005. Commercial ELISA test was done on 582 serum samples of broiler chickens. The total number of 572 serum samples were positive and the prevalence of Reovirus infection was 98.3% (CI = 96.9-99.2%). The result shows high prevalence of antibody titre in broiler chickens. The resistance of the virus could be one of the reasons for such a high prevalence. This high prevalence put emphasis on the vaccination of the breeder flocks and shows the necessity of more studies on aspects of Reovirus infection in broiler chicken.

**Key words:** Reovirus, Broiler, Commercial ELISA, Tehran province, Prevalence

## Introduction

Avian Reoviruses are the members of the genus Orthoreovirus in the Reovirus family (Kawamura and Tsubahara, 1966; Mathews, 1982). Reovirus infections are prevalent worldwide in chickens, Turkeys and other avian species (Saif *et al.*, 2003).

Avian Reovirus may cause immunosuppression in chickens (Springer *et al.*, 1983; Montgomery *et al.*, 1985; Neelima *et al.*, 2003) and predispose the host to other infectious agents and stresses present in the environment. Immunosuppression caused by the virus may also influence the success of vaccination against other infectious diseases,

such as infectious bursal disease and inclusion body hepatitis (Kudrun *et al.*, 1982). Chickens infected with Reovirus in the field have an increased incidence of secondary bacterial infections with *Staphylococcus aureus* (Kibegbe *et al.*, 1982).

Economic losses caused by Reovirus infections are frequently the result of lameness and poor performance, including diminished weight gains, high feed conversion, and reduced marketability of the affected birds (Dobson and Glisson, 1992; De Herdt *et al.*, 1999).

Avian Reovirus possesses a group-specific antigen which is discernible with gel diffusion techniques (Woernle *et al.*,

1974) and a serotype-specific antigen demonstrated with neutralizing antibody in plaque-reduction or chicken embryo assays (Van der Heide, 1977; Robertson and Wilcox, 1986). Since enzyme-linked immunosorbent assay (ELISA) is a sensitive test and it is very easy to use for large numbers of sera and its commercial kits are available, the test was selected for this study (Slaght *et al.*, 1978). To the best of our knowledge, well documented data indicating the disease condition in Tehran are not available. This study for the first time investigates the seroprevalence of Reovirus in broilers in Tehran province.

## Materials and Methods

According to the confidence level of 95%, estimated prevalence of 30% and absolute precision of 5%, sample size was estimated 323. Because of the cluster sampling method this value was multiplied by 1.8 and the sample size was calculated 582. Therefore, 72 broiler flocks (clusters) at the age of slaughtering were randomly selected among 226 broiler flocks. On average 8 samples were selected from each cluster. Samples were collected from sera bank of Razi Vaccine and Serum Research Institute. These sera had been collected from different slaughterhouses of Tehran province during autumn 2004 to winter 2005. ELISA was performed on the sera with the commercial ELISA kit (KPL Company). ELISA is a rapid serologic test for the detection of antibodies in serum samples. The test was developed primarily as an aid to detection of pre- and post-vaccination antibody levels. The assay is designed to measure the antibody bound to antigen coated plates (Slaght *et al.*, 1978).

## Results

Results of the ELISA test show that seroprevalence of Reovirus antibodies in broilers of Tehran province is 98.3% (CI = 96.9-99.2%) and just 1.7% of the serum samples (10/582) were negative for Reovirus titres.

## Discussion

Avian Reovirus has been implicated in

many disease syndrome and is not discernible from other poultry diseases by clinical examination, therefore laboratory diagnosis of the disease is required.

In comparison with the existing antibody assay technique in viral neutralization of AGP, the ELISA method offers high sensitivity and is more simple, faster and less expensive (Slaght *et al.*, 1978). But this test is not effective to detect all Reovirus strains and serotypes. So negative results obtained by commercial ELISA can not reject the presence of anti-Reovirus antibodies. This fact restricts the results for interpretation. Furthermore, ELISA test can not distinguish between Reovirus vaccine and natural Reovirus antibodies. Therefore, in this study we tested the sera of flocks which their parents had not been vaccinated.

In 2006 molecular detection of avian Reoviruses was performed by using RT and nested PCR in tissue samples of suspicious flocks in some provinces of Iran. The findings not only confirmed the presence of virus but also revealed that the molecular methods are more sensitive and even more rapid for detection of avian Reovirus (Harzandi *et al.*, 2006).

Reovirus-associated disease has been reported predominantly in the United States (Glass *et al.*, 1973; Dobson and Glisson, 1992; De Herdt *et al.*, 1999). In Europe clinical signs of the disease have been observed sporadically (De Herdt *et al.*, 1999). Results derived from a seroprevalence study on Nigerian poultry show that the prevalence of Reovirus antibody is 41% (Owoade *et al.*, 2006).

In Iran for the first time Khodashenas and Aghakhan (1992) isolated and characterized avian Reovirus from the case with malabsorption syndrome and arthritis/tenosynovitis.

Another study conducted in Fars province showed the infection in 92% of the broiler flocks which indicates the high prevalence of reoviral infection in another part of the country (Mosalla Nezhad, 2006). The virus can survive in farm conditions for 12-15 weeks, this environmental resistance of the virus is probably one of the reasons for these high prevalences.

According to the results of this study, avian Reovirus infections appear to be

widespread in poultry flocks of Tehran.

In conclusion this high prevalence put emphasis on the vaccination of the breeder flocks to reduce the economical losses of the disease. It also shows the necessity of further investigations in other parts of our country as well as other flocks such as parent, grand parent and layer stocks. The investigations should consider different aspects of the disease to identify risk factors which maybe responsible for pathogenicity of the virus.

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