

New IBV Strain D181 Active: Does it Resemble the Strains we Already Know?

Introduction

Infectious bronchitis virus (IBV) is a coronavirus belonging to the gammacoronaviruses. Because it is able to spread rapidly both within and between groups of chickens, it has a high impact on poultry production worldwide. IBV is an RNA virus which mutates at a relatively high rate. Because of this, new mutations are constantly being introduced when an IBV infection spreads through a flock, and in some cases this ultimately might lead to the selection of successful new viral strains with modified antigenicity or enhanced pathogenicity. This can pose challenges when making vaccination programmes for poultry flocks. Developing a new vaccine for each new strain of IBV is not realistic, so ways to induce cross-protection using existing vaccines should always be evaluated.

The paper 'Characterization of infectious bronchitis virus D181, a new serotype (GI-2)' describes the characterisation of a new IBV strain named D181. This new IBV strain managed to evolve from an incidental finding in 2017 to one of the most important field strains found in Dutch egg-laying chickens in 2018 and 2019. Despite findings of the strain in Germany, Belgium and the United Kingdom, not much is

known about the spread of this important strain. There might be considerable underdiagnosis, since many routinely used IBV PCR tests are not (or are poorly) able to detect this strain, as is shown in the paper.

The fact that this strain has become so dominant in such a short period of time seems to suggest that it has an advantage compared to earlier strains. This might be due to changes in its antigenicity, as the affected layer and breeder flocks had all been primed using live vaccines of the Massachusetts, 793B and QX serotypes and boosted with an inactivated vaccine with at least an M41 antigen. To get more insights into this aspect, virus cross-neutralisation tests were performed using strains and antisera of a panel of serotypes, including the new D181 strain. This allowed the determination of the antigenic relationship of D181 with these other IBV strains.

The virus neutralisation test showed that the new IBV strain (D181) is a new serotype. While the strain is genetically and serologically most related to a known strain (D1466), it deviated too much to be classified as one of the known serotypes.

Clinical Signs in Experimental Conditions

Further research showed that infection with the new





strain (D181) in adult layers without co-infections led to a significant reduction in egg production and egg quality without respiratory symptoms. In young pullets, respiratory signs were present. This work showed the pathogenicity of this strain.

Diagnostic Challenges

A number of routinely used IBV PCR tests were analysed in silico. It was found that these tests needed primer sets for GII lineage in order to be able to detect D181. What this means is that it is possible that in many cases, routine PCR tests miss this new serotype. The virus could therefore be much more widespread than we currently know.

Current Vaccine Strains May Not Be Effective Against New IBV Strain

The available vaccine strains do not produce neutralising antibodies against D181. It is, therefore, uncertain whether the current vaccines or vaccine combinations offer sufficient protection against the new IBV strain.

In short, the new IBV strain D181 is a new serotype, resulting in a significant decline in egg production and egg quality under experimental conditions, and the current vaccine strains may not be able to induce sufficient protection against it. That is why the poultry sector has commissioned further research into this strain in 2020, which will answer the question: can some new IBV strains including D181 cause kidney damage and false layers?

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Sjaak de Wit gained his veterinary qualification at the University of Utrecht in 1989 and completed a PhD degree, concerning diagnosis and transmission of infectious bronchitis virus, in 1997 at the University of Utrecht. His job as an immunologist and senior researcher at Royal GD has included responsibility for the quality and accreditation of serological tests for poultry pathogens, test development, applied research and on-site consultancy at farms, hatcheries and integrations. In 2016 he became president of the European College of Poultry Veterinary Science.



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