

Mutations in the globular head of the hemagglutinin protein following influenza vaccination

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Background/objectives:

In Europe, the most widespread method for controlling influenza A virus infections in piglets is implementation of sow vaccination programs to secure delivery of maternal derived antibodies to the new born piglets. However, recent studies have questioned the effect and benefit of maternal derived antibodies. The objective of the study was therefore to investigate the effect of mass sow vaccination in a herd experiencing an outbreak with a new subtype.

Materials and methods:

Four batches of pigs were included before implementation of mass sow vaccination. Each batch consisted of 4 sows and 5 earmarked piglets from each sow. Blood samples and nasal swabs were collected from both sows and piglets, along with recordings of clinical signs. The same setup of four batches was included after implementation of mass sow vaccination with RespiPorc Flu®3. Virus was isolated and sequenced before and after vaccination. Furthermore, hemagglutinin inhibition test was performed on the sow sera before and after vaccination.

Results:

The results revealed that the mass sow vaccination delayed the infection time and decreased the viral load. However, no effect on the number of infected animals or clinical signs was observed, and the number of long term shedders was significantly increased. Furthermore, a decrease in the number of seroconverted pigs was discovered at the end of the study. Sequencing results revealed that the circulating strain had gained 3 mutations in the antigenic sites of the hemagglutinin protein after vaccination, which resulted in lower hemagglutinin inhibition titers in the sow sera.

Discussion and conclusion:

The results of this study present an explanation for the occasional lack of effect of sow vaccination. Moreover, the results reveal that the use of influenza vaccination may result in selection pressure and lead to emergence of escape variants.