Active Immunization of Feeder Pigs against Transmissible Gastroenteritis (TGE) : Influence of maternal antibodies

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Transmissible Gastroenteritis (TGE) Virus infection is a problem not only in breeding but also in feeding units. When weaned piglets are brought together from different sources for fattening, diarrhoeas occur, which often are due to TGE virus infections.
Since on most fattening farms weaners are continuously brought in throughout the year, susceptible animals are available at all times so that the infection chain is kept up, and the disease occurs all year round on these farms (5).

In order to investigate the effect of oral vaccination of feeder pigs against TGE, similar to oral vaccination of pregnant sows, with the attenuated TGE virus strain Bl (1,3), a field study was carried out. The results clearly show that the combined vaccination of pregnant swine and feeder pigs is a valuable tool to eliminate or reduce TGE virus infections in swine.
Virus: Passage number 300 of the attenuated TGE strain Bl (Bl 300 ST) was used for immunizing feeder pigs by different routes at the time of weaning or some days after weaning. The vaccine virus had an infectivity titer of 10^7 to $10^{7,5}$ $TCID_{50}$/ml.
Challenge infection of two pigs out of each group of immunized feeder pigs was done by oral application of TGE strain Miller (5th piglet passage) using a dose of 1000 LD_{50} for newborn piglets.
Animals: The investigation was performed on a farm with 3000 feeder pigs of the German landrace which were kept in two units each divided into 4 subunits of about 300 animals, strictly separated from each other. The animals were preselected according to their serum antibody values against TGE virus. 144 seronegative swine were divided into 6 groups (group 1-6) as well as 110 seropositive animals (group 7-12), reared from swine, which were immunized 6 and 2 weeks prior to delivery by oral vaccination with Bl 300 ST virus. Both groups were immunized according to the following regime:

No. of group	First immun.	second immun. 3 weeks after 1st immun.	challenge 2 weeks after 2nd immun.
1,7	2ml i.nasally	2ml orally	1ml virus suspension given orally to two pigs out of each group
2,8	2ml orally in capsules	2ml orally in capsules	
3,9	2ml i.m.	2ml i.m.	
4,10	2ml i.m.	2ml orally	
5,11	capsules in food (2ml each)	capsules in food (2ml each)	
6,12	controls:none	none	

Each group consisted of at least 20 animals, the control groups of 10 or 12 animals. In each immunized group two animals were left without vaccination in order to test the shedding of the vaccine virus.
Results: Within the groups 1-6 all animals had seroconverted two weeks after the second immunization, exept 13/30 animals in group 2 (oral vacc.) and 12/28 animals in group 5 (vacc. with food). All control pigs, that had not been vaccinated but were in contact with the vaccinated animals, were serologically negative at this time. Coproantibodies were found reacting with TGE virus two weeks after the second immunization in group 1 and 2 (i. nasal/oral vacc.), whereas in groups 3-6 no significant antibody activity was detected using a plaque reduction test. Two weeks after challenge infection anti-TGE virus activity was found in the feces of all challenged pigs with highest titers in groups 1,2 and 6.
Within the groups 7-12, comprising pigs from immunized mothers, 62 of 110 animals were found seropositive before the first immunization. Two weeks after the second vaccination 16/20 pigs in group 7, 9//20 pigs in group 8, all 18 pigs of group 9, 17/19 pigs in group 10, 5/19 pigs in group 11 and 0/10 pigs of the control group 12 reacted seropositive.
Coproantibodies were detected in one animal, only, at the time of challenge infection. Two weeks later anti-TGE virus activity was found in 2 of 2 challenged pigs of group 9 and in 1 of 2 challenged pigs of group 7 and 11.
In all of the tested fecal samples IgG immunoglobulins were detected by immunoelectrophoresis, whereas IgA was found only in 50% of all samples.
Determination of class-specific coproantibodies against TGE virus by means of affinity chromatography will be discussed.
It can be concluded from these data, that it is possible to induce coproantibodies against TGE virus with the attenuated vaccine strain Bl 300 ST using intranasal or oral application methods. The influence of maternally derived antibodies, however, reduces the production of local as well as serum antibodies greatly.
In further experiments the optimal time schedule for vaccination of pregnant swine and their feeder pigs has to be evaluated.

Selected references:

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