

COMPARISON OF IMMUNOPROPHYLAXIS CONFERRED BY TRANSMISSIBLE
GASTROENTERITIS VACCINES

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Transmissible gastroenteritis (TGE) is an economically important enteric viral disease of swine. A TGE outbreak in pigs less than two weeks old is particularly devastating and includes diarrhea, sporadic vomiting, dehydration, and a very high death rate. Infected mature swine typically show only transitory anorexia, pyrexia, and/or mild diarrhea. Sows that have recovered from infection with virulent TGE virus passively transfer TGE immunity to their young via immunoglobulins present in colostrum and milk. In recognition of this immunologic circumstance, modified live virus (MLV) TGE vaccines have been developed. The vaccine is administered to the sow in the latter stages of pregnancy. The attenuated TGE virus of the vaccine causes an immunological response resulting in TGE antibody being present in the milk during lactation. Pigs nursing vaccinated sows ingest the TGE antibody, thereby becoming passively immunized.

This experiment was done: 1) to compare the IM and ORAL TGE vaccines by challenge of baby pigs nursing vaccinated sows; 2) to determine what effect the route of administration has upon immunity by administering IM vaccine by the regimen recommended for ORAL vaccine; and 3) to determine the serologic relationship of the viruses in IM and ORAL TGE vaccines by performing cross neutralization assays.

In this study, 26 TGE seronegative bred gilts from the same herd were distributed in four vaccine test groups and one control group on the basis of breeding dates. Gilts in three vaccine test groups were vaccinated according to product label recommendations. Gilts in a fourth vaccine test group were vaccinated with IM TGE vaccine by the regimen recommended for ORAL TGE vaccine. Following each vaccination the virus titer of the vaccine was determined by back titration. Pasteurized milk used in preparing orally administered vaccine doses was assayed and found free of TGE neutralizing activity. Test groups were kept isolated to prevent spread of orally administered MLV TGE virus between groups. When farrow appeared imminent, gilts were individually isolated. At 72 and 92 hours post farrow, baby pigs were weighed and individually challenged with 15 median pig lethal doses (PLD₅₀'s) of virulent Miller strain TGE virus obtained from the American Type Culture Collection. A single suspension of challenge virus preserved in liquid nitrogen was used throughout the experiment to provide uniform challenge.

The IM TGE vaccine given in two intramuscular doses according to directions was found more effective against challenge than was either ORAL TGE vaccine or IM TGE vaccine given in three doses, twice orally and once intramuscularly. The IM TGE vaccine regimen is therefore considered to offer better TGE immunogenicity, based on the results of this study, than does ORAL TGE vaccine. In those instances in this experiment when a litter became TGE infected, it was observed the sow sickened as well. It therefore appears the various levels of immunity conferred by the vaccines may be overwhelmed. The individual merits of the product regimens therefore appear to be their relative abilities to stimulate protection against exposures to virulent TGE virus. This measure of effectiveness was well demonstrated in this test by the challenge of isolated litters. When given according to product recommendations, both IM and ORAL vaccines stimulated detectable levels of TGE antibody in serum, colostrum, and milk of vaccinated sows. Serum titer differences between groups at vaccination dates are felt to reflect vaccination intervals rather than a superior antigenicity of either vaccine. It does appear, however, that IM vaccine virus given

twice intramuscularly either alone or in combination with bacterin-toxoid does produce consistently higher and more uniform TGE antibody titers in colostrum than does the ORAL vaccine. TGE antibody titers in milk were observed to decrease with time following farrow in all test groups representing recommended product regimens. Sows in all test groups that developed clinical signs of TGE after challenge also displayed anamnestic serologic responses based upon TGE antibody titers found in serum collected 11 days after challenge. Sows that protected their pigs and thereby prevented their own subsequent TGE exposure did not show anamnestic responses in parallel samples.

Intramuscular vaccine given by product recommendation was found more effective in protecting pigs and sows against infection than were products administered orally. Intramuscular and oral TGE vaccines were found to be of similar antigenic potentials when given by product recommendations. The vaccines were found to be antigenically related in cross neutralization assays. The IM vaccine provided better protection against challenge in this study than was reported in previous evaluations.^{1,2} It should be recognized that the previous studies were done with 5 ml dosages of IM vaccine prepared in primary swine kidney cell cultures. Since those studies were performed, the vaccine has undergone refinements including those permitting reduction of single dose volume from 5 ml to 2 ml and the implementation of a diploid cell culture system³ for the propagation of vaccine virus.

GROUP	VACCINE	ROUTE
1	IM TGE Vaccine	2X IM
2	IM TGE Vaccine/C. perf. Type C Bacterin-Toxoid	2X IM
3	Oral TGE Vaccine	2X Oral/1X IM
4	IM TGE Vaccine	2X Oral/1X IM
5	None - Control	

CLINICAL OBSERVATIONS FOLLOWING CHALLENGE

Group	Sows	Sick	Pigs	Sick	Dead
1	6	1 (17%)	42	4 (10%)	4 (10%)
2	5	1 (20%)	37	8 (22%)	6 (16%)
3	5	4 (80%)	30	25 (83%)	18 (60%)
4	5	5 (100%)	37	37 (100%)	22 (59%)
5	5	5 (100%)	35	35 (100%)	27 (77%)

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