Bacteria against H. pleuropneumoniae infections are usually ineffective in controlling the disease, especially if prepared with an analogous gel adjuvant (Nielsen, 1976). All-adjvant vaccines can prevent death, but seem to have little effect on clinically the organism. Therefore, it seems to depend on the presence of a specific material, which can be regarded as the protective antigen (Pijalan, 1982). However, virulence seems to depend on the production of antigen by the organism (Bendixen at al.). These toxins are produced by older cultures, which suggests that they do not constitute the protective antigen.

Recently a number of claims have been made for success with gel-adjvant bactria. Because of this, it was decided to study the protection conferred by these immunogens as well as the humoral and cellular response of vaccinated animals.

Materials and Methods

The experimental bacteria was prepared with a field isolate of H. pleuropneumoniae serotype 14. The organism was grown for 6 hrs., which yielded cultures of $10^9$ organisms/ml inactivated with 0.2% formalin, and precipitated with aluminum hydroxide.

Experiment 1: Five pigs (6 wks. old) were vaccinated with 5 ml of the bacteria and revaccinated 15 days later. Another 5 animals were kept as unvaccinated controls. Five days after revaccination, all the animals were challenged intranasally with an all strain. All animals were killed 11 days later. The lesions in the lungs were measured and weighed, and the results compared by a T-test.

Experiment 2: Ten pigs were revaccinated and revaccinated 30 days later, and another 10 pigs were kept as unvaccinated controls. Four days after revaccination, all the animals were challenged as described above, and killed 15 days later. All the animals were bled at regular intervals, and their antibody response was measured by a plate-agglutination test using the homologous strain as antigen. Also, the white cells were obtained with a Ficoll-Hypaque gradient, and used for a migration-inhibition test (M.I.T.) by conventional methods using the conidia homologous strain as antigen. This test measured the inhibition of migration of peripheral blood by antigen, and was used to indicate a cellular immune response. The percentage of M.I.T. activity was calculated by projecting the shadow of the migrating cells unto tracing paper, cutting them out and weighing the pieces of paper.

Results

Experiment 1: All animals had lesions at slaughter, characterized by marked congestion, fibrinopurulent, hemorrhagic and fibrinous plaques. However, the lesions were smaller (21.0 cm) in vaccinated than in the controls (31.0 cm); they also weighed less (33.25 g in vaccinated animals and 77.0 g in controls). The differences were statistically different at P < 0.05.

Experiment 2: The vaccinated animals had average titers of 1:1200 at 3 days post-inoculation (P.I.), increasing to 1:5000 until revaccination. At this time, titers of 1:1000 were found, 7 days after revaccination. Control animals had no titers until challenge-exposed, when they rapidly (11 days P.I.) developed a titer of 1:2500.

Cellular immunity was detected in vaccinated animals as early as 7 days P.I. with P.I. in our tests. This rose to 60% at 13 days P.I., and stayed there until revaccination. The difference rose to 10% on 5 days after challenge, which rose to 71% at 9 days P.I.

Discussion

There is little doubt that vaccination confers some degree of protection to the animals. However, it is doubtful if gel-adjvant vaccines are economically beneficial in an intensive swine operation. Henry (1965) only found gel-adjvant vaccines to be economically worth while. However, because death loss is decreased, in farms with numerous confirmed hemophilus pigs, the vaccine may prove useful. Our results corroborate Henry's findings in that all animals, vaccinated or not, had lesions.

The vaccine produced a very strong immune response, both humoral and cellular, in the challenged animal. However, some of the revaccination titer might also be attributed to the challenge exposure, which was given 48 hrs. before the first revaccination bleeding (7 days after revaccination).

Similar high titers were shown by the challenged control animals. This finding suggests that vaccination does not confer a protective titer because both titers are similar. Also, the cellular response detected shows that cellular immunity plays a role in the protection against this infection. This may be the reason why gel-adjvant vaccines give better results. It also suggests that immunization with live attenuated strains should be investigated.

References:

Este trabajo se realiza para determinar la efectividad de las bacterias contra Hsp usando un adyuvante de hidroxido de aluminio. Los animales fueron vacunados 2 veces y después desafiados. Todos los animales, vacunados y controles, presentaron lesiones en la necropsia. Las lesiones fueron sig-nificativamente menores en los vacunados. En otro experimento, los animales vacunados mostraron una fuerte respuesta inmune, tanto humoral como celular. Sin embargo, los controles infectados experimentaron un aumento de las lesiones. Los resultados sugieren que estas vacunas no son adecuadas contra la infección.