THE IMMUNOLOGIC INTERACTIONS OF PSEUDORABIES VIRUS IN CHRONICALLY INFECTED SWINE

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INTRODUCTION. The exact mechanism involved in the variation of the host response to acute and chronic infections, and the development of lesions due to endogenous chronic or latent virus is not completely understood. Since recurrent lesions appear in Herpes Simplex Virus (HSV) infected patients with high serum antibody titers, most investigators believe that some other immune mechanism plays a predominant role. Recent investigations[1,2] have shown that macrophages and thymus derived (T) lymphocytes are key factors in controlling chronic HSV infections in mice. An elegant series of experiments by Rager-Zisman and Allison[3] using cyclophosphamide-treated-HSV infected mice has indicated that protection against this virus infection is predominantly T cell dependent. Their studies seem to imply that humoral antibodies alone play no major role in the recovery of the host. However, they suggest that the data tends to support the theory that antibody-dependent cell-mediated cytotoxicity (ADCC) may well be operative in this specific incidence. Rouse and co-workers have recently confirmed this suggestion.[4] Lawman and colleagues[5] have shown that cytotoxic T cells have an antigen induced specificity for HSV infected cells. This work leads to the logical assumption that T lymphocytes function to control and modulate chronic HSV infections.

The nature of the immune mechanisms responsible for the recovery of cattle from acute IBRV infections, resistance to re-infection and the recrudescence of chronic or latent infection has not until recently been the subject of critical, refined scientific evaluations. The role of environmentally-induced physiologic stress in IBRV infections has been investigated,[6,7,8] but careful cause-related scientific analysis is difficult. The role of shipping stress, hormonal imbalances during calving,[9] and nutritional deficiencies[10] have also been suspect. One of the most intriguing theories is based upon the fact that certain groups of viruses may suppress the cell-mediated immune (CMI) response of acutely infected animals or depress CMI in chronically infected animals thereby allowing recurrent disease to develop. Myxoviruses have been shown to affect the CMI response in other animals. The recent report[11] of reactivation of IBRV infection in young calves by experimental PI-3 virus infection tends to support this hypothesis.

Davis and Carmichael[12] studied the effect of dexamethasone and ACTH upon the cell-mediated immune response during primary and recurrent infections. They suggested that suppression of cell-mediated immunity, as measured by lymphocyte transformation in whole blood cultures, occurred during CS induced recrudescence but that adrenocorticotropic hormone (ACTH) and trigenimal neurectomy induced recrudescence without a concomitant immunosuppression. Rouse and co-workers[13,14,15] have recently published a series of papers concerning their investigations into the immune mechanisms of acute and chronic IBR infections. Their conclusion is that almost all well-known immune mechanisms play a role in the recovery from, the maintenance of, and the recurrence of IBR infections.

Recent investigations[16] have shown that chronic IBR virus infections both from vaccine and field strains could be rescrudesced with corticosteroid in virtually all previously infected animals and that altered T lymphocyte response occurred in contrast to failure of rescrudescence with B lymphocytes and neutrophil function was altered with cyclophosphamide.

MATERIALS AND METHODS. We have conducted 2 different experiments in an effort to cause recrudescence in pseudorabies virus infected swine by corticosteroid treatment.

In the first experiment 4, 6-month-old pigs, experimentally infected 3 months earlier with PRV were given 10 mg of dexamethasone by the intramuscular route for 7 consecutive days. Hematologic parameters (CBC) were monitored at 3 and 1 day pre-treatment and days 2, 5, 7, and 9 post treatment. Lymphocyte blastogenesis to PRV antigen was conducted using whole blood cultures at the same intervals as CBC's. Tonsilar areas and nasal passages were swabbed for virus isolation attempts throughout the treatment period.

The second experiment was conducted on 10 eight-month-old pigs infected with PRV during a natural outbreak and subsequently vaccinated with commercial live PRV vaccine. Two non-infected controls from a different source was used. All previously infected swine had prominent delayed-type hypersensitivity reactions when tested by palpebral injection of heat inactivated PRV preparations.[17]

We placed 5 previously infected and vaccinated swine on daily massive intravenous doses of dexamethasone (20 mg) and 5 others on flumethasone (5.0 mg). Hematologic parameters and peripheral blood lymphocyte PRV Ag. stimulated blastogenesis was monitored 1 week before, at the initiation of treatment, and 1, 3, 5, 7, days post treatment.

RESULTS. Results of both experiments were uniformly negative. No significant change in total of differential leukocyte count could be detected. Determination of hematologic parameters of non-treated controls varied as much from day to day as treated animals. PRV antigen induced blastogenesis was not significantly affected by corticosteroid treatment. DTH responses were not diminished by corticosteroid treatment and in no instance was PRV isolated from the secretions of animals during treatment or tissues taken at necropsy following treatment.

CONCLUSION. We have failed to confirm the hypothesis and experimental results of other investigators that corticosteroid treatment in swine will induce PRV recrudescence in experimentally or naturally-infected swine. The conclusion that corticosteroid therapy fails to significantly alter the immune mechanism in adult swine and has only a minimal effect in young swine has been verified by recent investigations at Auburn University.[18]

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