CLINICAL RESEARCH NOTE

RECOVERY OF INFECTIOUS BOVINE RHINOTRACHEITIS VIRUS FOLLOWING CORTICOSTEROID TREATMENT OF VACCINATED ANIMALS

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There have been reports (2, 5, 6) that the virus of infectious bovine rhinotracheitis (IBR) can be recovered from nasal and ocular secretions of experimentally infected animals carrying IBR neutralizing antibodies, three to five days after the administration of dexamethasone USP[1]. Earlier, we had unsuccessfully attempted to recover virus from the nasal and vaginal secretions from dexamethasone-treated cattle carrying naturally acquired neutralizing antibodies to the virus of IBR (unpublished observations). The following describes a similar experiment where the administration of dexamethasone led to the recovery of virus, not from the nasal secretions but from the leucocytes and vaginal swabs. The experiment involved 15 five to ten year old cows maintained in the breeding herd on the station. Prior to vaccination, seven were serologically negative and eight were serologically positive with respect to IBR virus neutralizing antibodies. The eight positive animals had been used in the earlier experiments, already mentioned. The cows were all given one dose of IBR vaccine[2] intramuscularly on August 28, 1973 and the administration of dexamethasone (six daily doses, total of 120 mg) was started October 1, 1973. The following specimens were taken at intervals as indicated in Figure 1; nasal and vaginal swabs, untreated blood for serum and heparinized blood for leucocytes (3).

The swabs were rinsed with 2 ml of tissue culture medium (Eagle's MEM[3] containing 10% fetal calf serum) containing 400 IU/ml penicillin, 400 μg/ml streptomycin and 250 μg/ml amphotericin. Virus isolations from the nasal swab extracts and leucocyte suspensions

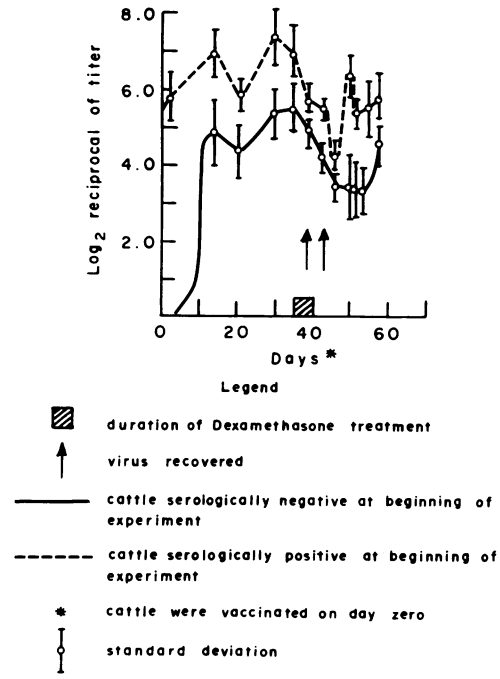

FIGURE 1. Effect of dexamethasone on cows inoculated parenterally with modified live IBR virus vaccine.

were attempted on monolayers of bovine fetal kidney(BFK) cells using conventional tissue culture procedures. Medium from wells showing cytopathic effect was checked by micro-complement-fixation (4) for the presence of IBR antigen using bovine serum with a complement-fixing titre of 1:64. Neutralizing antibody determinations were made with the MicroTest method with 25 $TCID_{50}$ of virus (1).

Virus was isolated from a vaginal swab and a leucocyte sample from two cows four days after the initial dose of dexamethasone. Eight days after the initiation of dexamethasone treatment, IBR virus was isolated from another five cows, one from a leucocyte preparation and four from vaginal swabs. Virus was not recovered from swabs taken later (Figure 1).

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[1]Azium, Schering Corporation, Pointe Claire, Quebec.

[2]Rhinotracheitis vaccine, bovine tissue culture origin. Diamond Laboratories, Des Moines, Iowa.

[3]Auto-Pow MEM, Flow Laboratories, Rockville, Maryland.

The virus recoveries were made from four cows that were serologically negative and three that were positive prior to vaccination.

The cattle were slaughtered on November 6, 1973. Extracts were prepared in growth medium with the aid of pyrex TenBroek tissue grinders from trachea, lung, ovaries, uterus, liver, cervix, spleen and kidney. IBR virus was not isolated from tissue cultures inoculated with the extracts of these tissues.

Thus corticosteroid treatment of cattle that had previously been vaccinated led to the recovery of IBR virus that is probably vaccine virus rather than field virus, although we could not verify this. However, if IBR virus is shed after the administration of synthetic corticosteroids to vaccinated cattle, it may also be released following naturally induced stress stimulating the production of naturally present corticosteroids. If vaccine virus could, with animal passage, revert to virulence this would be undesirable in certain situations. Sheffy and Rodman (6) concluded that none of the methods of vaccination with modified live IBR virus vaccine could be considered satisfactory if latent infections with IBR were undesirable. Our results support in principle their conclusions – but also stress the need for methods for easy differentiation of field and vaccine strains.

In this study virus was only isolated from vaginal swabs and leucocyte preparations; no virus was obtained from nasal swabs as had been successfully demonstrated by Sheffy and associates (5, 6). The reason for this difference is uncertain but it may be related to the tissue tropism of the strain of vaccine virus used or to the presence of differing amounts of local antibody.

The isolation of virus from leucocytes should be especially noted: whether it is located in lymphocytes or other white cells has not been determined. This may be important to determine as Davies and Carmichael (2) have studied the behaviour of lymphocytes in IBR vaccinated cattle given dexamethasone. They, however, were more concerned with the transformation of lymphocytes following IBR antigen stimulation, rather than with the presence of virus in these cells and they interpreted their results as evidence for cell-mediated immunity. If IBR virus is present in the lymphocytes at certain stages of the infection this could make the interpretation of such experiments difficult.

We used dexamethasone as an immunosuppressant, but Figure 1 shows no marked effect on the circulating antibody level in contrast to the results of Davies and Carmichael. These authors found an increased titer of virus neutralizing antibody ten days after treatment with this drug. The presence of high titers of circulating antibody could account for our failure to isolate virus from tissues taken at necropsy as the extracts would be expected to contain antibody.

Summary

Infectious bovine rhinotracheitis virus has been recovered from vaginal swabs and leucocyte preparations from vaccinated animals following dexamethasone treatment. In contrast to previously published work the virus was not recovered from nasal swabs and the drug treatment did not increase the titer of virus neutralizing antibody.

Résumé

Les auteurs ont recouvré le virus de la rhino-trachéite infectieuse bovine dans des écouvillons vaginaux et dans des préparations de leucocytes provenant d'animaux vaccinés, à la suite d'un traitement à la dexaméthasone. Contrairement à ce qu'ont déjà rapporté d'autres chercheurs, ils ne recouvrèrent pas le virus dans des écouvillons nasaux et le traitement à la dexaméthasone n'augmenta pas le titre d'anticorps neutralisants.

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