IMMUNOGLOBULINS, HAEMOLYTIC COMPLEMENT AND SERUM C3 IN CATTLE INFECTED WITH MALIGNANT CATARRHAL FEVER HERPESVIRUS

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ABSTRACT


Serum levels of the third component of complement (C3) were reduced only in the terminal stages in malignant catarrhal fever (MCF) virus-infected steers. Haemolytic complement and immunoglobulin (IgM, IgG1 and IgG2) levels were not altered. C3 and immunoglobulin deposits were also not demonstrated in the vascular lesions induced by MCFV. MCF virus infection of cattle is probably not a typical immune complex-mediated disease as previously suggested.

INTRODUCTION

The main histopathological change in malignant catarrhal fever (MCF) virus-infected cattle is a widespread mononuclear cellular infiltration and severe polyvasculitis (Daubney and Hudson, 1936). These changes bear a close resemblance to the lesions described in immune complex disease (Oldstone and Dixon, 1975) and have led some authors to suggest that MCF is an immune complex-mediated disease (Plowright, 1968; Rweyemamu et al., 1976).

The presence of immunoglobulin deposits in tissues, usually demonstrated by immunofluorescence, is evidence suggestive of immune complex deposition, especially when the deposits appear granular and are associated with complement (C3 and C1q) (Goldstein and Weissman, 1974). This communication reports on attempts to demonstrate deposits of immunoglobulin and C3 in tissues and on their levels in serum of MCF virus-infected cattle.
MATERIALS AND METHODS

Cattle inoculation

Crossbred bovine steers which were 3 years old were used. The steers were inoculated intravenously with $10^{2.0} \text{TCID}_{50}$ of cell-associated MCF virus isolated from wildebeest calf nasal secretions (Mushi et al., 1980). The rectal temperatures of these animals were recorded daily.

Serum was collected for immunoglobulin and C3 level determinations and stored at -70°C. Buffy coat fractions were inoculated into calf thyroid cell cultures which were subsequently examined for 21 days for the development of cytopathic effects. Viral neutralising antibodies to MCF virus were assayed in microtitre plates as previously described (Mushi and Plowright, 1979).

Preparation of rabbit anti-bovine IgG1, IgG2 and IgM

Bovine IgG1, IgG2 and IgM were purchased (Miles Lab. Inc., USA). A solution of either IgG1, IgG2 or IgM (2.5 mg/ml) was emulsified with an equal volume of Freund's complete adjuvant (Difco Lab., Detroit, MI, USA) and 0.5 ml emulsion was injected subcutaneously at four sites into each of four rabbits. After 3 weeks each rabbit received 2 ml of the same concentration of protein in Freund's incomplete adjuvant subcutaneously at four sites. The rabbits were bled 10 days later. The antisera were made specific by cross-absorptions; the anti-IgG1 was absorbed with IgG2 while the anti-IgG2 and anti-IgM were each absorbed with IgG1.

Determination of serum C3 levels

This was performed according to the method of Fahey and McKelvey (1965). Slides containing 1% rabbit anti-bovine C3 serum (Cappel Lab., Dowington, PA, USA) in 1% agarose in veronal buffer/EDTA were prepared. After adding 5 μl of serum per well, the slides were incubated at 4°C for 72 hours. The slides were then washed in 2% sodium chloride for 48 hours followed by 24 hours in distilled water. The slides were later dried and stained with Coomassie blue dissolved in acidified alcohol, and the diameter of immunodiffusion rings was measured with callipers.

Estimation of total haemolytic complement (CH50)

This was carried out as previously described (Rurangirwa et al., 1980). Guinea pig erythrocytes sensitised with normal bovine serum were used as the indicator system.