FURTHER OBSERVATION ON NEUTRALIZING ACTIVITY OF OESOPHAGEAL PHARYNGEAL FLUID OF CATTLE AFTER EXPOSURE TO FOOT-AND-MOUTH DISEASE VIRUS

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BRIEF REPORT

McVicar and Sutmöller (4) reported on the levels and persistence of neutralizing antibody of the oesophageal pharyngeal (OP) fluid in a small group of foot-and-mouth disease (FMD) convalescent cattle.

In the present report we describe a further study of the neutralizing activity of the OP fluid and serum in a group of 6 cattle. Four of these cattle were vaccinated with a trivalent inactivated vaccine and all were inoculated intradermolingually with FMD virus subtype O_1 3 weeks later. Details on the type of cattle, vaccine, virus strain used and disease history are presented in companion report (2). Serum and OP samples were collected at 12 weekly intervals and tested for neutralizing activity against subtypes O_1, A_{24} and C_3. Serum samples were assayed by the microneutralization test (3).

The neutralizing activity of OP fluid samples was tested by the plaque reduction test essentially according to the method described by McVicar *et al.* (5), with modifications of the plaque technique according to Augé (1). The neutralization titer of the OP fluid was expressed as the dilution reducing 70% of the plaques. The calculations were made as described (5). The carrier status of the cattle was determined by emulsification of the OP fluid with trifluortricloroetane (TTE) as described by Sutmöller and Cottral (6) and inoculation of IB-RS-2 and BHK cultures with the treated material.

None of the OP fluid samples collected at the time of virus inoculation contained detectable neutralizing activity against FMD virus types A_{24}, O_1 or C_3 and none of the cattle developed neutralizing activity in the OP fluid against A_{24} or C_3 during the course of this study.

The results of the plaque reduction tests of the OP fluid for type O_1 are listed in table 1. Already 1 week after inoculation neutralization activity was observed but the highest values were found between 4-9 weeks after exposure. The lowest titers were found in steer 3 from which no virus could be isolated after initial virus multiplication.

A rise of serum neutralization titers was observed of O_1 antibody in the unvaccinated steers and the vaccinated steers with titers less than 1:100 at the moment of infection. However, the serum antibody titer of steer 3 decreased significantly during the course of the experiment. These findings generally agree with those of McVicar and Sutmöller (4). They showed that the neutralizing titer of the OP fluid increased to a peak at 8 weeks in animals which remained carriers of FMD but that the neutralizing titer of the OP fluid from non-carriers declined from 2 weeks on. The same investigators also found that serum antibody titers of non-carriers declined faster than those of the carriers.

The present study also showed the specificity of the local response to FMD virus infection. Even though 4 of the cattle had serum neutralizing activity against subtypes A and C, as a consequence of previous vaccination, none of it appeared in detectable levels in the OP fluid. The infection with FMD virus type O_1 did not induce any detectable neutralization activity in the OP fluid against the heterologous virus types.

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TABLE 1. *Neutralizing activity of oesophageal-pharyngeal fluid from cattle after exposure to foot-and-mouth disease virus type O_1*

Weeks post-inoculation	Steer No.					
	Not vaccinated		Vaccinated			
	1	2	3	4	5	6
0	<1:2*	<1:2	<1:2	<1:2	<1:2	<1:2
1	1:80	1:6	<1:2	1:6	<1:2	1:25
2	1:3	1:10	1:3	1:10	<1:2	<1:2
3	<1:2	1:3	<1:2	1:2	1:50	1:40
4	1:10	1:10	<1:2	1:10	1:125	1:3000
5	<1:2	1:60	<1:2	1:50	1:2	1:2500
6	<1:2	1:50	<1:2	1:50	1:60	1:80
7	1:50	1:160	<1:2	1:50	1:25	1:30
8	1:200	1:30	1:60	1:50	1:100	1:40
9	1:25	1:250	1:40	1:80	1:100	1:6
10	1:80	1:30	<1:2	1:80	1:25	1:20
11	1:60	1:40	<1:2	1:60	1:16	1:30

* Dilution reducing 70% of the plaques of type O_1.

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