Comparative Immunogenicity of 146S, 75S and 12S Particles of Foot-and-Mouth Disease Virus

Brief Report

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With 3 Figures
Accepted June 3, 1982

Summary

Vaccines prepared from 75S particles of FMDV, strain A Cruzeiro, although less potent than 146S particle vaccines, conferred immunity to challenge. Heat and acid degraded 75S particles also conferred significant levels of immunity, whereas degraded 146S particle vaccines were ineffective.

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unless previously stabilised with formalin. In contrast, Cowan (3) reported that 75S particles of the A24 strain did stimulate significant levels of neutralising antibody, although to a lesser extent than 146S particles. Rwreyemamu, Terry and Pay (11) arrived at similar conclusions with the strain A Pando, but reported that the 75S particles were as immunogenic as 146S particles.

Our interest in 75S particles relates to a continuing study of factors which may influence the potency of vaccines, with particular reference to the considerable variation which is observed among vaccine strains of FMDV. For this reason it was decided to measure the potency of vaccines prepared from intact and degraded 146S and 75S particles both in terms of neutralising antibody response and resistance of recipient animals to challenge with infectious virus.

The virus strain A Cruzeiro was grown in BHK suspension cells, inactivated with AEI and the 75S and 146S particles concentrated and purified by sucrose gradient centrifugation (4). Because of cellular debris close to the top of the gradient, a small amount of 35S-methionine labelled virus was used to permit detection of 75S particles. Peak fractions were dialysed against 0.05 M tris-HCl, 0.15 M NaCl, 1 per cent v/v Nonidet NP40 and 75S and 146S particles purified by a second cycle of sucrose gradient centrifugation.

The concentration of 146S particles in purified preparations was measured by a quantitative sucrose density gradient procedure (5). Although this procedure was not possible with 75S particles, it was found that the ratio of complement fixation units to µg was the same for 75S and 146S particles (25 CFU/µg).

Polyacrylamide gel electrophoresis was used to check the authenticity of the 146S and 75S preparations (6). As was expected, 75S particles contained significant levels of VP0 protein whereas this protein was absent from 146S particles (Fig. 1).

![Fig. 1. Polyacrylamide gel electrophoresis of purified preparations of 146S particles (A) and 75S particles (B) of FMDV, strain A Cruzeiro](image)