

**Title:** Development and Testing of a Subunit Vaccine for Foot-and-Mouth Disease. - **NPB #99-019**

**Investigator:** Marvin J. Grubman

**Institution:** United States Department of Agriculture, Agricultural Research Service, Plum Island Animal Disease Center

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### Abstract:

We have tested the potency and efficacy of replication-defective recombinant human adenoviruses containing the capsid and 3C proteinase coding regions of foot-and-mouth disease virus (FMDV) as vaccine candidates in swine. This vaccine, which lacks the coding region of several FMDV nonstructural proteins, has a number of advantages over the current whole virus inactivated vaccine including the ability to readily distinguish vaccinated from infected animals using current technology.

Inoculation of swine with this vaccine resulted in either complete protection from disease after virulent homologous virus challenge or significant reduction in clinical signs as compared to co-housed uninoculated control animals. The optimal vaccine regimen tested was a low dose initial inoculation followed by a high dose boost. All animals inoculated by this regimen were completely free of disease after challenge. Increased efficacy of the two-dose regimen was associated with heightened levels of FMDV-specific IgG1 and IgG2 antibodies. Expression and processing of the FMDV capsid precursor protein, requiring a biologically active 3C proteinase, was essential for induction of FMDV-specific neutralizing antibodies and protection from challenge. This vaccine is safe since there is no evidence of seroconversion of co-housed unvaccinated control animals. These experimental results suggest that the Ad5-FMDV virus vector is a promising vaccine candidate against FMD and additional efforts to improve its potency and efficacy are underway.

*These research results were submitted in fulfillment of checkoff funded research projects. This report is published directly as submitted by the project's principal investigator. This report has not been peer reviewed*

#### For more information contact:

**National Pork Board, P.O. Box 9114, Des Moines, Iowa USA**

800-456-7675, Fax: 515-223-2646, E-Mail: [porkboard@porkboard.org](mailto:porkboard@porkboard.org), Web: <http://www.porkboard.org/>

