Pinghua Li et al., J Vaccines Vaccin 2014, 5:5
http://dx.doi.org/10.4172/2157-7560.S1.022

OMICS Group Conferences
Accelerating Scientific Discovery

4th International Conference on
Vaccines & Vaccination
September 24-26, 2014 Valencia Convention Centre, Spain

Evaluation of a 3A-truncated foot-and-mouth disease virus in pig for its potential as marker vaccine

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Foot and mouth disease (FMD) is a highly contagious and economically devastating disease of domestic and wild cloven-hoofed animals. The disease is distributed worldwide and has great negative economic impact not only on livestock health and production but also on international trade. Conventional FMD vaccines consisting of chemically inactivated viruses have been used for many years and proved quite effective in controlling clinical disease. However, vaccinated animals cannot be distinguished serologically from ones that have recovered from a natural infection. The availability of an antigenic marker vaccine allowing discrimination between infected and vaccinated animals (DIVA) is of great value for the control and eradication of endemic infectious diseases. Here we report construction of a recombinant FMDV containing 93-143aa deletion (this region contains a relatively conserved B-cell epitope) in the NSP 3A using a recently developed FMDV infectious cDNA clone. The recombinant marker virus, r-HN/3A93-143, had growth kinetics similar to the wild type (WT) virus in culture cell and caused a symptomatic infection in pigs. Pigs immunized with chemically inactivated r-HN/3A93-143 vaccine were fully protected from WT FMDV challenge. Furthermore, a test using the 50% pig protective dose (PD50) showed that this marker vaccine could achieve 10.05 PD50 per dose. Serum analysis demonstrated that this recombinant marker virus, in conjunction with a blocking ELISA, enabled serological differentiation between the marker virus-infected and WT virus-infected animals. Our study indicated that a DIVA FMDV vaccine can be developed by deleting an immunodominant epitope in NSP 3A.

Biography

Pinghua Li completed her PhD on preventive veterinary science at Gansu Agricultural University. She is a Research Assistant in National Foot and Mouth Disease Reference Laboratory of Lanzhou Veterinary Research Institute, Chinese Academy of Agricultural Sciences and is now working for the development of novel and effective marker vaccine of FMDV of type A, O and Asia1 using FMDV infectious cDNA clone.

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