

The Evaluation of Adjuvant Effects of CD154 in a Subunit Vaccine against Classical Swine Fever Virus

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Abstract : Many recent researches have demonstrated that CD154, a protein primarily expressed on activated T cell molecules, has potentially acted as a molecular adjuvant to improve the immunogenicity of subunit vaccines against viral infections. Classical swine fever (CSF) affects the swine industry worldwide that is one of the most devastating and highly contagious pig diseases. It is listed by the World Organization for Animal Health (OIE) as an infectious animal disease that must be reported. Although pigs vaccinated with subunit vaccines can be differentially diagnosed from those infected animals, subunit vaccines usually need adjuvants to enhance and elicit immune responses. In this study, CD154 was linked with CSFV E2 sequences and then expressed in CHO cells to produce the fusion protein as E2-CD154. The porcine specific CpG adjuvant was also used in one of the formulations. The specific pathogen-free pigs (SPF) at the age of 4-week-old were randomly separated into four groups, vaccinated with E2-CpG, E2-CD154, E2-CD154-CpG or the commercial Bayovac® CSF-E2 vaccine and boosted two weeks after primary vaccination. The results showed that the percentages of CD4+ and CD4+IL2+ in peripheral blood mononuclear cells (PBMC) in E2-CD154 vaccinated piglets seven days after primary vaccination were gained by 1-5% relative to the control group. In addition, the percentages of CD4+IFN γ + T cells had slightly edged up 0.1-0.3% compared with the control group. Also, increased E2-specific IFN γ levels had edged up CD4+CD8+ T cells found in E2-CD154 and E2-CD154-CpG groups, particularly in the E2-CD154-CpG group. These results implicate that CD154 may enhance cellular immunity and synergistically act with species-specific CpG adjuvant as a dual-phase adjuvant. Therefore, the CD154 may be beneficial as a promising adjuvant in subunit vaccines.

Keywords : CD154, CpG adjuvant, cellular immunity, subunit vaccine, pig

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