GP5 protein-based ELISA for the detection of PRRSV antibodies

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Abstract

Porcine reproductive and respiratory syndrome virus (PRRSV) is an important swine pathogen, causing huge economic losses each year worldwide. Immunization with vaccines containing the glycoprotein 5 (GP5) of PRRSV is the main measure to induce neutralizing antibodies and control the disease. Here, we developed a GP5 protein-based ELISA for detecting antibodies against PRRSV. The overall yield of purified GP5 in E. coli flask culture was more than 45 mg/L cell culture. Western blot and IFA indicated that the GP5 protein was highly immunogenic. After optimization and validation with IDEXX PRRS using 566 clinical sera, the DSN, DSP, and accuracy of GP5-ELISA were 81.39%, 75.96%, and 80.39%, respectively. Besides, GP5-ELISA is highly specific, showing no cross-reactions with sera against other important swine pathogens. Hence, GP5 is a good diagnostic antigen and the GP5 protein-based ELISA has the potential to be used in the field.

Key words: PRRSV, GP5 protein, ELISA, antibody detection

Introduction

Porcine reproductive and respiratory syndrome (PRRS) was first reported in America in 1987, and has become one of the most economically important swine diseases worldwide (Keffaber 1989, Collins et al. 1992). The disease is characterized by severe reproductive failure in sows and a high rate of respiratory diseases and mortality in young pigs (Kimman et al. 2009). Its causative agent, PRRSV, was first isolated in the Netherlands in 1991 (Lelystad virus, LV) and one year later in North America (ATCC-VR-2332) (Wensvoort et al. 1991, Collins et al. 1992). In China, a PRRS outbreak occurred at the end of 1995 and the disease has been one of the most significant problems for swine production, resulting in great economic losses each year (Gao et al. 2004). At present, most identified PRRSV Chinese isolates belong to the NA-type (Ren et al. 2010).