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Novel p22-Monoclonal Antibody Based Blocking ELISA for the Detection of African Swine Fever Virus Antibodies in Serum

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Abstract : African swine fever (ASF) is a highly infectious viral disease of pigs, resulting in significant economic loss worldwide. As there is no approved vaccines and treatments, the control of ASF entirely depends on early diagnosis and culling of infected pigs. Thus, highly specific and sensitive diagnostic assays are required for accurate and early diagnosis of ASF virus (ASFV). Currently, only a few recombinant proteins have been tested and validated for use as reagents in ASF diagnostic assays. The most promising ones for ASFV antibody detection were p72, p30, p54, and pp62. So far, three ELISA kits based on these recombinant proteins have been commercialized. Due to the complex nature of the virus and variety forms of the disease, robust serodiagnostic assays are still required. ASFV p22 protein, encoded by KP177R gene, is located in the inner membrane of viral particle and appeared transiently in the plasma membrane early after virus infection. The p22 protein interacts with numerous cellular proteins, involved in processes of phagocytosis and endocytosis through different cellular pathways. However, p22 does not seem to be involved in virus replication or swine pathogenicity. In this study, E.coli expressed recombinant p22 protein was used to generate a monoclonal antibody (mAb), and its potential use for the development of blocking ELISA (bELISA) was evaluated. A total of 806 pig serum samples were tested to evaluate the bELISA. Acording the ROC (Reciever operating chracteristic) analysis, 100% sensitivity and 98.10% of specificity was recorded when the PI cut-off value was set at 47%. The novel assay was able to detect the antibodies as early as 9 days post infection. Finaly, a highly sensitive, specific and rapid novel p22-mAb based bELISA assay was developed, and optimized for detection of antibodies against genotype I and II ASFVs. It is a promising candidate for an early and acurate detection of the antibodies and is highly expected to have a valuable role in the containment and prevention of ASF.

Keywords : ASFV, blocking ELISA, diagnosis, monoclonal antibodies, sensitivity, specificity
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