

Comparison of Surface-Plasmon-Resonance Biosensor measurements and Western Blot Assay for detection of GPE- strain of classical swine fever virus by using WH211 and WH303 monoclonal antibodies

ABSTRACT

Monoclonal antibodies WH211 and WH303 are in routine laboratory use for detecting Classical Swine Fever Virus (CSFV) or its major envelope E2 protein. While E2 is recognized as the most immunogenic protein, it is also the most variable and often not recognized by specific monoclonal against this protein. The aim of this study was to compare the detection sensitivity of WH211 and WH303 antibodies for CSFV GPE- strain via two well-known assays, Surface Plasmon Resonance Biosensor and Western Blot Assays. Both WH211 and WH303 Abs which specifically known to detect E2 gene (gp55) of CSFV at different recognition sites (epitope) were used as ligands to detect the GPE- strain (analytes). GPE- strain showed interaction with monoclonal antibodies at highest dilution of 1:1000 (v/v) in SPR assay. At lowest dilution (1:10), the interaction of GPE- strain with immobilized monoclonal antibody WH211 showed more than two-fold increase (163.5 RU) than the interaction with monoclonal antibody WH303 (60.0 RU). This study documented profound preference for WH211 as the target for CSFV E2 gene by having higher sensitivity towards GPE- strain but with lesser affinity. E2 epitope of GPE- strain was found undetectable when blotted with WH303 at the investigated dilutions as compared to WH211. The findings indicated a 2500-fold higher SPR sensitivity in detection in comparison to Western Blot and the limit of detection of GPE- strain by Western Blot could not be achieved beyond 1:10 dilution of monoclonal antibodies. Therefore, SPR approach could overcome the risk of GPE- vaccine strain from being invisible for identification. Although, WH303 was unable to recognize this strain by Western Blot, both WH211 and WH303 were applicable as a sensitive detection ligand for GPE- strain of CSFV using SPR analysis.

Keyword: Surface-Plasmon-Resonance; Western blot; GPE- strain; WH211; WH303