Poster

Potential Antigen in Combating the Pervasive Threat of the Malaysian Foot and Mouth Disease Virus (FMDV) in Ruminant

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Abstract

Foot-and-mouth disease (FMD) is a major infectious disease caused by the foot-and-mouth disease virus (FMDV) that affects the domestic and foreign trade in livestock and animal products, resulting in high economic losses and social consequences. Current control of FMD includes prevention by vaccination with inactivated vaccines. However, various challenges arise, including difficulty handling multiple serotypes, due to the vaccines specific for a single serotype and providing short-term immunity. Previous studies have utilised capsid protein, P1 which encodes four structural proteins (VP4, VP2, VP3, and VP1) of the FMDV to develop potential vaccines due to antigenic variation. Despite this, the antigenicity of the Malaysian FMDV capsid protein is not well studied. This study aims to characterise the Malaysian FMDV serotypes O and A capsid protein via *in silico* and *in vitro* analysis. The FMDV serotypes O and A capsid protein sequences were identified based on the FMD outbreaks in Malaysia and the antigenicity was predicted by bioinformatics approaches and computational techniques. Then, the antigenic genes were cloned into an expression vector, pET-28a and further manipulated for protein expression analysis. The capsid proteins were predicted to be antigenic by Kolaskar and Tongaonkar's semi-empirical method. The antigenic genes were successfully characterised and expressed in *E. coli* BL21(DE3). The results provide information on the stability of the capsid protein and the future ability to elicit immune responses. Therefore, this research can be utilized to design a novel vaccine to combat FMD in ruminants.

Keywords: FMD, FMDV, capsid protein, antigenicity, ruminant disease