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Display of VP1 on the surface of baculovirus and its immunogenicity against human enterovirus 71 in mice

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Human enterovirus 71 (EV71) causes hand, foot and mouth disease (HFMD) among young children with increasing fatal instances of neurological complications in recent years. A safe and effective EV71 vaccine is exigent to control HFMD. In the present study, infectious EV71 viruses were generated from their synthetic complementary DNA using the human RNA polymerase I reverse genetics system. Secondly, the major immunogenic capsid protein (VP1) of EV71-fuyang (subgenogroup C4) was displayed on the surface of recombinant baculovirus Bac-Pie1-gp64-VP1 as gp64 fusion protein under a novel White Spot Syndrome Virus (WSSV) immediate early ie1 promoter. After two immunizations in mice, Bac-Pie1-gp64-VP1 elicited neutralization antibodies titers of 26 against EV71 in an in vitro neutralization assay. Furthermore, the antisera showed high cross-neutralization activities against all 11 subgenogroup EV71 strains. These results illustrated that Bac-Pie1-gp64-VP1 retained native epitopes of VP1 and acted as an effective EV71 vaccine candidate which would enable rapid production without any biosafety concerns.