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Induction of Cellular and Humoral Immune Responses in BALB/c Mice Immunized With rB2L and rF1L Proteins of Orf Virus Adjuvanted With Alumina Nanoparticles

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Abstract : Orf virus (ORFV) is the causative agent of a proliferative skin lesion known as contagious ecthyma in sheep and goats. Currently used live attenuated vaccines against ORFV infection have been reported to cause severe outbreaks in vaccinated animals. In this study, we investigated the immunogenicity of the B2L and F1L proteins of the virus, which are thought to elicit a protective immune response The 6-week-old 50 female mice were divided into 8 groups: seven experimental groups and one control group. Each animal in the experimental group received an initial immunisation with the nanoparticles or proteins coated with the nanoparticles, followed by two booster immunizations with the same products 14 days apart. Ten days after the last booster inoculation, the mice were either humanely killed or lethally challenged with UPM /HSN-2-ORFV at a dose of 106 TCID50/mL in a volume of 50 µl. The spleen was examined for histopathological changes and quantification of T cells by flow cytometry. On the other hand, the degree of protection of mice from the lethal virus was evaluated by lesion size, weight loss, and histopathological examination of skin and liver. The results showed that mice immunised with rB2L alone, rB2L-Al_2O_3-NPs, rB2L/rF1L, and rB2L/rF1L-Al_2O_3-NPs elicited statistically higher levels of anti-rB2L and/or rF1L-specific IgA/IgG and CD4/CD8 cell immune responses than mice in the control groups ($p < 0.01$). The vaccine candidate did not exhibit severe skin damage after monitoring histopathology, morbidity, and mortality. Overall, the results suggest that recombinant rB2L and rF1L antigens may be useful universal vaccine candidates against ORFV infections.

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