



## Development and characterization of Rift Valley fever virus-like particles

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**ABSTRACT.** Rift Valley fever (RVF) is an acute, febrile zoonotic disease that is caused by the RVF virus (RVFV) and spread by arthropod vectors. RVF is currently prevalent in Africa and the Arabian Peninsula, and causes substantial economic losses. Furthermore, this disease poses a serious threat to animal and human health in regions worldwide, making it a serious public health concern. However, RVFV vaccines for human use are still unavailable, and hence there is an urgent need for novel efficient vaccines against RVFV. Vaccine preparation techniques have become a crucial factor in developing new vaccines. In the current study, the N and G protein genes of RVFV were inserted into the pFastBacDual baculovirus expression vector downstream of the pP10 and pPH promoters. The resultant recombinant vector, pFastBacDual-S-M, was transfected into Sf9 insect cells by lipofection. The recombinant baculovirus, named rBac-N-G,

was retrieved and infected into Sf9 insect cells to generate RVFV virus-like particles (VLPs). Using polyclonal antibodies against RVFV proteins in immunofluorescence and western blot analyses, we positively identified the presence of the RVFV proteins in VLP preparations. Sucrose density gradient centrifugation and transmission electron microscopy revealed that the morphology of the RVFV VLPs was consistent with previous reports of RVFV virions. This study describes a technique for efficient production of RVFV VLPs, and has laid the foundation for future VLP-based RVFV vaccines.

**Key words:** Baculovirus expression system; Rift Valley fever virus; Vaccine preparation; Virus-like particle