The immunogenicity of the secretory GATM protein of bovine ephemeral fever virus stably expressed by mammalian cells

Payuda Hansooongnern¹, Chalitka Kaewborisuth², Ketkaew Wasanasuk³, Penpitcha Chankeeree⁴, Sukontip Poonsuk⁵, Chalampol Lecharoensuk⁶, Porntip Lecharoensuk⁷

¹ Interdisciplinary Graduate Program in Genetic Engineering, The Graduate School, Kasetsart University, Bangkok, 10900, Thailand
² Ostar for Advance Studies in Agriculture and Food, Kasetsart University, Bangkok, 10900, Thailand
³ Veterinary Teaching Hospital, Faculty of Veterinary Medicine, Kasetsart University, Bangkok, 10900, Thailand
⁴ Department of Microbiology and Immunology, Faculty of Veterinary Medicine, Kasetsart University, Bangkok, 10900, Thailand
⁵ Department of Companion Animal Clinical Sciences, Faculty of Veterinary Medicine, Kasetsart University, Bangkok, 10900, Thailand

1. Introduction

Bovine ephemeral fever virus (BEFV) causes an acute febrile disease in cattle and water buffalo. The disease has an impact on dairy and beef production in tropical and subtropical countries. Vaccination is used for disease prevention and control. In this study, we developed a recombinant lentivirus to produce mammalian stable cells expressing histidine-tagged BEFV G protein with a deleted transmembrane domain (GATM) as a secretory protein. In addition, guinea pigs were immunised with the purified GATM protein and booster immunised at a 3-week interval. The mammalian stable cells were able to continuously produce GATM protein for a minimum of 25 passages. All of the mammalian stable cells expressing GATM protein could react specifically with a BEFV convalescent bovine serum. Serum samples from the immunised guinea pigs could react strongly and specifically with the purified GATM protein. Moreover, post-immunised guinea pig sera contained antibodies that could neutralise BEFV. These results indicate that the G protein without a transmembrane domain can be used as a subunit vaccine for the prevention and control of BEFV. The availability of the mammalian stable cells, which constitutively express GATM protein, could facilitate the potential use of the secretory protein for BEFV diagnosis and vaccine development.