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Bovine herpesvirus type 4-BAC as an attractive viral vector for vaccination and gene therapy

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BoHV-4 is a member of the family of *Herpesviridae*, subfamily *Gammaherpesvirinae* in the *Rhadinovirus genus*, and it is found worldwide among cattle populations. According to the previous researches, bovine herpes virus type 4(BoHV-4) is sparkling member of the attractive new emerging viral vectors in the vaccination and gene therapy fields. Several biological characteristics of bovine herpesvirus 4 (BoHV-4) make it a good candidate as a gene delivery vector for vaccination purposes. These characteristics include little or no pathogenicity, unlikely oncogenicity, the capability to accommodate large amounts of foreign genetic material, the ability to infect several cell types coming from different animal species, and the ability to maintain transgene expression in both undifferentiated and differentiated cells. In addition, compared to other herpesviruses, BoHV-4 has less complex genome with some determined gene areas to insert the desired gene. Being episomal in the target cells including macrophages, B and T cells makes this virus as a new candidate in the field of viral vectors. To develop a BoHV-4-BAC vector in this research, we have selected the gene area among gp3 and gp4 which has been previously shown to be suitable for introduce of foreign DNA and after insertion of the BAC cassette the resulting virus is stable and able to replicate *in vitro* and *in vivo*. For this, BAC cassette from pBeloBAC11 vector that has been ligated to CMV-EGFP-Neo cassette (from pEGFP-C1) flanked by loxp has been inserted between gp3 (Bo2) and gp4 (Bo3) of Movar33/63 strain of BoHV-4. The extra-chromosomal homologous recombination has been performed in the MDBK cell line after electroporation of circular plasmid containing homologous arms and BAC cassette after inoculation of the virus. After three rounds of G418 selection in BEK cells (700 µg/ml) and one plaque purification, the recombinant virus DNA has been extracted by Hirt method and used for transformation of DH10B cells by electroporation. After 20 serial passages in the bacteria, the stability of BoHV-4-BAC has been proved. This BoHV-4-BAC vector system will be utilized in the future researches including viral vaccination and gene therapy.

Biography

Touraj Aligholipour Farzani has earned his DVM from Urmia Veterinary Medicine School of Iran. After graduation, he has worked for 2 years in the Navy as a Veterinary Surgeon and then pursued his PhD in Virology from the Department of Virology, Ankara University, Turkey. During his Doctorate studentship, he has worked on the development of new strategies including DNA and viral vector (adenoviral vectors) against CCHFV. He has expertise in numerous laboratory techniques including recombinant DNA cloning, cell culture and homologous recombination in eukaryotic and prokaryotic cells. His main focus is on the viral vector systems in vaccination and gene therapy.

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