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BHV-1 gG and tk deletion decreased viral virulence, provided protection, and improved IFN-β production

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To provide a better vaccine against infectious bovine rhinotracheitis, a BHV-1 mutant was constructed by deleting the immunosuppression gene gG and virulent gene tk. The homologous arms of both gene, with (forward selection) or without (reverse selection) gfp gene were cloned into pcDNA3.1(+) myc-HisB for gG gene and pBluescript II SK (+) for tk gene. The viral genome, as well as target gene fragments cut from the recombinant plasmids, coinfected MDBK cells. By forward and reverse screening of Green fluorescence, PCR detection, sequencing, and Western blot assay of gG expression, BHV-1 gG-/tk- mutant was demonstrated to be obtained. Thirty one calves were tested in parallel with this BHV-1 gG-/tk- mutant, gE-/ tk- mutant and wild type (wt) BHV-1. Compared to wtBHV-1, BHV-1 gG-/tk- and gE-/tkinoculation with three doses (4×105 PFU, 4×106 PFU and 4×107 PFU) did not produce any clinical signs and could not be reactivated by dexamethasone (dex). Both mutants provided full protection clinically for the cattle against wtBHV-1 challenge. Although the mutants induced significant lower levels of serum neutralization antibody, IFN- γ and TNF- α than wtBHV-1 on the days 3, 5, 7 after immunization, the transcription and expression of IFN-β of BHV-1 gG-/ tk- was significantly higher than those of wtBHV-1 in vitro and in vivo. With regard to the protection, gG-/tk- mutant was superior than gE-/tk- mutant. In conclusion, BHV-1 gG-/tk- is sufficiently attenuated and would be a promising marker vaccine candidate for IBR, and the mechanism of protection relates to IFN-β.

Biography

Guo Aizhen, born on Oct. 4,1965, has completed his Ph.D at the age of 33 years from Nanjing Agricultural University, China and postdoctoral studies from University of Pennsylvania School of Veterinary Medicine, USA. She is the director of Disease Control Laboratory, National Beef Cattle Industrial Technology System, China. She has published more than 140 papers in reputed journals, among them, 27 research articles published in international journals and others in Chinese journals. She developed several diagnostic methods and kits and novel vaccines for cattle disease control. The main pathogens studied are Mycobacterium bovis, salmonella, Mycoplasma bovis, Infectious Bovine Rhinotracheitis Virus.