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Functional analysis of envelope protein Ernns of bovine viral diarrhea virus

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Bovine viral diarrhea virus (BVDV) is a member of the genus Pestivirus within the family Flaviviridae. In contrast to the genera Flavivirus and Hepacivirus, pestiviruses encode two additional proteins: the autoprotease Npro and the envelope protein Ernns. Although Ernns is described as essential for the generation of infectious virus progeny, only little is known about the structural functions of Ernns and the processing between Ernns and E1. In this study, different virus mutants with partial deletions of the Ernns-encoding region were constructed on the basis of the infectious cDNA clone of BVDV type 1 strain NCP7. In the virus mutants functional parts like basic clusters or the transporter peptide of Ernns were still maintained. Subsequently, bovine cell cultures transfected with the recombinant RNAs were characterized by immunofluorescence and quantitative real-time RT-PCR. Although all mutants were replicons, only one construct with an amino acid substitution within the transporter peptide region could be passaged. Furthermore, bi-cistronic mutants with a deletion of the Ernns-sequence which are expressing BVDV structural proteins under the control of a heterologous IRES were analyzed. With these constructs regions within the structural proteins of BVDV important for cis-complementation of BVDV-Ernns could be defined and will be discussed.

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