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Further insights in the role of pestivirus non-structural protein p7 and NS2

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The p7 protein of pestiviruses was suggested to play a crucial role in virion release, and was therefore classified as a putative 'viroporin'. Here, full-length clones with deletions or substitutions in the p7-encoding region of bovine viral diarrhea virus (BVDV) were analyzed for assembly and release of infectious virions as well as processing of the E2-p7-NS2 region. All mutants showed autonomous RNA replication, and some deletions (CP7_Deltap7_1-70 and CP7_Deltap7_1-50) completely blocked the release of infectious particles, which was associated with an inefficient processing of the E2-p7-NS2-polyprotein. These mutants could even not be trans-complemented with p7 or E2-p7 expressing cell lines. In contrast, constructs with smaller deletions (CP7_Deltap7_15-50 and CP7_Deltap7_25-26) and a less pronounced or even not detectable defect in the processing of E2-p7-NS2 could be trans-complemented with different efficiencies. Surprisingly, constructs with deletions or substitutions in the highly conserved loop region (34REENTKK40) of p7 (CP7_Deltap7_38-40 or p7_K40I) generated infectious virions with growth characteristics identical to wild-type BVDV. Furthermore, accumulation of virus like particles in the rough ER could exclusively be confirmed by electron microscopy for constructs with a severe defect in the processing of the E2-p7-NS2 polyprotein after transfection into a helper cell line, expressing all BVDV structural proteins. In conclusion, the conserved loop region of p7 is obviously less important for virus growth as it was previously predicted and processing of the E2-p7-NS2 polyprotein could markedly influence assembly and release of pestivirus virions. Here, especially the role of a not fully functional NS2-protein for virion accumulation has to be further discussed.