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Abstract

Cytopathic BVDV-1 Induces Type I Interferon Expression through IRF-1 and IRF-7 Transcriptional Factors in MDBK Cells †

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Abstract: Bovine viral diarrhea virus (BVDV-1) is responsible for the Bovine Viral Diarrhea/Mucosal Disease complex, endemic pathology of cattle, as well as for heavy losses for the livestock and dairy industry in the world. Several investigations have shown that BVDV-1 is capable of altering the host animal's immune system, but there is little information available on the molecular and cellular mechanisms involved. The production of interferon (IFN-a/b) is considered a potent and rapid response of the innate immune system against the presence of a virus. In the case of BVDV-1, the antecedents that show whether IFN-b expression is triggered during an infection in bovine models are contradictory, and the transcription factors that regulate the expression of this key cytokine to trigger antiviral status have not been established. To investigate the effects of BVDV-1 on the activation of the immune response, Madin–Dardy bovine kidney (MDBK) cells were infected with the cytopathic biotype cpBVDV-1, and the expression of IFN-b, interferon regulatory factors (IRF) and immunity markers was analyzed. Additionally, a transient silencing of the IRF-7 factor was performed. The results obtained show that BVDV-1 is capable of inducing the production of IFN-b, IRF-1, and IRF-7 in a manner similar to polycytidylic acid, evaluated transcript, and protein level. The use of pharmacological inhibitors against IRF-1 and IRF-7 decreases the production of IFN-b, a phenomenon observed by mainly interfering with the activation pathway of IRF-7. These results propose that in an infection with cpBVDV-1, the activation of the IRF-7 factor is required and indispensable for the regulation of the transcription of the IFN-b gene in an in vitro model of infection.

Keywords: BVDV-1; IFN-b; IRF-7; IRF-1