

Investigation of Porcine Interferons as a metaphylactic intervention strategy against Classical Swine Fever Virus (CSFV)

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Classical Swine Fever (CSF) is an important viral disease of swine. The application of Interferon (IFN) via viral vectors could be a beneficial intervention strategy against CSFV. Unlike type I and II IFN, the anti-CSFV activity of type III IFNs are unknown. Type III IFNs have similar antiviral actions to type I IFN but their specific receptors have limited tissue distribution and may be important as very early defences against infection at epithelial surfaces. PoIFN (type I (α ; β) type II (γ) and type III ($\lambda 1$, 3)) were cloned into a mammalian expression vector, expressed in porcine tracheal (NPTR) cells and the induction of an immune response and anti-CSFV activity examined. PoIFNs were subsequently cloned into an Adenovirus viral vector and the antiviral activity assessed. All three types of IFN upregulated expression of the interferon stimulated gene MxA and significantly reduced CSFV infection in the NPTR cell line and in porcine primary cells. Inoculation of NPTR cells with adenovirus vectors expressing all three types of IFN inhibited CSFV infection, with the AdIFN α/β and λ constructs inducing a greater anti-CSFV effect than the AdIFN γ constructs.

Conclusion: All three types of porcine IFN have some antiviral activity against CSFV and delivery via adenovirus vectors may offer a promising targeted intervention strategy against CSF. Future studies will assess the kinetics of protection of single and combined vectored PoIFN treatments in vitro and in vivo.