Functional implications of natural polymorphisms in the p10 protein of avian reovirus

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Avian reoviruses (ARVs) are economically significant pathogens of poultry. They cause various disease syndromes including arthritis/tenosynovitis and produce substantial economic losses. ARVs are non-enveloped viruses with double stranded segmented RNA genomes. The virus evolves through accumulation of point mutations as well as through genome re-assortment and recombination events. Currently, there are 6 different genotypic cluster groups identified in North America. The S1 genome segment which encodes for p10, p17 and Sigma-C proteins is highly variable and is used as a genetic marker for evolutionary studies. p10 is a 98 amino acid long non-structural transmembrane protein which induces syncytium formation in ARV infected cells. It promotes virus dissemination by facilitating cell to cell fusion. Mechanisms of p10 mediated cell to cell fusion and regulation of host cellular machinery by variant proteins are unclear. Therefore, the objective of this study was to examine the effect of p10 protein natural polymorphisms on host protein interactions and protein function. Sequence alignment of variant p10 proteins revealed a sequence identity ranging between 70.7 to 85.9%. To further characterize the protein, p10 protein coding genes from different ARV genotypic groups were cloned in frame with cMyc-tag in a mammalian plasmid DNA expression vector. Protein expression was confirmed in transfected cells by Western blot using anti-cMyc antibody. Each variant protein was able to induce cell to cell fusion. Preliminary functional analysis using DiO/DiI membrane dye assays demonstrated that p10 variants induced varying levels of syncytium formation. Also, C-terminal fusion of p10 variant proteins with mCherry eliminated their fusogenic activity. Currently work is in progress to understand the effect of variations in p10 protein on host gene expression and p10 - host protein interactions by mRNA sequencing and mass spectrometry, respectively.

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