

THE AVIAN REOVIRUS P10 PROTEIN MODULATES EXTRACELLULAR MATRIX SIGNALLING PATHWAYS WHICH MAY PROMOTE SYNCYTIIUM FORMATION

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Background: Avian reoviruses (ARV) are economically important causes of arthritis and tenosynovitis in poultry. p10 is a fusion-associated small transmembrane (FAST) protein that induces syncytium formation. This allows viral dissemination while avoiding extracellular immune mediators. How p10 induces syncytium formation and alters host cell metabolism remains unclear.

Hypothesis: We hypothesized p10 expression would alter host protein expression and aspects of host metabolism.

Objectives: Identify host cellular proteins and signaling pathways altered by p10 expression.

Methods: The ARV p10 gene was cloned into the pcDNA3-Cymc plasmid expression vector, named pCymc.p10. Leghorn male hepatoma (LMH) cells were transfected with the pCymc.p10 plasmid. p10 expression was assessed 36 hr post-transfection by Western blot. To assess host metabolic effects, pCymc.p10 and pcDNA3-Cymc transfected cells underwent quantitative mass spectrometry-based proteomics. Proteomics data underwent differential protein abundance, functional enrichment, cellular localization, and protein-protein interaction network analysis.

Results: Differential protein expression identified 795 significant proteins (FDR < 0.05), including 109 upregulated (logFC > 1) and 54 downregulated (logFC < -1). Functions, localization, and interactions of 43 significant proteins were further examined. p10-regulated proteins were associated with the extracellular matrix, focal adhesion complexes, membrane receptors, and the cytoskeleton. KEGG pathway analysis indicated that p10 expression influences remodeling of extracellular matrix signaling pathways, involving ECM organization, integrin signaling, focal adhesion, and ECM-receptor interactions. SPP1, ITGB1, COL6A1, and EGFR proteins were key pathway drivers.

Conclusion: ARV p10 expression appears to cause a proteomic shift characterized by extracellular signaling reprogramming, and adhesion pathway modulation, which may facilitate syncytium formation.

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