Expression of innate immune genes, proteins and microRNAs in lung tissue of pigs infected experimentally with influenza virus (H1N2)

This study aimed at providing a better understanding of the involvement of innate immune factors, including miRNA, in the local host response to influenza virus infection. Twenty pigs were challenged by influenza A virus subtype H1N2. Expression of microRNA (miRNA), mRNA and proteins were quantified in lung tissue at different time points after challenge (24 h, 72 h and 14 d post-infection (p.i.)). Several groups of genes were significantly regulated according to time point and infection status including pattern recognition receptors (TLR2, TLR3, TLR7, retinoic acid-inducible gene I, melanoma differentiation associated protein-5), IFN and IFN-induced genes (IFN-β, IFN-γ, IRF7, STAT1, ISG15 and OASL), cytokines (IL-1β, IL-1RN, IL-6, IL-7, IL-10, IL-12A, TNF-α, CCL2, CCL3 and CXCL10) and several acute phase proteins. Likewise, the following miRNAs were differentially expressed in one or more time groups compared with the control pigs: miR-15a, miR-21, miR-146, miR-206, miR-223 and miR-451. At d 1 p.i. lung tissue protein levels of IL-6, IL-12 and IFN-α were significantly increased compared with the control group, and haptoglobin and C-reactive protein were significantly increased at d 3 p.i. Our results suggest that, in addition to a wide range of innate immune factors, miRNAs may also be involved in controlling acute influenza infection in pigs.

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