Unraveling the Role of Novel Type I Interferon in Human Paramyxovirus Infections

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Respiratory Syncytial Virus (RSV) and Human Metapneumovirus (HMPV) are paramyxoviruses that represent the leading cause of pediatric hospitalizations worldwide. Type I interferons (IFN) are critical antiviral mediators that remain largely unknown. In fact, the majority of research has focused on IFN-alpha and IFN-beta, which are known to cause adverse side effects upon clinical administration. One novel member of type I IFN family is IFN-epsilon, which is reported to be expressed in the lung mucosa, where RSV and HMPV replicate. However, there are currently no reports of the role of IFN-epsilon in respiratory viral infections. Therefore, in this work, using an in vitro model of paramyxovirus infection, I determined: 1) the IFN-epsilon expression after viral infection through ELISA and RT-qPCR; 2) the activation pathway for IFN-epsilon induction by the viruses using siRNA transfection and RT-qPCR; and 3) the susceptibility of both viruses to IFN-epsilon by bioactivity assays and flow cytometry. The results demonstrate that RSV and HMPV are inducers of IFN-epsilon, and that cytosolic helicases (RIG-I, MDA5) are critical for its production. Finally, the results suggest that IFN-epsilon is effective in protecting cells from viral infection.Together these results indicate that IFN-epsilon is a relevant cytokine in respiratory paramyxovirus infection.

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