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Higher Susceptibility of Allergic Rhinitis Nasal Mucosa to Influenza a Viral Infection: *In vitro* and *In vivo* Study

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Rationale: We studied whether the nasal mucosa in allergic rhinitis (AR) would be more susceptible to influenza A virus (IAV) infection due to lower induction of interferon (IFN)-related immune responses.

Objectives: To determine whether IFN induction would be impaired in allergic nasal mucosa and to identify which IFN was correlated with higher viral loads in IAV-infected allergic nasal mucosa.

Methods: IAV mRNA, viral titers and IFN expression were compared in IAV-infected normal human nasal epithelial (NHNE, N=10) and allergic rhinitis nasal epithelial (ARNE, N=10) cells. We used *in vivo* model of AR (BALB/C mouse, N=10) and human nasal mucosa from healthy volunteers (N=72) and AR patients (N=29) to assess the induction of IFNs after IAV infection.

Results: IAV mRNA levels and viral titers were significantly higher in ARNE compared with NHNE cells. IFN-β and -λs were induced in NHNE and ARNE cells up to 3 days after IAV infection. Interestingly, induction of IFN-λs mRNA levels and the amount of secreted proteins were considerably lower in ARNE cells. The mean IFN-λs mRNA level was also significantly lower in the nasal mucosa of AR patients. We found that recombinant IFN-λ treatment attenuated IAV mRNA levels and viral titers in IAV-infected ARNE cells and completely controlled IAV infection in an in vivo AR model.

Conclusion: Higher susceptibility of the allergic nasal mucosa to IAV may depend on impairment of type III IFN induction, and type III IFN is a key mechanistic link between higher viral loads and control of IAV infection in allergic nasal mucosa.

Keywords: Influenza A virus; type III interferon; allergic rhinitis; nasal mucosa.

Biography:

Yung Jin Jeon is a Clinical Research Fellow of Department of Otorhinolaryngology at Seoul National University Hospital in South Korea. She graduated from Seoul National University College of Medicine and has completed her resident training at Seoul National University Hospital. She was honored as Excellent Resident. She has done International Medical Education and Research program of University of Minnesota in 2011 and visited the Department of Otorhinolaryngology at University of Harvard Medical School as a visiting physician in 2016. She is a Ph.D. candidate in Immunology of Seoul National University and currently doing basic research focusing on respiratory allergic diseases.