

High prevalence of IgE sensitization to inactivated influenza vaccines, yet robust IgG4 responses, in a healthy pediatric population

Prince Baffour Tonto¹, Mizuho Nagao¹, Shigeru Suga¹, Kiyosu Taniguchi², Masahiro Hirayama³, Tetsuo Nakayama⁴, Takuji Kumagai⁵, and Takao Fujisawa²

¹Kokuritsu Byoin Kiko Mie Byoin

²National Mie Hospital

³Mie Daigaku

⁴Kitasato Institute for Life Sciences

⁵Kumagai Naika Shonika In

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Abstract

Background: Anaphylaxis following influenza vaccination is a rare but serious problem. The underlying immune responses are not well understood. This study elucidated the IgE and IgG antibody responses in healthy children and adolescents following inactivated influenza vaccines (IIVs). Methods: The efficacy and safety of quadrivalent IIV (QIV) and trivalent IIV (TIV) were compared in healthy subjects aged 0-18 years. Serum IIV-specific IgE, IgG and IgG4 levels (sIgE, sIgG, sIgG4) were measured with ImmunoCAP. Hemagglutinin inhibition (HI) assay was performed for each influenza virus subtype. Sera from earlier patients who developed anaphylaxis to different IIVs were similarly tested. Results: A total of 393 subjects were enrolled: 96 were 6 months -2 years old, 100 were 3-5 years old, 100 were 6-12 years old, and 97 were 13-18 years old. No anaphylaxis was observed. Generally, QIV and TIV induced similar antibody responses. IIV-sIgE levels rose significantly after vaccination in the 6m-2y and 3-5y groups, did not change in the 6-12y group, and decreased in the 13-18y group. In contrast, the IIV-sIgG4/sIgE ratio increased significantly after vaccination in all age groups. Sensitized subjects had significantly higher HI titers and IIV-sIgG levels in the youngest age group and higher IIV-sIgG4 levels in all age groups compared with the non-sensitized. The IIV-sIgG4/sIgE ratio in 5 patients with anaphylaxis was significantly lower than in age-matched healthy subjects. Conclusion: IIVs induce IgE sensitization in healthy children, but also robust IgG4 responses that may protect them from anaphylaxis.

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