Allergic rhinitis is a heterogeneous disorder that is associated with significant medical and economic burdens. The mechanisms underlying allergic rhinitis are highly complex and involve multiple immune cells, mediators, and cytokines [1-4], and the etiological pathways involved in the development of allergic rhinitis have not been fully elucidated. Experimental animal models play a vital role in determining the underlying pathophysiological mechanisms of allergic rhinitis. It is therefore important to choose the appropriate animal to establish an allergic model. The causative allergen is another essential aspect of developing a good animal model [5].

In the current issue of Clinical and Experimental Otorhinolaryngology, Lee et al. [6] aimed to compare the sensitivity of BALB/c and C57BL/6 mouse strains to allergic rhinitis using the Dermatophagoides farinae (Der f1) allergen. Mice were sensitized by intraperitoneal injection of aluminum hydroxide gel and challenged by intranasal administration of the Der f1 allergen. Immunohistochemistry, quantitative polymerase chain reaction, and enzyme-linked immunosorbent assay were performed to analyze differences between the two mouse strains and to determine the optimum dose of Der f1 for a mouse model of allergic rhinitis.

The authors observed a significant increase in serum total immunoglobulin E (IgE), Der f1-specific IgE, Der f1-specific IgG1, and Der f1-specific IgG2a for BALB/c mice that were challenged with a low dose of Der f1, but the response in C57BL/6 mice was not statistically significant. Interleukin (IL)-4, eotaxin-1, eotaxin-2, CXCCL-1, and CXCCL-2 mRNA expression levels were also higher in the BALB/c group than in the C57BL/6 mice that received the same treatment. Both mouse strains treated with Der f1 demonstrated higher eosinophil and neutrophil infiltration than their respective control groups. Interestingly, there were no statistically significant differences in immune cell infiltration between both strains. BALB/c and C57BL/6 mice challenged with the Der f1 allergen exhibited significantly higher numbers of IL-25-positive cells. In contrast, there were no appreciable differences in IL-33-positive cells in the BALB/c and C57BL/6 mice compared to the control group.

Taking into account the obtained results, BALB/c mice are biased toward a Th2 response and are more suitable model for allergic rhinitis than C57BL/6 mice. The authors also found that an intranasal challenge with a low dose of allergen (25 μg) is the best for yielding reproducible symptoms and immune reactions in both BALB/c and C57BL/6 mice.

However, C57BL/6 mice are widely used as a starting point for creating strains of gene-manipulated mice. Gene-manipulated mice (transgenic and knockout) may enable analyses of the cellular and molecular basis of pathophysiological conditions [7]. It seems that these models will be excellent future options for obtaining a better understanding of the role of each molecule and cytokine in allergic rhinitis.

Animal models remain the easiest way to illuminate the pathophysiology of allergic rhinitis. They also yield new insights into the pathogenesis and potential treatment of this disorder. It is hoped that further advances in animal models that develop the hallmark features of allergic rhinitis will aid in the identification and testing of new therapeutic approaches.

CONFLICT OF INTEREST
No potential conflict of interest relevant to this article was reported.

ORCID
Roza Khalmuratova https://orcid.org/0000-0002-8518-4034
Hyun-Woo Shin https://orcid.org/0000-0002-4038-9992
AUTHOR CONTRIBUTIONS
Conceptualization, Data curation, Formal analysis, & Methodology: all authors. Project administration: HWS. Visualization: RK. Writing—original draft: RK. Writing—review & editing: HWS.

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Received May 15, 2020
Accepted May 19, 2020