

CORRESPONDENCE

Role of fungal colonization for sensitization in asthma

H. Ogawa¹, M. Fujimura², Y. Takeuchi³ and K. Makimura⁴

¹Division of Pulmonary Medicine, Ishikawa-ken Saiseikai Kanazawa Hospital, Kanazawa, Japan, ²Respiratory Medicine, National Hospital Organization, Nanao National Hospital, Nanao, Japan, ³Division of Respiratory Medicine and Clinical Allergy, Fujita Health University, Toyoake, Japan and ⁴Department of Molecular Biology and Gene Diagnosis, Institute of Medical Mycology and Genome Research Center, Graduate School of Medical Science, Teikyo University, Hachioji, Japan

We would like to comment on the three questions raised in the Review and feature articles by Kennedy et al. [1].

As emphasized by Kennedy et al., efforts to detect fungi in bronchial specimens from patients with allergic fungal respiratory disease will lead to new types of management with use of antifungal drugs. It is reasonable to carry out bronchial washing to exclude contamination and to obtain relevant fungi. However, with regard to patient safety, the essential purpose may be accomplished by obtaining samples of repeated induced sputum [2] instead of bronchial washings as a routine part of management of severe asthma. Our series of studies concerning basidiomycetous (BM) fungi were begun with a similar background [3].

It should be noted that *Fusarium* and *Zygomycota* are not susceptible to itraconazole *in vitro*. Before starting antifungal treatment, it is important to decide what type of antifungal drugs should be administered, but it is also important to consider how they should be used. Kennedy et al. described three distinct forms of exposure to fungal allergens – fungal colonization of the lungs, inhalation of fungal allergens on spores or hyphae, and fungal infection outside the respiratory tract – which raised fundamental problems regarding antifungal therapy that remain to be resolved. Recent developments in molecular biological analyses have increased the list of BM fungi that were not previously thought to be of concern as pathogenic agents [4]. It has recently been demonstrated that colonization by *Bjerkandera adusta* is necessary in the process of sensitization to this fungus in allergic fungal cough (AFC) patients [5]. On the other hand, it has recently been clarified that colonization by *Schizophyllum commune* is not necessary in the process of sensitization to this

fungus in asthma [6], but it is necessary in allergic bronchopulmonary mycosis (ABPM) caused by this fungus [7]. Thus, considering the role of fungal colonization for sensitization in patients with fungus-associated asthma may yield insights that will aid in successful treatment with antifungal drugs.

We have already reported successful therapy using amphotericin B aerosol with fewer side effects in atopic cough [8]. In spite of the availability of antifungal drugs [9], our case reports suggested that disease recurrence in both AFC [10] and ABPM [7] was influenced by the existence of related fungi in the patients' environment. Successful strategies including environmental management may be established by resolving further problems – Does the detected fungus obtained from the bronchial specimen really sensitize the patient via colonization by this fungus? Can eradication of this fungus prevent sensitizing in the patient by this fungus? What types of antifungal drugs should be used? Is sensitization by a fungus, regardless of whether fungal culture is positive or not, an aggravating factor in asthma control? Does fungal sensitization influence the patients' prognosis? How can sensitization to the fungus be prevented? [11].

With appropriate information regarding the target fungi, antifungal drugs have the potential to both eradicate fungal colonization and prevent fungal sensitization.

Conflict of interest

All authors declare that they have no competing interests that might be perceived to influence the results and discussion reported in this manuscript.

Correspondence:

Haruhiko Ogawa, The Division of Pulmonary Medicine, Ishikawa-ken Saiseikai Kanazawa Hospital, Ni-13-6 Akatsuchi-machi, Kanazawa 920-0353, Japan.

E-mail: saiseikh@po3.nsknet.or.jp

References

- 1 Kennedy JL, Heymann PW, Platts-Mills TA. The role of allergy in severe asthma. *Clin Exp Allergy* 2012; **42**:659–69.
- 2 Ogawa H, Fujimura M, Takeuchi Y, Makimura K. Efficacy of itraconazole in the treatment of patients with chronic cough whose sputa yield basidiomycetous fungi—Fungus-associated chronic cough (FACC). *J Asthma* 2009; **46**:407–11.
- 3 Ogawa H, Fujimura M, Takeuchi Y, Makimura K. Possible roles of 2 basidiomycetous fungi in allergic fungal respiratory disease. *J Allergy Clin Immunol*. 2012; **130**:279–80.
- 4 Knutsen AP, Bush RK, Demain JG *et al*. Fungi and allergic lower respiratory tract diseases. *J Allergy Clin Immunol* 2012; **129**:280–91.
- 5 Ogawa H, Fujimura M, Takeuchi Y, Makimura K. Is *Bjerkandera adusta* important to fungus-associated chronic cough (FACC) as an allergen? Eight cases' report. *J Asthma* 2009; **46**:849–55.
- 6 Ogawa H, Fujimura M, Takeuchi Y, Makimura K. The influence of *Schizophyllum commune* on asthma severity. *Lung* 2011; **189**:485–92.
- 7 Ogawa H, Fujimura M, Takeuchi Y, Makimura K. The definitive diagnostic process and successful treatment for ABPM caused by *Schizophyllum commune*: a report of two cases. *Allergol Int* 2012; **61**:163–9.
- 8 Ogawa H, Fujimura M. Is eradication of fungal colonization by amphotericin B aerosol efficacious for severe atopic cough? *Allergology* 2005; **20**:549–52 (in Japanese).
- 9 Platts-Mills TA, Woodfolk JA. Trichophyton asthma. *Chest* 2009; **135**:887–8.
- 10 Ogawa H, Fujimura M, Takeuchi Y, Makimura K. Sensitization to *Bjerkandera adusta* enhances severity of cough symptom in patients with fungus-associated chronic cough (FACC). *Med Mycol J* 2011; **52**:205–12.
- 11 Ogawa H, Fujimura M, Takeuchi Y, Makimura K. Hypothesis for future management of *Schizophyllum* allergy in asthma control. *Pulm Pharmacol Ther* 2012; **25**:335–6.