NOTE *Internal Medicine*

Oral Allergy Syndrome Induced by Tomato in a Dog with Japanese Cedar (*Cryptomeria japonica*) Pollinosis

Masato FUJIMURA[1)], Keitaro OHMORI[2)], Kenichi MASUDA[2)], Hajime TSUJIMOTO[2)] and Masahiro SAKAGUCHI[3)]*

[1)]*Fujimura Animal Clinics, 5–10–26 Aomatanihigashi, Mino-shi, Osaka 562–0022,* [2)]*Department of Veterinary Internal Medicine, Graduate School of Agricultural and Life Sciences, The University of Tokyo, 1–1–1 Yayoi, Bunkyo-ku, Tokyo 113–8657 and* [3)]*Department of Immunology, National Institute of Infectious Diseases, 1–23–1 Toyama, Shinjuku-ku, Tokyo 162–8640, Japan*

(Received 10 May 2002/Accepted 12 July 2002)

ABSTRACT. A dog with Japanese cedar (*Cryptomeria japonica*, CJ) pollinosis had oral allergy syndrome (OAS) after ingesting fresh tomato. The dog showed specific IgE to both CJ and tomato allergens. As a negative control, twenty dogs without atopic dermatitis that had no exposure to tomato and no specific IgE to CJ allergen were used. They had no specific IgE to tomato allergen. Furt hermore, IgE cross-reactivity was observed between CJ and tomato allergens in the dog. We found that OAS induced by tomato exists in the dog and there is a relationship between CJ and tomato allergens.

KEY WORDS: oral allergy syndrome, pollen, tomato.

J. Vet. Med. Sci. 64(11): 1069–1070, 2002

In Japan, Japanese cedar (*Cryptomeria japonica*, CJ) pollinosis is one of the most common human allergic diseases [3]. CJ pollinosis has also been reported in dogs in Japan [10]. Our recent epidemiological study reported that approximately 20% of atopic dogs had specific IgE to crude CJ allergen [7]. Furthermore, dogs sensitive to CJ allergen showed blastogenesis and histamine release from peripheral leukocytes specific to this pollen antigen [5]. These findings suggested that CJ allergen might be associated with the pathogenesis of atopic dermatitis in dogs.

Human patients showed oral allergy syndrome (OAS) after eating fruits and vegetables [1]. In human pollinosis patients, sensitivity to fruits and vegetables as OAS was reported [8]. Furthermore, there has been reported the association between some pollinosis and OAS in regard to fruits such as apple, orange, tomato, grape [2,11]. Recently, it is suggested that there is an association between human CJ pollinosis and tomato (*Lycopersicon escletum*) allergy [4]. However, there has been no report on OAS in dogs. In this study, we found that a dog with CJ pollinosis showed OAS induced by tomato.

A 6-years-old male mixed-breed dog showed typical lesions of chronic dermatitis including erythema, eczema, and hair-loss with severe pruritus during April to October. The dog showed severer symptoms during the season of CJ pollenation. Specific IgE to both crude CJ and tomato allergens were assayed by a fluorometric ELISA as described previously [6]. Fresh tomato was washed well with water and rinded. Next, the tomato was dissected and homogenized. After centrifugation and filtration through a 0.22-μm membrane, the tomato extract was used as an ELISA antigen. The dog had specific IgE to both CJ and tomato allergens (Fig. 1). As a negative control, 20 healthy dogs without specific IgE to CJ allergen were used. There was no history of exposure to tomato in the dogs. The 20 control dogs showed no specific IgE to tomato allergens (Fig. 1). In this study, interdermal skin test could not be performed.

Since the dog with atopic dermatitis had been treated with elimination diets (Eukanuba veterinary diets dry dog food, Response™ FP/Canine, Iams Co., Dayton, U.S.A.) for the last 3 years, it is considered that the dog has not been exposed to tomato. Oral provocation test was performed to

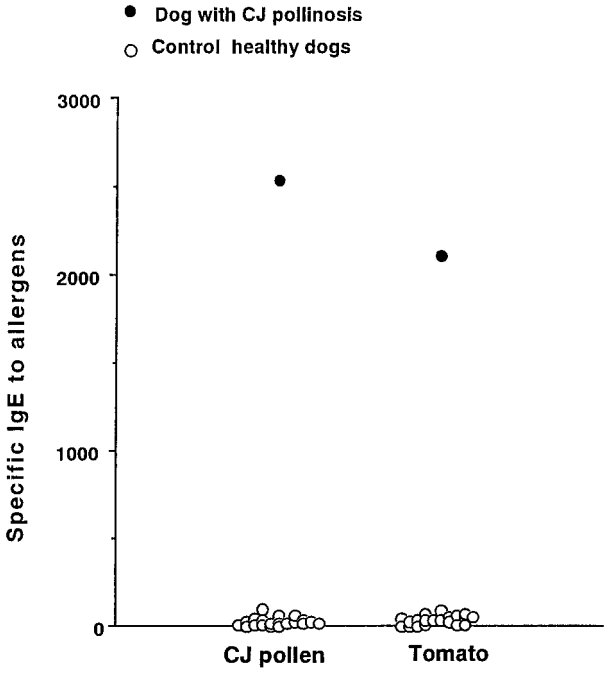

Fig. 1. Specific IgE to CJ and tomato allergens in dogs. ● dog with CJ pollinosis, ○ negative control dogs. Specific IgE levels are expressed as fluorescence units.

* CORRESPONDENCE TO: DR. SAKAGUCHI, M., Department of Immunology, National Institute of Infectious Diseases, Toyama 1–23–1, Shinjuku-ku, Tokyo 162–8640, Japan.

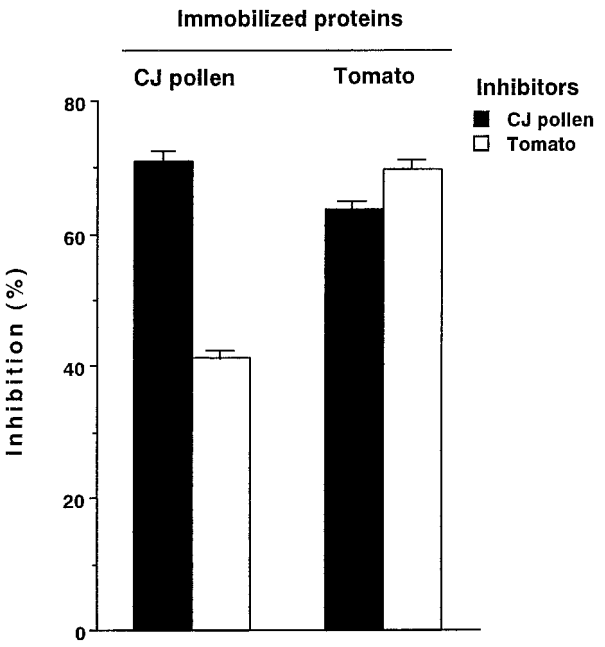

Fig. 2. IgE cross-reactivity between CJ and tomato allergens. Inhibitors: ■ CJ allergen, □ tomato allergen.

confirm the diagnosis of tomato allergy. First, 10 g of tomato juice was given to the dog, and no change was observed in the dog 30 min after tomato provocation. In general, heated fruits do not cause OAS in human patients [11]. In this study, the IgE reactivity to the tomato allergen which was autoclaved at 120°C for 20 min was reduced by more than 90% (data not shown). Next, 10 g of fresh tomato was given to the dog. The dog showed OAS such as flowing saliva, lip tightness and swelling, and quivering of tongue 15 min after tomato provocation. In addition, the dog showed flushing with pruritus in the abdomen and ears 30 min after the provocation. These symptoms were considered to be similar to those of OAS in human patients.

The allergenic cross-reactivity between CJ and tomato allergens was analyzed by a fluorometric ELISA inhibition as described previously [6]. In the dog, incubation of the homologus CJ antigen with the serum inhibited binding by more than 80% (Fig. 2). IgE binding to CJ was inhibited by tomato allergen. A similar pattern in the reciprocal inhibition was also observed (Fig. 2). These results showed a cross-reactivity between CJ and tomato allergens in the dog. Petersen *et al.* reported IgE cross-reactivity between grass pollen and tomato allergens in human patients with grass pollinosis [9]. As well, Kondo *et al.* reported IgE cross-reactivity between CJ and tomato allergens in human patients with CJ pollinosis [4].

In conclusion, it appears that OAS induced by tomato exists in a dog suffering from CJ pollinosis. IgE cross-reactivity between CJ and tomato allergens in the dog is similar to that seen in human patients with CJ pollinosis.

REFERENCES

1. Amlot, P.L., Kemeny, D.M., Zachary, C., Parkes, P. and Lessof, M.H. 1987. *Clin. Allergy* **17**: 33–42.
2. Boccafogli, A., Vicentini, L., Camerani, A., Cogliati, P., D'Ambrosi, A. and Scolozzi, R. 1994. *Ann. Allergy* **73**: 301–308.
3. Ishizaki, T., Koizumi, K., Ikemori, R., Ishiyama, Y. and Kushibiki, E. 1987. *Ann. Allergy* **58**: 265–270.
4. Kondo, Y., Tokuda, R., Urisu, A. and Matsuda, T. 2002. *Clin.Exp. Allergy* **32**: 590–594.
5. Masuda, K., Sakaguchi, M., Saito, S., DeBoer, D.J., Fujiwara, S., Kurata, K., Yamashita, K., Hasegawa, A., Ohno, K. and Tsujimoto, H. 2000. *J. Vet. Med. Sci.* **62**: 995–1000.
6. Masuda, K., Tsujimoto, H., Fujiwara, S., Kurata, K., Hasegawa, A., Taniguchi, Y., Yamashita K., Yasueda, H., DeBoer, D.J., de Weck, A.L. and Sakaguchi, M. 2000. *Vet. Immunol. Immunopathol.* **74**: 263–270.
7. Masuda, K., Sakaguchi, M., Fujiwara, S., Kurata, K., Yamashita, K., Odagiri, T., Nakao, Y., Matsuki, N., Ono, K., Watari, T., Hasegawa, A. and Tsujimoto, H. 2000. *Vet. Immunol. Immunopathol.* **73**: 193–204.
8. Ortolani, C., Ispano, M., Pastorello, E.A., Bigi, A. and Ansaloni, R. 1988. *Ann. Allergy* **61**: 47–52.
9. Petersen, A., Vieths, S., Aulepp, H., Schlaak, M. and Becker, W.M. 1996. *J. Allergy Clin. Immunol.* **98**: 805–815.
10. Sasaki, Y., Kitagawa, H., Fujioka,T., Kitoh, K., Iwasaki, T., Sakaguchi, M. and Inouye, S. 1995. *J. Vet. Med. Sci.* **57**: 683–685.
11. Sicherer, S.H. 2001. *J. Allergy Clin. Immunol.* **108**: 881–890.