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An OMA case: ELISA proved mite pollution

A case of oral mite anaphylaxis: contamination of wheat flour by mites determined by enzyme-linked immunosorbent assay

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Dear Editor,

Oral mite anaphylaxis (OMA) induces severe allergic reactions after the intake of mite-contaminated wheat flour.^{1,2,3,4} This is the first case of OMA diagnosed using a basophil activation test (BAT) and enzyme-linked immunosorbent assay (ELISA).

A 37-year-old woman with a history of allergic rhinitis experienced anaphylactic symptoms including rash, nausea, diarrhea, and nasal obstruction 30 minutes after the ingestion of home-made okonomiyaki cooked with mixed wheat flour stored in a plastic container at ambient temperature after opening (home flour mix). The other ingredients in okonomiyaki were pork, cabbage, and eggs and she had consumed these individual ingredients without symptoms. Furthermore, she had eaten other wheat products and okonomiyaki cooked in restaurants without symptoms.

Laboratory examination showed total IgE was 490 IU/ml and mite specific IgE (*Dermatophagoides pteronyssinus*: 71.0 IU/ml, and *Dermatophagoides farinae*: 79.9 IU/ml) in serum, but negative for wheat, gluten, omega-5 gliadin, egg yolk/white, and pork were noted. We performed skin prick tests (SPTs) using reagents supplied by Torii Pharmaceutical Co., Ltd. Natural saline was used for negative controls and histamine dihydrochloride (10 mg/ml) for positive controls. Wheal diameters were 9 mm for histamine, 19 mm for mite allergen extract, and negative for other factors (wheat and egg yolk/white). Wheal diameters were 3 mm for the

home flour mix suspension and 0 mm for an unopened flour mix (Figure 1a, b, c). However, microscopic examination of the home flour mix indicated only one obscure structure and no presence of mites.

Therefore, we performed BAT using the home flour mix, the unopened flour mix, and mite allergen extract. High CD203c/CD63 expression, indicating basophil activation, was observed with mite allergen extract and the home flour mix, but not with the unopened flour mix (Figure 1d, e). The mite allergens in flours were measured by ELISA (Nichinichi Pharmaceutical Co., Ltd.). In the home flour mix, the Der f 1 and Der Gr 2 (consist of Der p 2 and Der f 2) concentrations were 16.35 ng/g and 25.22 ng/g, respectively, but were absent in the unopened flour mix (Figure 1f).

To diagnose OMA, it is suggested to i) detect mite-specific IgE; ii) perform SPTs with suspected and uncontaminated flour; iii) microscopically identify mites in the suspected flour; and iv) perform immunoassays to detect mite allergens in the suspected flour.¹ An oral challenge test with mite-contaminated food is not likely to practical or not recommended and may lead to severe reactions.^{2,5} Kamizono *et al.* reported a case of OMA diagnosed by a combination of microscopic examination and BAT.² However, in our case, ELISA, but not microscopic examination, successfully identified contamination by mites. In addition, the activated basophils were only confirmed by BAT with the mite allergen extract and the home flour mix. Therefore,

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- 66 BAT and ELISA with suspected flour might aid the diagnosis of OMA, when microscopic
- 67 examination of the suspected flour does not reveal the contamination of mites.

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CONFLICT OF INTEREST: none declared.

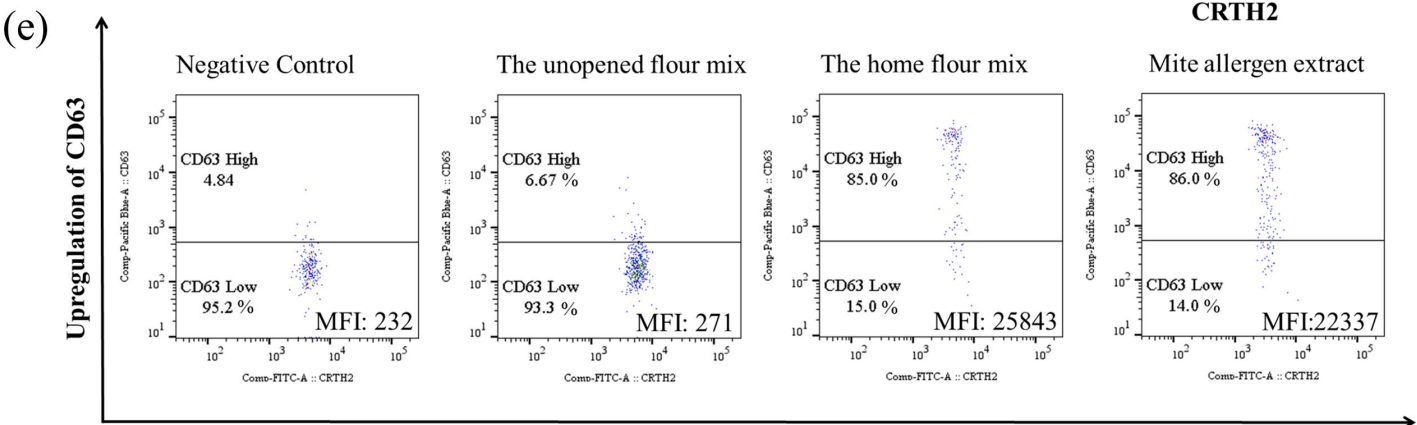
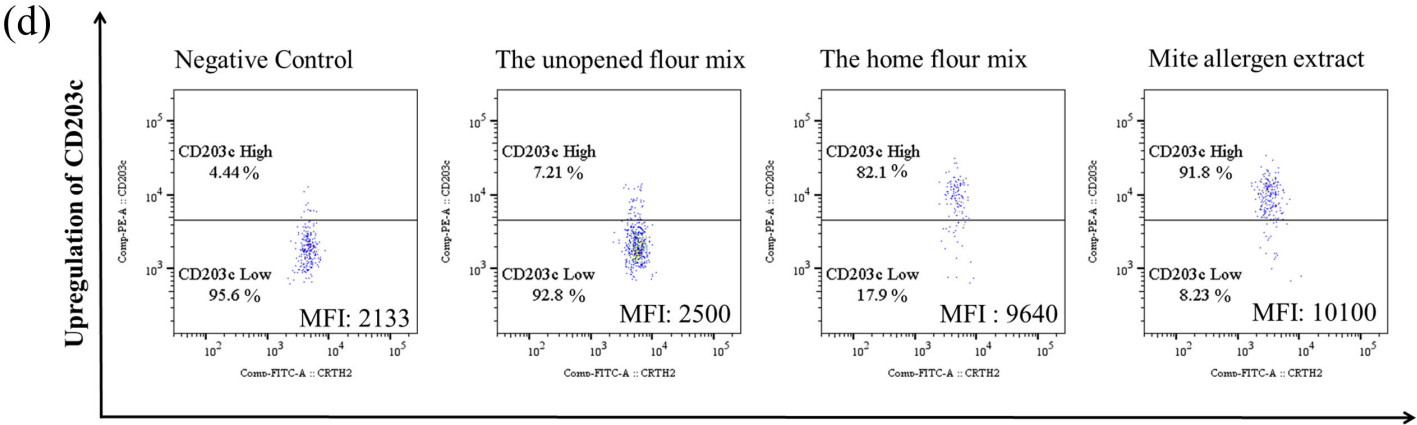
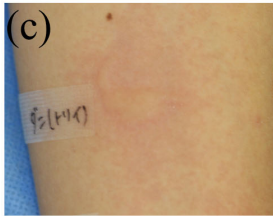
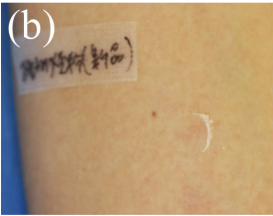
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84 **Figure Legend**

85 Figure 1. (a-c) The results of SPTs. Wheal diameters were (a) 3 mm for the home flour mix, (b)
86 and 0 mm for the unopened flour mix. (c) Wheal diameter by SPT was 19 mm for mite allergen
87 extract. (d, e) The results of the BAT. High CD203c/CD63 high-expression, indicating activated
88 basophils, was observed with the home flour mix and mite allergen extract, but not the
89 unopened flour mix. (f) The results of the ELISA. Der f 1 and Der Gr.2 (consist of Der p 2 and
90 Der f 2) were detected in the home flour mix, but not detected in the unopened flour mix. The
91 measurement of mite allergen content by ELISA. The data were expressed as nanograms per
92 flour weight (ng/g).

Figure 1



		CRTH2		
(f)	Storage condition	Der f 1	Der p 1	Der f 2
The home flour mix	ambient temperature	1.635 ng/mL	-	2.522 ng/mL
The unopened flour mix	ambient temperature	-	-	-