One of the Rubber Latex Allergens Has Lysozyme Activity

T.	Takeshi	Yagami ^a
M.	Michio	Sato ^a
A.	Akitada	Nakamura ^a
M.	Mamiko	Shono ^b

^aDivision of Medical Devices, National Institute of Health Sciences, ^bShono Clinic of Dermatology, Tokyo, Japan

Correspondence to: Takeshi Yagami, MS, Division of Medical Devices, National Institute of Health Sciences, Kamiyoga 1-18-1, **Setagaya-ku**, Tokyo 158 (Japan)

Dear Sir,

Recently type I hypersensitivity reactions caused by rubber latex gloves have frequently been reported, and some proteins eluted from rubber gloves are considered to be responsible for this allergy [1]. Although the molecular weights of these allergenic proteins have been determined by several groups, the detailed properties of them have not been clarified yet. On the other hand, it was reported that rubber latex allergy was occasionally associated with allergy to fruits such as banana, avocado, fig, and passion-fruit [2]. The cross-reactivity between rubber latex and these fruits implies the presence of common antigens or antigenic determinants, but any reasonable explanation has not been presented so far because of phylogenetical dissimilarity between rubber tree (*Hevea brasiliensis*) and these fruits. We report here that one of the allergenic proteins in rubber latex gloves has lysozyme (mucopolysaccharide N-acetylmuramoylhydrolase, EC 3.2.1.17) activity. The presence of this protein may be accountable for the cross-reactivity between rubber latex and fruits.

There are some reports describing the lysozyme activity of avocado, papaya [3], fig [4], and also rubber tree latex [5]. We focused our attention on this enzyme activity, and examined the extracts from ammoniated rubber latex, surgical gloves (Triflex; Baxter, USA), and household gloves (Dunlop Home Products, Japan) by means of a cell suspension clearing test using *Micrococcus lysodeikticus* cell walls [3]. All of the three extracts exhibited strong clearing activity, i.e., lysozyme activity. The protein profiles of these extracts in sodium dodecyl sulfate-polyacrylamide gel electrophoresis were different, but they had a common strong band at 27 kD. We isolated a protein having lysozyme activity by ion-exchange chromatography, and gel filtration chromatography then confirmed that the lysozyme activity was mostly ascribed to the 27-kD protein. This protein showed its maximum lysozyme activity at pH 4.4 and 70 °C in 0.03 ionic strength buffer. Moreover, the activity was effectively inhibited by histamine (60% inhibition at 0.02 M), but not by N-acetyl-D-glucosamine (20% inhibition at 0.4 M). These features coincide with those of papaya, fig, and other plant lysozymes. In point of allergenicity, the glove extracts and the isolated lysozyme were submitted to immunoblotting with the serum of a 51-year-old housewife. She had developed generalized wheal after wearing the household gloves and exhibited strongly positive reactions in prick test to the aqueous extracts of the ammoniated rubber latex and the two brands of gloves (Triflex, Dunlop). The IgE antibodies

bound to the lysozyme band (27 kD) as well as to some other protein bands (14, 33, 34, 37, and 45 kD). Therefore, this lysozyme was proved to be one of the rubber latex allergens. There is a high probability that the 27-kD rubber latex

protein reported as a major antigen by Alenius et al. [6] is the same.

These results offer a clue to the riddle of the cross-reactivity between rubber latex and the fruits. Furthermore, considering the high specificity and sensitivity, the lysozyme activity test may become a useful tool in evaluating the safety of rubber latex products.

References

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