Latex, an Intriguing Allergen

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Key Words

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Natural rubber latex (NRL) is a complex cytosolic mixture obtained from the rubber tree *Hevea brasiliensis*. Fresh NRL (FL) is preserved with ammonia, centrifuged, 'compounded' and, after 'aging', used in the manufacture of medical devices and many everyday products.

FL contains $\approx 1\%$ protein and includes > 200 different polypeptides. By immunoblotting, $\geq 20\%$ of these polypeptides have been identified as allergens [1].

Since about 1989, allergy to proteins in NRL has become a major health problem among certain groups at risk, namely, health care workers (the prevalence being up to 10% or more in operating-room personnel) and in patients who have undergone multiple surgical procedures (the prevalence being up to 50% in children with spina bifida). This 'epidemic' is related to the marked increase in the use of latex gloves for protection against HIV and hepatitis viruses which occurred in the mid-1980s.

The diagnosis of latex allergy rests largely on an adequate history and reliable skin prick tests. Unfortunately, well-characterized, standardized diagnostic reagents are not yet available. A few latex extracts are available commercially in Europe and Canada, but none is available in the USA, allergists there being forced to prepare their own in-house reagents.

To illustrate this problem, we performed skin prick tests in 46 latex-allergic patients with six latex extracts (from four European and one Canadian firm), all prepared from high-ammoniated latex (HAL) but differing in their preparation. Four of them appeared to have been centrifuged to eliminate some or most of the rubber particles; the other two, having a milky appearance, had simply been diluted with buffer or glycerine.

Results

There were significant differences in the potency of these reagents, their sensitivity varying from 72 to 100%. Still, all the latex-sensitive patients reacted to at least two of them.

There is evidence that nonammoniated FL may be a better source material than HAL for the production of diagnostic reagents. In fact, there are several potential latex sources for the preparation of diagnostic reagents: (1) whole HAL (which includes the rubber particles); (2) the serum of ammoniated latex (ALS), obtained by centrifuging HAL and removing the upper layer

consisting of rubber particles; two fractions, (3) the 'C serum' (CS) and (4) the 'bottom (lu-toid) fraction' (BF), separated after centrifuging FL, and (6) 'F serum' (containing proteins of both the CS and BF) resulting from freezing FL, and later thawing it and centrifuging the resulting exudate. In addition, extracts of latex gloves and films prepared from HAL can be used.

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We compared ALS, CS and BF (previously lyophilized), at a concentration of 10 µg/ml, by skin prick testing a group of 15 latex-sensitive patients. ALS failed to provoke a response in any patient whereas CS and BF were highly reactive. On the other hand, fractions obtained by separating the component proteins on Sephacryl S300 proved to be reactive when derived from any of the three preparations. The fraction retained on the column to the greatest extent from all three sources was the most allergenic; each of these was found to have a similar but complex polypeptide composition. Other fractions of CS and BF, and to a far lesser extent ALS, also gave some positive responses.

Conclusions

The description of an optimal latex skin test reagent, including its source material, still requires investigation.

Reference

1 Alenius H, Kurup V, Kelly K, Palosuo T, Tur-janmaa K, Fink J: Characteristic IgE profile to natural rubber latex in patients with spina bifida and anaphylaxis (abstract). *J Allergy Clin Immunol* 1994;93:300.

455