

Corn Allergens: IgE Antibody Reactivity and Cross-Reactivity with Rice, Soy, and Peanut

Samuel B. Lehrer^a Gerald Reese^a Jean-Luc Malo^b Chawki Lahoud^a
Susan Leong-Kee^a Bruce Goldberg^c Tim Carle^a Motohiro Ebisawa^c

^aTulane University Medical Center, New Orleans, La., USA; ^bHôpital de Sacré-Cœur de Montréal, Montréal, Québec, Canada; ^cDepartment of Pediatrics, National Sagamihara Hospital, Kanagawa, Japan

Key Words

Rice · Corn · Soybean · Peanut · Allergens · Cross-reactivity

three criteria – a positive history of allergy, a positive skin test and/or a positive radioallergosorbent test (RAST) to corn, soybean, rice or peanut, were tested.

Results

Introduction

Although cited as a food allergen, there has been little investigation of corn. Studies of corn allergy are complicated by the prevalence of corn throughout our food supply, the alcohol solubility of the majority corn proteins, and the suggested crossreactivity of corn with other seeds as well as with grass pollen allergens [1–3]. The current study was undertaken to determine the crossreactivity of corn allergens by RAST and RAST inhibition with those present in rice, soy, and peanut.

Materials and Methods

Corn kernels were ground and extracted with 0.5 M phosphate-buffered NaCl, pH 7.4 containing 10 μ M EDTA and centrifuged (100,000 g). The corn extract was concentrated (Amicon, molecular weight cutoff 1,000 Daltons). Extracts of rice, soybean, or peanut were prepared similarly in PBS, pH 7.4. Dry weights of all extracts were determined. One-hundred and twenty-three sera from corn, soy, rice and peanut-reactive subjects with at least two of the following

Extracts were coupled to cyanogen bromide-activated paper discs and RAST performed with serum diluted 1:20 with saline in duplicate as described previously [2]. Results were expressed as mean percent bound of the total ¹²⁵I added. RAST values at least three fold greater than that of the negative control sera (>3%) were considered positive. Seed extracts (1 μ g/ml, 10 μ g/ml, 100 μ g/ml, 1 mg/ml, 10 mg/ml, 20 mg/ml) used to inhibit the RAST [5]. The parameters of the inhibition curve (50% inhibition concentration, maximal slope) were calculated by logit-log transformation and linear regression.

Significant RAST correlations were observed between rice and corn ($r = 0.95$) (fig. 1), corn and soybean ($r = 0.85$), rice and soy ($r = 0.81$), and peanut and soybean ($r = 0.76$). Nonsignificant correlations were observed upon comparison of peanut and corn ($r = 0.50$), and peanut and rice ($r = 0.51$) RASTs.

Inhibition analysis for corn RAST demonstrated significant inhibition with soybean, rice and peanuts. Rice had the highest inhibitory reactivity (fig. 2). For the soybean RAST, similar yet significant inhibition was observed with corn,

rice and peanut. For the rice RAST, inhibitions were observed with corn, rice and peanut. Surprisingly, peanut inhibition, significant although low, was achieved with soybean but not with corn and rice.

Discussion

This study demonstrates *in vitro* cross-reactivities among IgE binding proteins of corn, rice, soybean and peanut. A high degree of cross-reactivity between corn and rice probably relates to the fact that they belong to the botanical family *Graminaceae* (grasses). This suggests that further studies should address possible crossreactivities of corn and rice with grass pollen allergens and their clinical relevance. Furthermore, the clinical significance of the observed *in vitro* cross-reactivities must be evaluated in double-blind placebo-controlled challenge studies.

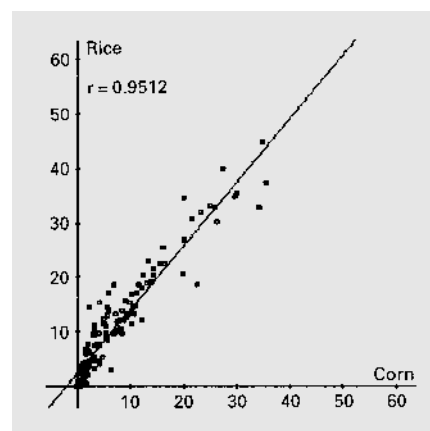


Fig. 1. Correlation analysis of RAST reactivities to corn and rice.

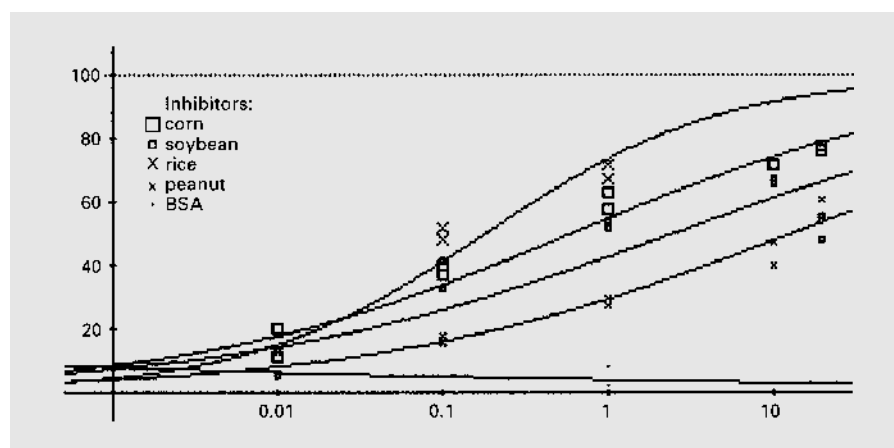


Fig. 2. Corn RAST.

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