Threshold dose distribution in walnut allergy

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Aims: To determine eliciting doses (EDs) in walnut allergic adults and to compare with previously established threshold data in peanut and tree nuts.

Methods: Prospectively, adult subjects with a suspected walnut allergy were included and underwent a low-dose double-blind, placebo-controlled food challenge (DBPCFC). Individual no observed and lowest observed adverse effect levels (NOAELs/LOAELs) were determined and Log-Normal, Log-Logistic and Weibull models were fit to the data. Estimated eliciting dose (ED) values were calculated for the ED\textsubscript{5}, ED\textsubscript{10} and ED\textsubscript{50}, the dose respectively predicted to provoke an allergic reaction in 5, 10 and 50% of the walnut allergic population.

Results: Fifty-seven subjects were challenged and 33 subjects were confirmed to be walnut allergic. Objective symptoms occurred in 20 of the positive challenges (61%), varying from angioedema of the lip to severe dyspnea. The lowest cumulative LOAEL for objective symptoms was 0.31 mg of walnut protein, leading to repeated coughing in one subject. Data from 13 subjects with only subjective symptoms were right censored. The cumulative eliciting doses in the three distribution models ranged from 3.1 to 4.1 mg for the ED\textsubscript{5}, from 10.6 to 14.6 mg walnut protein for the ED\textsubscript{10} and from 590 to 625 mg of walnut protein for the ED\textsubscript{50}.

Conclusion: Population EDs for walnut are slightly higher compared to those previously found in peanut and hazelnut allergy. Additionally, previous ED estimates for cashew from a limited number subjects (31) was also higher when compared to hazelnut (202 subjects), indicating that threshold levels for hazelnut could be used as a conservative estimate for risk assessment of other tree nuts where little or no food challenge data is available.