

Raw egg allergy—A potential issue in vaccine allergy

To the Editor:

I read with interest the article by Eigenmann (Eigenmann PA. Anaphylactic reactions to raw eggs after negative challenges with cooked eggs. *J Allergy Clin Immunol* 2000;105:587-8). In this article he described two patients who tolerated the ingestion of hard-boiled eggs but later had systemic immediate-type allergic reactions to foods containing raw eggs. The patients' skin tests revealed less reactivity to boiled, as opposed to raw, eggs. I have a patient who may demonstrate another danger to patients who tolerate cooked but not raw eggs.

A 37-year-old woman reported that 4 years earlier she had reacted to a yellow fever vaccination. Within 4 hours of receiving the shot she had total body itching and then frank hives. She stated that she routinely eats eggs without any reaction whatever, and when asked before the vaccination whether she was egg allergic, she answered no. Further questioning, however, revealed that when she ate cookie dough containing raw egg she had immediate oral itching. Yellow fever vaccine is prepared in chicken embryos and also contains gelatin as a stabilizer.¹ Prick skin tests were performed with yellow fever vaccine, commercial whole egg and chicken extracts, egg white, and gelatin. The yellow fever vaccine and commercial whole egg extract were tested unheated as well as heated in a microwave oven. The egg white was tested raw (as is) and hard boiled (pulverized and extracted in saline solution). The results are presented in Table I.

Table I. Prick skin test results

Skin test reagent	Wheal (mm)/erythema (mm)
Full-strength yellow fever vaccine (unheated)	5/33
Full-strength yellow fever vaccine (heated)	0
Commercial whole-egg extract (unheated)	4/46
Commercial whole-egg extract (heated)	0
Egg white (raw)	6/35
Egg white (hard boiled)	0
Commercial chicken extract (unheated)	0
Gelatin (liquid, unheated)	0
Positive control (histamine, 1 mg/mL)	5/53
Negative control (50% glycerin)	0

The patient was advised that she could continue to eat cooked egg but should strictly avoid raw egg. Yellow fever vaccine boosters are given every 10 years, and she was advised to return to the allergy clinic when her next dose was due to consider administration of the vaccine in graded doses.¹

This patient is probably allergic to some heat-labile allergen in egg.^{2,3} When asked if she is egg allergic, she would logically answer no because she eats cooked eggs regularly without reaction. The number of foods consumed containing raw egg is so small that these ingestions would likely not be recalled, or the connection not made to raw egg as the ingredient causing a reaction. Yellow fever vaccine is cultured in chicken embryos and contains residual egg and chicken proteins.^{1,4} The vaccine is not heated at any time during the manufacturing process (personal communication, Connaught Laboratories, Swiftwater, Pa). Thus the residual egg proteins could include some that are heat labile. The rate of anaphylactic reactions to yellow fever vaccine is estimated to be 1 in 131,000 or higher,⁵ although recipients are routinely asked about egg and chicken allergy before receiving the vaccine. Perhaps some of these reactions are due to unrecognized raw egg allergy. Most influenza vaccines, which are also propagated in chicken embryos, contain little residual egg protein^{4,6} and can often be safely administered to egg-allergic individuals.⁶ Nonetheless, this same phenomenon could account for some allergic reactions to influenza vaccines containing higher amounts of egg protein.

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