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■ Manuscript received April 16, 2010; accepted for publication September 24, 2010.

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### The Basophil Activation Test as a Promising Diagnostic Tool in Hypersensitivity to Chironomid Larvae

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Key words: Anaphylaxis. Basophil activation test. *Chironomus*.  
Diagnosis. Fish food.

Palabras clave: Anafilaxia. Test de activación de basófilos.  
*Chironomus*. Diagnóstico. Comida para peces.

Chironomids are nonstinging insects belonging to the Nematocera suborder of the Diptera order. They are found in wetlands and are a frequent cause of environmental allergy in Sudan, Japan, Egypt, and the northern part of the United States [1]. However, in recent years, hypersensitivity to chironomids has been reported after occupational exposure in fish food handlers (fish food factories, fishermen, pet shops.) [2] and in relation to hobbies in countries where *Chironomus* larvae (*Chironomus thummi*) are commercialized as fish food [3]. Hypersensitivity to these larvae has been reported to cause urticaria, rhinoconjunctivitis, asthma, angioedema, and even anaphylaxis [3,4].

Conventional diagnosis is made using the skin prick test with chironomid extract and specific immunoglobulin (Ig) E against *C thummi*. However, the allergenic potential of *Chironomus*

larvae carries a risk when the noncommercial extract is used in skin tests, and cases of anaphylaxis have been reported when these tests were performed [4].

We report the case of a 33-year-old woman with an unremarkable clinical history. Immediately after feeding her fish with *Chironomus* larvae (Tetra Delica, Tetra, Spectrum Brands, USA) 10 days previously, the patient suffered from bouts of sneezing, itching in the nose and eyes, rhinorrhea, and epiphora followed a few minutes later by ocular angioedema and dizziness. This clinical picture persisted with difficulty in breathing, wheezing, and dry cough for which she took terbutaline. Her symptoms improved slowly, although the rhinorrhea and nasal obstruction persisted. She had previously handled the same fish food with no problems. However, on the day of the reaction, she had rubbed the dry *Chironomus* larvae between her fingers to break them into smaller pieces before dropping them into the fish tank.

Two weeks after her first consultation and with all her symptoms having resolved, a skin prick test was performed with a battery of common inhalant and food allergens including pollens, dust mite, fish, shellfish, *Anisakis*, cockroach, and common mosquito (*Aedes communis*), all of which were negative. We performed a further skin prick test with an extract of freeze-dried *Chironomus* larvae (Tetra Delica 20% w/v in phosphate-buffered saline), which was positive (29 × 13 mm), and determined specific IgE to *C thummi* (41.70 kU<sub>A</sub>/L). Five skin prick tests were performed with *Chironomus* in control patients and the results were negative. A few minutes after the skin test, the patient began to report a sensation of nasal obstruction and pharyngeal foreign body, but not breathing difficulties. Examination revealed no apparent edema of the uvula. She was administered 5 mg of levocetirizine and her clinical picture gradually resolved. A basophil activation test using CD63 as a marker for activated basophils (FACSCanto, BD Biosciences, San José, California, USA) was performed with *C thummi* extract (6 mg/mL) with a positive result at all the concentrations tested (29.8% at 3 mg/mL, 25.5% at 0.3 mg/mL, 20.6% at 0.03 mg/mL, 20.5% at 3 μg/mL; baseline activation, 2.3%; anti-IgE, 42.1%) (Figure). The test was carried out in parallel in 4 controls and the results were negative.

We present a case of allergy to *C thummi*, with positive results in the skin prick test, specific IgE determination, and basophil activation test. To our knowledge, this is the first report of an allergy to *Chironomus* in which the basophil activation test [5] was performed as part of the allergy workup. Given the risk not only of serious local reactions [6], but also of severe systemic reactions [4] when a prick-prick test with *Chironomus* is used, we believe that the basophil activation test is a highly useful tool in the diagnosis of allergy to *C thummi*.

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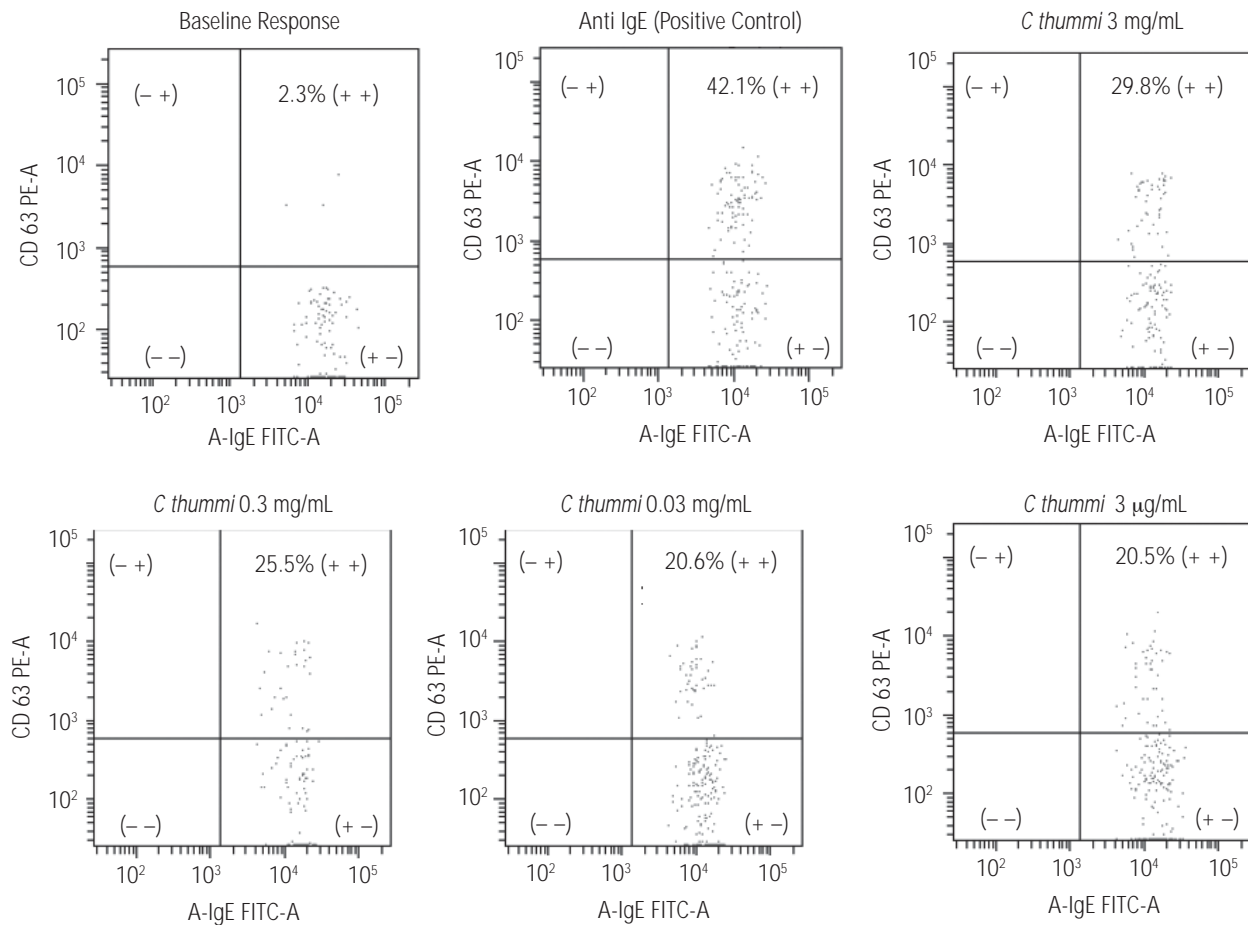


Figure. Basophil activation test with *Chironomus thummi* extract (6 mg/mL). Results of the different concentrations tested.

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■ Manuscript received September 17, 2010; accepted for publication October 8, 2010.

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