

suction tip from the lumen of the ostium internum in visual control with a head lamp and a nasal speculum (4). The subjective sensations of nasal patency were registered with a visual analog scale (VAS) from 0 (totally open) to 10 (totally obstructed). The measurements took place at 20-min intervals during short interruptions in the exposure.

Nasal secretion: The median amounts of the nasal secretions from both nasal cavities began to increase during the resting period in the cold (Fig. 1), the increase being statistically significant ($P=0.031$, Wilcoxon test for paired comparisons). During the exercise in the cold, the secretions further increased ($P=0.031$).

Nasal volume and flow. Slight, statistically nonsignificant average increases in the total nasal flow and volume were noted during the resting period in the cold when compared with the pre-exposure values (Fig. 1). During the exercise, the increases were statistically significant both in the flow ($P=0.046$) and in the volume ($P=0.021$).

Contralateral comparison of flow and volume changes. The flow and volume changes between the pre-exercise resting periods at $+22^{\circ}\text{C}$ and -11°C were compared in the initially more open and less open cavities (Fig. 1). Statistically significant increases in the less open cavities were noted both in the flow ($P=0.006$) and in the volume ($P=0.015$). In the more open cavities, nonsignificant average decreases in flow and volume were noted.

Subjective sensations of nasal patency. All subjects evaluated their noses as patent (VAS 0–3) throughout the experiment. No significant average patency changes could be noted in the cold exposure, either during the resting periods or during the exercise.

We conclude that in a cold environment unilateral adjustments in nasal congestion take place, maintaining the total nasal patency. Therefore, the lower airways are protected better than if oral breathing were to take place in these circumstances. The

nasal secretory reaction in exposure to cold seems to be physiological, as it was noted in all study subjects.

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Accepted for publication 10 March 2000
Allergy 2000; 55:783–784
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ISSN 0105-4538

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IgE antibody to parasite induced in mice

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Key words: BALB/c mice; *Brama raii*; ELISA; fish; *Gymnorhynchus gigas*; IgE; seafood.

• THE eggs of *Gymnorhynchus gigas*, a Trypanorhynchidea cestode, are passed in the feces of the final host and hatch in the water. The larva then penetrates through the gut wall of a copepod host and develops in the body cavity to the proceroid stage. If this stage of the larva is ingested by a fish, it encysts in the musculature, where it develops to the plerocercoid stage. The life

cycle is completed if the host fish is eaten by a final host (an elasmobranch fish), in the intestines of which the cestode develops to maturity (1). *G. gigas* plerocercoids are often found in the ray's bream (*Brama raii*), massively invading the muscles of the fish. Spaniards eat 78.2 g of fish (including 0.48 g of ray's bream) per head a day (2).

In the present study, larvae of *G. gigas* were collected from naturally infected *B. raii*. Crude extracts of parasite and host were obtained by homogenization and extraction in PBS (3). BALB/c mice were immunized with either crude *B. raii* or *G. gigas* extract as multiple doses of 1 ml of antigen in FCA (1 mg of protein/ml in final volume) given weekly for 3 weeks by the intramuscular route. The mice were bled weekly. Plates (Nunc-Immuno Plate Poly Sorp™) were coated with *B. raii* or *G. gigas* antigen. Serum samples diluted 1/10 were incubated at 37°C for 2 h. A goat, horseradish peroxidase-conjugated antibody specific to mouse IgE (The Binding Site, Birmingham, UK) was added. Substrate (*o*-phenylene-diamine, SIGMA) with hydrogen peroxide was added.

Both immunizations produced a highly specific IgE response. When sera from animals injected with *G. gigas* extract were tested against its homologous antigen, specific IgE was first detected by 5 weeks post-immunization (p.i.), with the maximum response at 10–14 weeks p.i. When we calculated the ratio between the optical density resulting from the test sera and the optical density of the control sera, we observed indexes situated between 4 and 7 during the entire experiment. No detectable levels of IgE were observed when these sera were tested against *B. raii* antigen (Fig. 1). Sera from mice injected with *B. raii* antigen showed a strong IgE response only against its homologous antigen with values seven

***Gymnorhynchus gigas* and its host, *Brama raii*, are allergenic.**

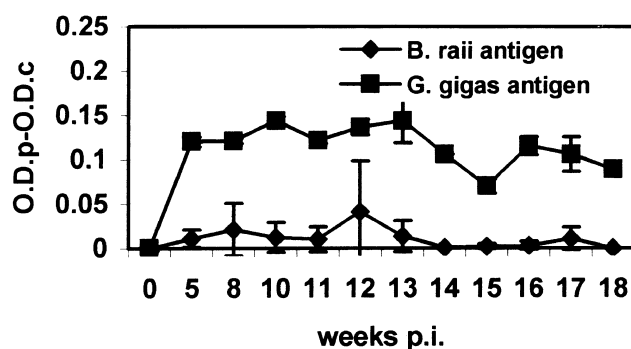


Figure 1. Dynamics of IgE production in BALB/c mice immunized with *G. gigas* extract against *B. raii* and *G. gigas* antigens. Results were expressed as ODp-ODc indexes by subtracting mean OD₄₉₀ of control from mean OD₄₉₀ of test sera once nonspecific reaction with BSA used in postcoating was subtracted. Standard errors are included.

and eight times greater than those observed with the negative control. Cross-reactions between both antigens were not observed. Activity against collagen has been demonstrated (4) in the *G. gigas* plerocercoid stage and is presumably involved in its penetration processes. Moreover, in experimental animals, extracts of cestodes induce symptoms that were mitigated by the administration of antihistaminic drugs (5).

Acknowledgment We thank Dr R. Pelta for his great interest in this topic.

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Accepted for publication 17 April 2000
Allergy 2000; 55:784–785
Copyright © Munksgaard 2000
ISSN 0105-4538

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Interleukins in Churg-Strauss syndrome

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Key words: Churg-Strauss syndrome; ECP; EDN; eosinophil; IgE; IL-4; IL-5; IL-13.

● CYTOKINE production was studied in patients with Churg-Strauss syndrome (CSS). However, as far as we know, no previous study has investigated the levels of IL-4 and IL-13 in CSS. A high level of serum eosinophil cationic protein (ECP) has been reported in a patient with CSS (1). Excretion of urinary eosinophil-derived neurotoxin (EDN) has been shown

to reflect ongoing *in vivo* eosinophil degranulation, and a high level of urinary EDN excretion was found in a patient with CSS (2).

This is the first report describing serial levels of plasma IL-4, IL-5, and IL-13; **IL-13 and EDN, but not IL-4, IL-5, or ECP, paralleled nonspecific inflammatory markers.**

serum ECP; and blood and urine EDN, in a 56-year-old female patient with CSS successfully treated by oral prednisolone, and showing that IL-13 and EDN levels, but not levels of either IL-4, IL-5, or ECP, paralleled nonspecific biologic inflammatory marker levels.

Blood and urine EDN was measured by an efficient ELISA method for EDN which we have developed very recently (3). Urinary EDN concentrations were expressed as μg per millimole of Cr ($\mu\text{g}/\text{mmolCr}$) to correct for urine volume. ECP in serum was determined by the Pharmacia ECP-RIA kit, and IL-4, IL-5, and IL-13 in plasma were measured by commercially available ELISA kits, respectively.

The laboratory data on 28 June 1999 showed a peripheral blood leukocyte count of 11 000/ μl with 40% eosinophils, an erythrocyte sedimentation rate of 96 mm/h, and a C-reactive protein level of 2.5 mg/dl. The total serum IgE level of 1 July was 929 IU/ml. The plasma IL-4 level was measurable (0.64 pg/ml) only on 28 June; however, the level stayed in the normal range throughout the clinical course. On the other hand, the levels of plasma IL-5 and IL-13, serum ECP, and blood and urine EDN were increased on 28 June (44.5 pg/ml of IL-5; 27.7 pg/ml of IL-13; 234 $\mu\text{g}/\text{ml}$ of ECP; and 725 ng/ml, 185 ng/ml, and 6010.9 $\mu\text{g}/\text{mmolCr}$ of EDN in serum, plasma, and urine, respectively) (Fig. 1). After the start of oral prednisolone therapy, eosinophilia and levels of plasma IL-5 and serum ECP were improved immediately. Total serum IgE and plasma IL-13 levels fell gradually, and the