Reactivity of IgE in fish-allergic patients to fish muscle collagen

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Background: In addition to parvalbumin, the well-known major allergen in fish, collagen was recently identified as a new allergen in the muscle of bigeye tuna and in the skin of several species of fish. The aim of the present study was to evaluate fish muscle collagens for their reactivity with IgE in fish-allergic patients and antigenic cross-reactivity.

Methods: Collagen was purified from the white muscle of five species of fish (Japanese eel, alfonsin, mackerel, skipjack and bigeye tuna) by acid extraction and salt precipitation, whereas parvalbumin was purified from bigeye tuna by gel filtration and reverse-phase HPLC. The IgE reactivities to collagen and parvalbumin were examined by ELISA, whereas antigenic cross-reactivity among fish muscle collagens was investigated by ELISA inhibition experiments.

Results: When 15 sera from fish-allergic patients were subjected to ELISA using bigeye tuna collagen and parvalbumin, 10 sera reacted only to parvalbumin, two reacted only to collagen, two reacted to both collagen and parvalbumin and one reacted to neither collagen nor parvalbumin. The sera containing specific IgE to bigeye tuna collagen also reacted to collagens from the other four species of fish. In the ELISA inhibition experiments, bigeye tuna collagen inhibited the binding of IgE not only to bigeye tuna collagen, but also to that from the other four species of fish, suggesting cross-reactivity among the collagens from five species of fish.

Conclusions: These results demonstrate that some Japanese fish-allergic patients have specific IgE to fish muscle collagen and that fish muscle collagen is a cross-reactive allergen among various species of fish.

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