



# Allergic and adverse reactions to fish or seafood

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Around 1% of the Australian population may have allergic sensitisation to fish or seafood. It is more common in teenagers and adults than in early childhood and clinical severity may range from mild to anaphylactic reactions.

Fish and seafood are an important part of the human diet around the world, however, reactions from their consumption may occur. Adverse reactions may result in toxicity, non-IgE-mediated reactions (intolerances) or IgE-mediated, allergic reactions.

In line with common usage, fish is regarded as distinct from seafood, that is, all other creatures from ocean, lakes and rivers. The distinction is easily understood by patients, as well as being clinically useful. Seafood allergy usually results from sensitisation to muscle proteins of crustaceans and/ or molluscs, while sensitisation to fish usually results from sensitisation to parvalbumin, the piscine version of albumin. In general, allergy to a fish is usually associated with allergies to other fish, while allergy to a crustacean is usually associated with other crustacean allergy. Some patients can be sensitised to both fish and seafood but, as described above, the mechanisms are different. Following a reaction, specific testing is useful to clarify the spectrum of sensitisation and expected risk associated with future ingestion.



Consumption of the food itself is the major trigger for allergic reactions, whether by direct ingestion or ingestion of other foods in which allergen-contamination has occurred. For some individuals, skin or mucosal membrane contact during food preparation and cooking can elicit sometimes serious reactions.

## What are the symptoms of fish or seafood allergy?

- Skin rashes, swelling, nausea and vomiting. Severe reactions may cause breathing difficulty and collapse.
- Respiratory symptoms may occur in very allergic people who eat fish or seafood but less commonly from cooking the food.
- Following ingestion of the food, allergic reactions will occur within six hours, but can also happen in minutes.

## Shellfish

The key element which lies behind allergy to fish and seafood is the production by allergic individuals of IgE antibodies. These cause the release of histamine and other substances when the food is eaten. Seafood allergens are usually very heat stable and cannot easily be destroyed through cooking, although occasional individuals seem to tolerate canned fish (intensely heat-treated).

## Glucosamine and the risk of shellfish allergy

Glucosamine supplements taken for osteoarthritis are derived from the outer coatings of shellfish, such as crustaceans. While people allergic to shellfish are not usually allergic to shell constituents but to protein, and the risk of adverse reaction is considered extremely low, such products in Australia and New Zealand are not recommended for people with seafood allergy.

## Crustaceans and molluscs

These include bivalves (clams, mussels, oysters and scallops), cephalopods (octopus and squid) and gastropods (abalone, whelks and snails). Tropomyosin, the major allergen in these foods, is also found in dustmites and cockroaches and this accounts for cross-reactive crustacean allergy in approximately 5% of patients with dustmite allergy. Prawns also have some allergenic proteins unrelated to tropomyosin which can produce reactions not elicited by other seafoods.

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## Why may reactions to fish or seafood occur inconsistently?

- Persons with milder sensitisation may get inconsistent symptoms.
- Cross-contamination of allergens during food preparation, cooking or serving may elicit a reaction to a known allergen not thought to be present in the food being eaten.
- Infestation of fish with the parasite *Anisakis* may elicit crustacean-like reactions in persons allergic to crustacean tropomyosin but not fish.
- Non-allergic reactions to toxin-contaminated fish or metabisulphite-treated crustaceans may clinically resemble allergy.

## What other adverse reactions may resemble allergy?

- Scombrotoxic fish poisoning occurs when people eat spoiled fish, when fish is not kept cool enough or spends some time unrefrigerated.
- Ciguatera fish poisoning occurs when people eat reef fish in tropical and subtropical waters.
- The incidental presence of fish parasites, such as *Anisakis*, may produce an allergic reaction which is not due to the fish or seafood being consumed.
- Metabisulphite, a preservative that is sometimes used to prevent crustaceans, such as prawns, from discolouring, can produce reactions, including wheezing/tight chest, stomach irritation (e.g. nausea, pain) and, very uncommonly, itch/rashes.

## Reliable diagnosis of food allergy is important

A careful history is important, to exclude exposure to other causes of allergy, such as foods or medicines, which may have been forgotten. This approach will also help to exclude conditions that can sometimes be confused with food allergy. Skin or blood allergen specific IgE allergy tests help confirm or exclude potential triggers. While the results of allergy testing are a guide to whether the person is allergic, they do not allow prediction of the severity of a reaction. It is also important to be aware that it may not be possible to test for all seafood species using commercial skin prick or blood allergy testing, since these are not available for all seafood species. For this reason, some allergy specialists will recommend that a sample of the food in question be provided for specific assessment.



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