



SEAFOOD ZOOMER

Seafood Zoomer

Peptide level identification of seafood sensitivity



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Final Report Date:	10-19-2018 16:24	Specimen Collected:	11-30-2015
Accession ID:	1512010000	Specimen Received:	12-01-2015 00:00

LAST NAME	FIRST NAME	MIDDLE NAME	GENDER	DATE OF BIRTH	ACCESSION ID
TESTNAME	PATIENT		MALE	1996-10-22	1512010000

PATIENT

Name: PATIENT TESTNAME
Date of Birth: 1996-10-22
Gender: Male
Age: 22

Telephone #: 000-001-0002
Street Address: 1021 HOWARD AVENUE SUITE B
City: San Carlos
State: CA Zip #: 94070

Fasting: FASTING No. of hours: 12.0

PROVIDER

Practice Name: Test Client, MD
Provider Name: Internal2 Test Client2, MD (999999)
Phlebotomist:
Street Address: 999999 PRACTICE STREET AVE
City: SAN CARLOS
State: CA
Zip #: 94404
Telephone #: 666-666-6662
Fax #: 111-222-0000

For doctor's reference

Vibrant Wellness is pleased to present to you Seafood Zoomer, to help you make healthy lifestyle and dietary choices in consultation with your healthcare provider. It is intended to be used as a tool to encourage a general state of health and well-being.

The Vibrant Seafood Zoomer is an array of commonly consumed seafood antigens which offers very specific antibody-to-antigen recognition. The panel is designed to assess an individual's IgG and IgA sensitivity to these antigens at the peptide level.

Interpretation of Report: The summary report provided for Seafood Zoomer lists the set of seafood to be avoided based on the calculated results. In the detailed report, the test results of antibody levels to the individual proteins are calculated by comparing the average intensity of the individual protein antibody to that of a healthy reference population. Reference ranges have been established using 192 healthy individuals. The results are displayed as Positive, Moderate or Negative. A Positive result indicates that you have an increased reactivity to the antigen with respect to the reference range. A Moderate sensitive result indicates that you have a moderate reactivity to the food antigen with respect to the reference range. A Negative or no sensitivity result indicates that you have a low reactivity to the food antigen with respect to the reference range. Vibrant utilizes proprietary fluorescent analysis which is designed to assay specific total IgG (subclasses 1, 2, 3, 4) and total IgA (subclasses 1, 2) antibodies. The classification of Positive to Moderate to Negative denotes the level of antibody reactivity detected through this analysis.

The Vibrant Wellness platform provides tools for you to track and analyze your general wellness profile. Testing for Seafood Zoomer panel is performed by Vibrant America, a CLIA certified lab CLIA#:05D2078809. Vibrant Wellness provides and makes available this report and any related services pursuant to the Terms of Use Agreement (the "Terms") on its website at www.vibrant-wellness.com. By accessing, browsing, or otherwise using the report or website or any services, you acknowledge that you have read, understood, and agree to be bound by these terms. If you do not agree to accept these terms, you shall not access, browse, or use the report or website. The statements in this report have not been evaluated by the Food and Drug Administration and are only meant to be lifestyle choices for potential risk mitigation. Please consult your physician/dietitian for medication, treatment, or lifestyle management. This product is not intended to diagnose, treat, or cure any disease.

Please Note - It is important that you discuss any modifications to your diet, exercise and nutritional supplementation with your physician before making any changes. To schedule an appointment with Vibrant Clinical Dietitians please call: Toll-Free 866-364-0963.

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INTRODUCTION

Seafood, which includes various species of fish and shellfish (crustacean and mollusk), is a prime source of high-quality protein. Seafood is high in vitamins and minerals but low in calories, total fat, and saturated fat. Consumption of seafood has been linked to numerous health benefits.

Whitefish such as haddock and cod are very low in fat and calories which, combined with oily fish rich in omega-3 fatty acids, such as mackerel, sardines, fresh tuna, salmon and trout, can help to protect against heart disease, as well as help to develop strong bones and teeth. Shellfish are particularly rich in zinc, which is essential for healthy skin and muscles, as well as fertility. Seafood can provide essential nutrients for developing infants and children.

Despite the nutritional benefits, both fish and crustacean shellfish are among the eight most common allergenic foods designated by the Food Allergen Labeling and Consumer Protection Act (FALCPA).

In crustaceans, the protein **Tropomyosin** is the major antigen responsible for ingestion-related reactions. Tropomyosin belongs to the family of actin filament-binding proteins with different isoforms that can be expressed in muscle, and non-muscle tissues. A complex of tropomyosin and troponin regulates the calcium sensitive interaction of actin and myosin. The antigenicity of tropomyosin was confirmed in six species of crustaceans: black tiger prawn, kuruma prawn, pink shrimp, king crab, snow crab, and horsehair crab by immunoblotting and the overall sequence identity showed more than 90% homology.¹

Arginine kinase (40 kDa) is another antigen which has been identified in prawn (kuruma prawn), shrimp (white shrimp, gulf shrimp, Chinese shrimp), and crab species (mud crab, snow crab).²

Sarcoplasmic reticulum Ca-binding protein (20 kDa) is a novel crustacean antigen extracted from black tiger shrimp and identified in white shrimp and snow crab. Sarcoplasmic Ca-binding protein is an invertebrate EF-hand calcium buffering protein that fulfills a similar function in muscle relaxation as vertebrate major antigen parvalbumin³.

In 2008, **myosin light chain** was identified as an antigen in white shrimp and black tiger prawn.⁴ Overall, individuals with food sensitivity to one kind of crustacean are usually advised to avoid all types of crustacean foods. Individuals with sensitivity to insects such as cockroach or moths may also react to crustaceans. The Atlantic cod was the first model for studying fish antigens.

Parvalbumin (12 kDa) is a glycoprotein that buffers calcium during muscle relaxation. Parvalbumin represents the major clinical cross-reactive fish antigens with human sequence homology ranging from 60-80%.⁵ As the parvalbumins are similar in all fish species, individuals reactive to one fish are likely to react to a range of different fish species. Additionally, fish sensitivity is not to be confused with a toxic reaction to histamine in spoiled fish (scombroid fish poisoning).

Anisakis simplex (herring or whale worm) is the most well studied fishery product-contaminating parasite eliciting clinical sensitivity responses.⁶ To date, eight *Anisakis simplex* antigens have been described at the molecular level (Ani s 1 to Ani s 8); six of these are ES derived, two are somatic in origin, and none are associated with the cuticle of the worm.

While food allergy is an immediate IgE-mediated immune response, food sensitivity is usually a delayed IgG-mediated immune response that is frequently overlooked or misdiagnosed. Detection of IgG and IgA antibodies to possible seafood antigens can be predictive of a need to change nutritional intake (in consultation with a dietitian) and can reduce the risk of development into more serious health concerns long term.

LAST NAME	FIRST NAME	MIDDLE NAME	GENDER	DATE OF BIRTH	ACCESSION ID
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Positive		Moderate		Negative
IgG	IgA	IgG	IgA	
Oyster Salmon and Trout	Parasite Anisakis simplex	Crab Cod and Pollock Parasite Anisakis simplex	Lobster	Shrimp and Prawn
				Clam
				Mussel
				Snail
				Scallop
				Squid
				Octopus
				Flatfish (Plaice, Sole, Flounder)
				Monkfish
				Mackerel and Tuna
				Sardine, Herring, Pilchard
				Anchovies
				Bass
				Carp
				Catfish
				Bream
				Hake
				Pufferfish
				Croaker
				Tilapia
				Swordfish

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LIFESTYLE CONSIDERATIONS

» Avoid seafood

Shellfish is rarely a hidden ingredient, but it may be in fish stock or seafood flavoring. Companies are required to label any product that contains shellfish or other foods that often cause food sensitive reactions, but the regulations do not apply to mollusks, such as clams, oysters, and scallops. You may need to completely avoid places where shellfish are prepared or processed. Some people react after touching shellfish or inhaling steam from cooking shellfish. It might be necessary to avoid eating at seafood restaurants, where there is a high risk of cross-contamination.

If fish or shellfish is present in a food product, it is usually listed on the packaging. Here is a list of seafood to avoid if you are sensitive to fish or shellfish:

- ☐ **Crustaceans** (crab, lobster, shrimp, prawn)
- ☐ **White fish** (cod, plaice, sole, coley, haddock, pollock, monkfish)
- ☐ **Fatty fish** (mackerel, tuna, sardines, anchovies, salmon, pilchards, herring, trout)
- ☐ **Mollusks** (clams, mussels, oysters, snails, scallops, squid, octopus)



» Replacements for seafood for a balanced diet

Seafood is an excellent source of protein, vitamins, and minerals. The Food Standards Agency recommends that we eat at least two portions of fish a week, with at least one of these being fatty fish, which is particularly high in essential omega-3 fatty acids. However, if you are suffering from seafood sensitivity, it is important to discover which seafood in particular you react to and to make sure you include suitable fatty acid replacements in your diet such as:

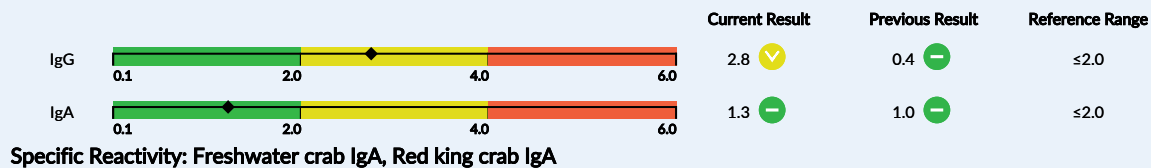
- ☐ **Coconut oil**
- ☐ **Tofu**
- ☐ **Sesame butter**
- ☐ **Pumpkin seed butter**
- ☐ **Eggs**
- ☐ **Olive oil**
- ☐ **Flaxseed oil**
- ☐ **Walnuts**
- ☐ **Brazil nuts**
- ☐ **Hazelnuts**
- ☐ **Pecans**
- ☐ **Avocado**
- ☐ **Spinach and other leafy greens**

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Shellfish - Crustaceans:

Crab

Crab is a member of the crustacean family. All crab species are low in fat and a good source of protein, as well as minerals like selenium. Food sensitivity to crab is relatively common. Cooking does not remove the sensitivity-associated antigens. Major proteins involved in crab sensitivity are tropomyosin, arginine kinase, and sarcoplasmic reticulum Ca-binding protein, which are very similar in a wide range of crustacean foods.



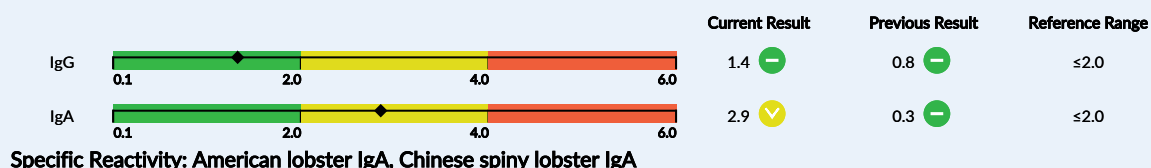
Shrimp & Prawn

Shrimp and prawn are both members of the crustacean family. There are no major documented differences between prawns and shrimp in terms of nutritional value. They both are rich in proteins and vitamins, as well as the carotenoid astaxanthin, an antioxidant and anti-inflammatory nutrient. They rank as good sources of omega-3 fatty acids and contain two specific omega-3 fatty acids: EPA and DHA. Major proteins involved in shrimp sensitivity are tropomyosin, arginine kinase, sarcoplasmic reticulum Ca-binding protein, and myosin light chain. In addition, some adverse reactions to shrimp/prawn may not involve actual food sensitivity, but rather reaction to sulfite preservatives used to protect the shelf life of the shrimp/prawn products.



Lobster

Lobsters are members of the crustacean family. Lobster is a low-calorie protein source and rich in phosphorous, magnesium, potassium, and B-vitamins. Food sensitivity to lobster is relatively common with mild symptoms. Cooking does not remove the lobster antigenic proteins. Most lobster sensitivity seems to involve a muscle protein tropomyosin, which is very similar in a wide range of crustacean foods.

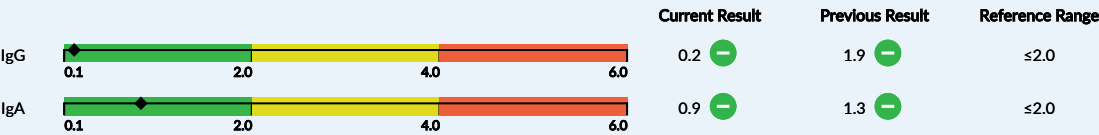


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Shellfish - Mollusk:

Clams

Clam is a common name for several kinds of bivalve mollusks. There are over 150 different edible species of clams in the world. Clams are a low fat, high protein seafood choice with an above average amount of healthful minerals such as selenium, zinc, iron, and magnesium and B vitamins like niacin. Due to the protein content difference, the individuals who are sensitive to crustaceans may not necessarily react to clams.



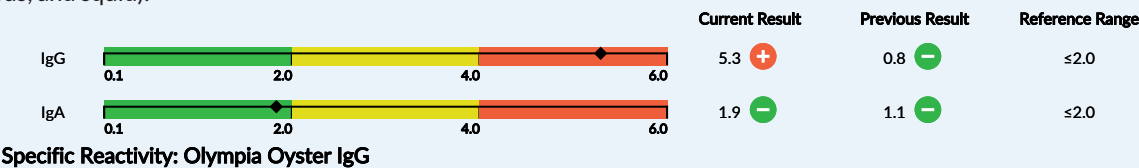
Mussel

Mussel is a common name for members of several families of bivalve mollusks, from saltwater and freshwater habitats. Mussels offer several health benefits. They are high in B12 vitamins and provide a readily absorbed source of many other B vitamins, vitamin C, amino acids, and vital minerals including iron, manganese, phosphorus, potassium, selenium and zinc. Mussels have more omega-3 fatty acids than any other shellfish. In addition, some adverse reactions to mussels may not involve actual food sensitivity, but, rather, shellfish poisoning. Avoid eating mussels if they were harvested in or near a "red tide," which indicates a high population of dinoflagellates, reddish-brown microorganisms that can infect mussels and cause shellfish poisoning.



Oyster

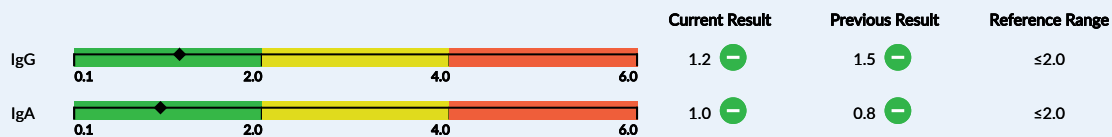
Many, but not all, oysters belong to the superfamily Ostreoidae. Pacific oysters are naturally one of the most nutritionally well-balanced of foods. They are low in fat, calories, and cholesterol, in addition to being high in protein, iron, omega-3 fatty acids, calcium, zinc, and vitamin C. Because oysters are bivalve mollusks, sensitivity to oyster is most commonly associated with sensitivity to other bivalves (e.g., clams, mussels, and scallops) as well as distantly related mollusks (e.g., snails, octopus, and squid).



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Snail

Most snails belong to the gastropod mollusk family. Snails are low in calories and high in protein, iron, and zinc. Snail sensitivity is associated with an unusual distribution of symptoms with asthma.⁷ Sensitivity to snail is frequently associated with sensitivity to dust mites and this may account for the high frequency of asthma and rhinitis seen as symptoms. There are also concerns that desensitization therapy with dust mite extracts may cause a more severe reaction to snails.⁸ Some individuals with sensitivity to mollusks and even crustaceans may also suffer associated sensitivity to snails.



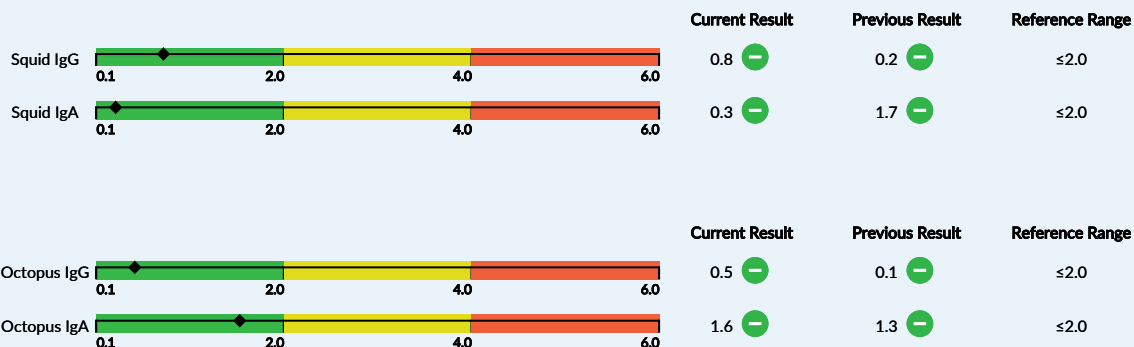
Scallops

Scallops are a cosmopolitan family of Pectinidae and Pectinoidea bivalves found in oceans and never in fresh water. Scallops are a low-fat seafood choice that is a good source of protein and some minerals and vitamins. Scallops are also low in mercury so that they can be included into a seafood-based diet on a regular basis. Due to the protein content difference, the individuals who are sensitive to crustaceans may not necessarily react to scallops.



Other mollusks

Although squid and octopus have no shell, they are cephalopods, two commonly consumed mollusks. Sensitivity to squid is associated with sensitivity to other cephalopods, such as octopus and potentially other mollusks.









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Fish – White fish:

Cod and Pollock

Cod belong to the same family, Gadidae, as both haddock and pollock. Cod is a low-fat, flaky white meat fish that is a good source of protein, phosphorus, niacin, and vitamin B-12. The Atlantic cod major antigen Gad m 1 was identified as parvalbumin.⁹

		Current Result	Previous Result	Reference Range
IgG		3.2 	2.0 	≤2.0
IgA		0.7 	1.9 	≤2.0


Flatfish (Plaice, Sole, Flounder)

Plaice, sole, and flounder are common names for three different groups of flatfish. Plaice seem to share moderate antigenic components within groups of fish (e.g., codfish, hake, mackerel, and tuna). Specific IgE antibodies to plaice have been measured in atopic dermatitis patients¹⁰ and in food-allergic children.

		Current Result	Previous Result	Reference Range
IgG		1.8 	1.2 	≤2.0
IgA		1.7 	<0.1 	≤2.0

Monkfish

Monkfish, also known as frog-fish, is a member of the Lophius genus, found in the Atlantic and Indian Oceans. Monkfish provides beneficial minerals as well as proteins and vitamins. However, Monkfish is relatively high in mercury and it can pose health risks if eaten in large amounts.

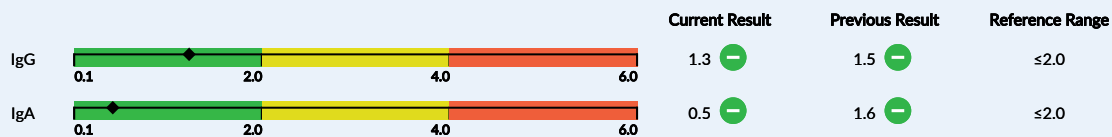
		Current Result	Previous Result	Reference Range
IgG		0.7 	1.4 	≤2.0
IgA		0.1 	0.2 	≤2.0

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Fish - Oily or Fatty fish:

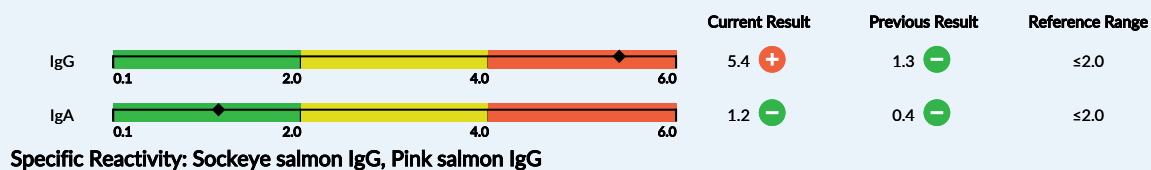
Mackerel and Tuna

Mackerel and tuna are members of the same family, Scombridae, which includes many species of open-sea fish. Mackerel has outer layers of red meat and lighter interior layers of meat. Both of them are among the top fish on the list for omega-3 fatty acid content and vitamin B12. Canned mackerel may have reduced antigenicity, as is found with tuna.



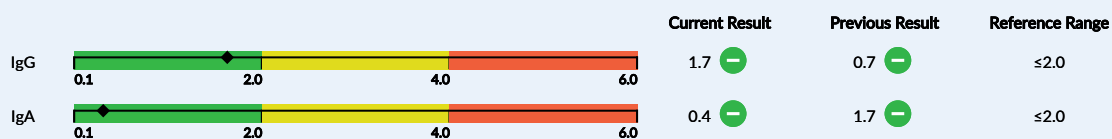
Salmon and Trout

Salmon and trout are members of the same family, Salmonid, also known as ray-finned fish. All types of salmon and trout provide a good source of high-quality protein and the heart healthy omega-3 fatty acids. The tryptophan found in salmon is a precursor to serotonin, which may help manage depression. Salmon is a good source of vitamin D, and ingesting it may also help to improve mood, protect against macular degeneration, and aid in bone health. Smoked salmon is likely to have antigenic properties similar to ordinary fish. Canned salmon may have reduced antigenicity as is found with tuna.



Sardine, Herring, Pilchard

Sardine, herring, and pilchard are common names used to refer to various small, oily fish in the family Clupeidae. They are an excellent source of vitamin B12, selenium, phosphorus, omega-3 fatty acids, protein, and vitamin D. Sardines are commonly canned as they are perishable; however, sensitivity to them are not rare. The overlap antigenicity between this group and Gadiformes (e.g., codfish, hake) and Scombroid fishes (examples: mackerel and tuna) seem to be moderate or even small.



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Anchovies

Anchovy is a small, common forage fish of the family Engraulidae. The anchovy, being an oily or fatty fish, is rich in omega-3 fatty acids and protein, well known for its ability to lower levels of triglycerides and cholesterol in the blood. Anchovy antigens can be especially problematic because anchovies are "hidden" ingredients in other foods, such as Worcestershire sauce, Caesar salad dressing, and Bloody Mary cocktails.



Other fish:

Bass

Bass is a member of the Serranidae family. Both sea- and freshwater bass is low in calories and serves as an excellent source of protein, selenium, and essential omega-3 fatty acids, while having varying amounts of vitamins B-12 and B-6.



Carp


Carp is a member of the family Cyprinidae, a very large group of fish native to Europe and Asia. Carp, as an oily freshwater variety, is incredibly rich in minerals and vitamins, as well as high levels of beneficial fatty acids, protein, and antioxidants.



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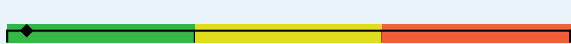


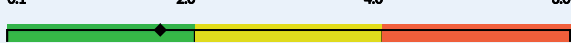

Catfish

Catfish are a diverse group of ray-finned fish, named for their cat's whisker-like barbels. Catfish is a moderately fatty fish that is also a good source of high-quality protein and B vitamins. As a whitefish, catfish is among the most common types of fish resulting in a food sensitive reaction.

		Current Result	Previous Result	Reference Range
IgG		0.4 	1.9 	≤2.0
IgA		0.5 	1.4 	≤2.0

Other species

Some commonly consumed fish that are not included in the above families are listed. Food sensitivities have also been found in these fish species.

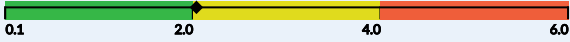

Bream IgG		0.1 	2.0 	≤2.0
Bream IgA		1.4 	1.1 	≤2.0
Hake IgA		0.5 	0.8 	≤2.0
Hake IgG		1.0 	1.3 	≤2.0
Pufferfish IgG		0.4 	1.7 	≤2.0
Pufferfish IgA		1.0 	2.0 	≤2.0
Croaker IgG		0.3 	1.9 	≤2.0
Croaker IgA		2.0 	1.2 	≤2.0
Tilapia IgG		1.0 	1.8 	≤2.0
Tilapia IgA		1.4 	1.8 	≤2.0
Swordfish IgG		0.3 	0.2 	≤2.0
Swordfish IgA		1.7 	0.6 	≤2.0

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Parasite:

Anisakis simplex

Anisakis simplex is a parasitic worm which infects marine fish or shellfish. The parasite can also infect humans (known as anisakiasis), as well as trigger sensitive reactions. Sensitive reactions to Anisakis simplex can be mistaken for sensitivity to fish or shellfish. Eight Anisakis simplex antigens have been described at the molecular level (Ani s 1 to Ani s 8). Ani s 1 is now known to occur in different isoforms and has been found to be highly resistant to heat.¹¹ Ani s 2 (paramyosin) is similar to paramyosin from dust mites and the similarity in sequence of these highly conserved proteins is probably the cause of cross-reactivity binding to Anisakis simplex proteins seen for German cockroaches, chironomids, and dust mites.¹²

		Current Result	Previous Result	Reference Range
IgG		2.1 ✓	0.9 —	≤2.0
IgA		4.5 +	1.7 —	≤2.0

Key Terms/Glossary

Actin

Actin protein is an important contributor to the contractile property of muscle and other cells.

Antibody

An antibody, also known as an immunoglobulin (Ig), is a large, Y-shaped protein produced mainly by plasma cells that is used by the immune system to neutralize pathogens such as pathogenic bacteria and viruses.

Cross-reactivity

Cross-reactivity happens when an antibody directed against one specific antigen (allergen) is successful in binding with another different antigen.

Crustacean

Crustaceans form a large, diverse arthropod taxon which includes such familiar animals as crabs, lobsters, crayfish, shrimp, krill, woodlice, and barnacles.

Decapod

The Decapoda or decapods are an order of crustaceans within the class Malacostraca, including many familiar groups, such as crayfish, crabs, lobsters, prawns, and shrimp. Most decapods are scavengers.

Histamine

Histamine is an organic nitrogenous compound involved in local immune responses, as well as regulating physiological function in the gut and acting as a neurotransmitter for the brain, spinal cord, and uterus. Histamine is involved in the inflammatory response and has a central role as a mediator of itching.

IgA

Immunoglobulin A (IgA), as a major class of antibody present in the mucosal secretions of most mammals, represents a key first line of defense against invasion by inhaled and ingested pathogens at the vulnerable mucosal surfaces.

IgG

Immunoglobulin G (IgG), as the most abundant type of antibody, is found in all body fluids and protects against bacterial and viral infections. An IgG reaction to food proteins suggests tolerance related to immune cell reaction. Repeated exposure, inflammation, and immune reactivity contribute to sensitivity and high IgG in response to food proteins.

Isoform

A protein isoform is one of a number of different structurally similar proteins that are created as the result of alternative splicing or from similar genes formed from a copied gene and differentiated as the result of evolution.

Myosin

Myosins are a superfamily of motor proteins best known for their roles in muscle contraction and in a wide range of other motility processes in eukaryotes.

Citations/Sources

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Risk and Limitations

This test has been developed and its performance characteristics determined by Vibrant America LLC., a CLIA certified lab. These assays have not been cleared or approved by the U.S. Food and Drug Administration.

Allergen-specific IgE assays do not demonstrate absolute positive and negative predictive values for allergic disease. Clinical history must be incorporated into the diagnostic determination. Quantification of specific IgG and IgA antibodies is not FDA-recognized diagnostic indicator of allergy.

Seafood Zoomer testing is performed at Vibrant America, a CLIA certified laboratory and utilizes ISO-13485 developed technology. Vibrant America has effective procedures in place to protect against technical and operational problems. However, such problems may still occur. Examples include failure to obtain the result for a specific antigen due to circumstances beyond Vibrant's control. Vibrant may re-test a sample in order to obtain these results but upon re-testing the results may still not be obtained. As with all medical laboratory testing, there is a small chance that the laboratory could report incorrect results. A tested individual may wish to pursue further testing to verify any results.

The information in this report is intended for educational purposes only. While every attempt has been made to provide current and accurate information, neither the author nor the publisher can be held accountable for any errors or omissions.

Vibrant Wellness makes no claims as to the diagnostic or therapeutic use of its tests or other informational materials. Vibrant Wellness reports and other information do not constitute medical advice and are not a substitute for professional medical advice. Please consult your healthcare practitioner for questions regarding test results, or before beginning any course of supplementation or dietary changes.