Allergen Panel, IgE by ImmunoCap ISAC

Patient: [redacted]
DOB: [redacted] Age: 9 Sex: F
Patient Identifiers: [redacted]
Visit Number (FIN): [redacted]

Client: [redacted]
Physician: [redacted]

ARUP Test Code: 2005894

Collection Date: 08/23/2024
Received in lab: 08/24/2024
Completion Date: 08/28/2024

Test Information

Performed at: Phadia Immunology Ref. Laboratory (PiRL), 4169 Commercial Ave., Portage, MI 49002

Patient's Report

Patient's test results from the allergen panel from PiRL continues on following pages.

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Jonathan R. Genzen, MD, PhD, Laboratory Director

Chart continues on following page(s)

Patient: [redacted] | **Date of Birth:** [redacted] | **Sex:** F | **Physician:** [redacted]
Patient Identifiers: [redacted] | **Visit Number (FIN)** [redacted]

Thermo SCIENTIFIC

ImmunoCAP ISAC

SAMPLE INFORMATION		PATIENT INFORMATION			
Sample ID:	[redacted]	Patient ID:	[redacted]		
Sampling date:	23.08.2024	Name:			
Approval status:	Measured	Birth date:	[redacted]	Age:	9
Print date:	28.08.2024	ID/MR#:		Gender:	
Calibration curve:	CTR03 7/31/2024 EYJ2I30_1				

ORDERING PHYSICIAN INFORMATION

Ordering physician:	**ARUP**
Address:	500 CHIPETA WAY SALT LAKE CITY, UT 84108
Comment:	This test was developed using investigational use only and/or analyte specific reagents. The performance characteristics of this test have been established. It has not been cleared or approved by the FDA. Interpretation is the sole responsibility of the licensed healthcare professional ordering the test. -Steven Drury MD Medical Director

1. Summary of positive IgE results

Egg white	Gal d 2	Ovalbumin	11 ISU-E	
Cow's milk	Bos d 4	Alpha-lactalbumin	29 ISU-E	
	Bos d 5	Beta-lactoglobulin	14 ISU-E	
	Bos d 8	Casein	6 ISU-E	
Cod	Gad c 1	Parvalbumin	0,6 ISU-E	
Cashew nut	Ana o 2	Storage protein, 11S globulin	0,5 ISU-E	
Hazelnut	Cor a 9	Storage protein, 11S globulin	0,9 ISU-E	
Peanut	Ara h 2	Storage protein, 2S albumin	34 ISU-E	
	Ara h 6	Storage protein, 2S albumin	3,2 ISU-E	
Soybean	Gly m 5	Storage protein, Beta-conglycinin	0,7 ISU-E	
	Gly m 6	Storage protein, Glycinin	1,2 ISU-E	
Wheat	Tri a 14	Lipid transfer protein (nsLTP)	5,6 ISU-E	
	Tri a aA_TI	Alpha-amylase / Trypsin inhibitor	37 ISU-E	

Mainly species-specific aeroallergen components

Grass pollen				
Bermuda grass	Cyn d 1	Grass group 1	0,7 ISU-E	
Timothy grass	Phl p 4	Berberine bridge enzyme	1,1 ISU-E	
Animal				
Dog	Can f 1	Lipocalin	37 ISU-E	
	Can f 4	Lipocalin	15 ISU-E	
Cat	Fel d 1	Uteroglobin	>100 ISU-E	

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Cross-reactive components

Serum albumin				
Cow's milk/meat	Bos d 6	Serum albumin	30 ISU-E	
Dog	Can f 3	Serum albumin	29 ISU-E	
Horse	Equ c 3	Serum albumin	14 ISU-E	
Cat	Fel d 2	Serum albumin	30 ISU-E	
Lipid transfer protein (nsLTP)				
Peanut	Ara h 9	Lipid transfer protein (nsLTP)	3,6 ISU-E	
Hazelnut	Cor a 8	Lipid transfer protein (nsLTP)	2 ISU-E	
Walnut	Jug r 3	Lipid transfer protein (nsLTP)	3,6 ISU-E	
Peach	Pru p 3	Lipid transfer protein (nsLTP)	3,7 ISU-E	
Mugwort	Art v 3	Lipid transfer protein (nsLTP)	2,1 ISU-E	
Olive pollen	Ole e 7	Lipid transfer protein (nsLTP)	0,7 ISU-E	
Plane tree	Pla a 3	Lipid transfer protein (nsLTP)	1,9 ISU-E	
Thaumatine-like protein				
Kiwi	Act d 2	Thaumatin-like protein	0,6 ISU-E	
Profilin				
Birch	Bet v 2	Profilin	17 ISU-E	
Latex	Hev b 8	Profilin	35 ISU-E	
Annual mercury	Mer a 1	Profilin	24 ISU-E	
Timothy grass	Phl p 12	Profilin	1,8 ISU-E	
CCD				
CCD	MUXF3	CCD	1,5 ISU-E	

ISAC Standardized Units (ISU-E)	Level
< 0.3	Undetectable
0.3 - 0.9	Low
1 - 14.9	Moderate / High
≥ 15	Very High

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Thermo SCIENTIFIC

ImmunoCAP ISAC

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Approval status:	Measured
Print date:	28.08.2024
Calibration curve:	CTR03 7/31/2024 EYJ2I30_1

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Phadia Xplain

SUMMARY COMMENTS
This patient has IgE to both species-specific and cross-reactive components. In general, the higher the sIgE level the greater the likelihood of allergic symptoms. IgE to peanut Ara h 2, wheat Tri a 14, peach Pru p 3, peanut Ara h 9, walnut Jug r 3, peanut Ara h 6, hazelnut Cor a 8, soybean Gly m 6, hazelnut Cor a 9, soybean Gly m 5 and cashew nut Ana o 2 is associated with risk of systemic allergic reactions.

FOOD COMPONENTS (mainly species-specific)
IgE to wheat, peanut, cow's milk, egg white, soybean, hazelnut, cod and cashew nut detected (listed in descending ISU-E levels).
Egg: IgE to egg white Gal d 2 is associated with reactions to raw or slightly heated egg.
Milk: High levels of IgE to milk Bos d 8 (casein) is associated with persistent milk allergy. Both cooked and uncooked milk may elicit symptoms. IgE to cow's milk Bos d 4 and cow's milk Bos d 5 is associated with reactions to fresh milk.
Fish: IgE to cod Gad c 1 (parvalbumin), the main allergen in cod, may cross-react with parvalbumins in other species of fish.
Nuts, Seeds & Legumes: IgE to the storage protein(s) peanut Ara h 2, peanut Ara h 6, soybean Gly m 6, hazelnut Cor a 9, soybean Gly m 5 and cashew nut Ana o 2 is associated with risk of systemic allergic reactions. Many storage proteins are heat and digestion stable and associated with allergic reactions both to cooked and uncooked food. Cashew and pistachio are closely related, and clinical cross-reactivity can be expected. Walnut and pecan are closely related, and clinical cross-reactivity can be expected.
Wheat: IgE to wheat Tri a aA_TI and wheat Tri a 14 is associated with allergic reactions to ingested wheat. IgE to wheat Tri a aA_TI and wheat Tri a 14 is also associated with baker's asthma.

AEROALLERGEN COMPONENTS (mainly species-specific)
IgE to cat, dog, timothy and bermuda grass detected (listed in descending ISU-E levels).
Pollen: IgE to timothy components may cross-react with similar proteins in other grasses. IgE to olive Ole e 7 is associated with more severe respiratory symptoms in regions with high olive pollen exposure. IgE to mugwort Art v 3 may be associated with allergy to various plant foods. Note that part of the IgE response to timothy Phl p 4 and bermuda grass Cyn d 1 may be due to CCD (sugar structures) present on the component. CCD rarely causes allergic reactions.
Animals: IgE to cat Fel d 1, dog Can f 1 and dog Can f 4 is associated with respiratory symptoms. Multisensitization may be associated with severe respiratory symptoms. IgE to cat Fel d 2, dog Can f 3 and horse Equ c 3 may explain cross-sensitization between furry animals.

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FOOD-INHALATION CROSS-REACTIVE COMPONENTS

IgE to cow's milk and meat Bos d 6 and cat Fel d 2 may cause allergic reactions upon meat consumption.
Serum albumin: Bos d 6 is an allergen present both in beef and milk.
LTP: IgE to wheat Tri a 14, peach Pru p 3, peanut Ara h 9, walnut Jug r 3 and hazelnut Cor a 8 may cause systemic allergic reactions, especially in regions where peaches and closely related fruits are cultivated. Food LTPs are stable proteins present in plant food (e.g. nuts and fruits) associated with allergic reactions both to cooked and uncooked food.
Profilin: IgE to latex Hev b 8, annual mercury Mer a 1, birch Bet v 2 and timothy Phl p 12 often have little clinical relevance in allergic diseases. However, profilins may cause reactions in few patients allergic to plant foods including citrus fruits, melon, banana, litchi and tomato. As profilins are sensitive to heat and digestion reactions are usually restricted to the oral cavity. Profilin in pollen, plant food and latex often cross-react. IgE to latex Hev b 8 is usually not associated with latex allergy.
Thaumatin-like protein: IgE to kiwi Act d 2 may cross-react with other thaumatin-like proteins in plant foods and pollen.
CCD: IgE to CCD, as indicated by the CCD marker bromelain MUXF3, rarely causes allergic reactions, but may produce positive in-vitro test results to native CCD-containing allergens from pollen, plant food, insects and venoms. The result for some purified native components (e.g. timothy Phl p 4 and bermuda grass Cyn d 1) may be affected by CCD-specific IgE antibodies.

Disclaimer

Presence of IgE implies a risk of allergic disease and its significance must be evaluated within the clinical context. Absence of IgE does not necessarily exclude the potential for an allergy-like reaction. The result comments are intended as an aid in the interpretation of test results and do not constitute medical advice. No liability is accepted with their use. The comments generated herein are copyright protected and may only be used together with ImmunoCAP™ ISAC results.

Knowledge base

Phadia Xplain Knowledge Base, version 1.3.2

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Patient Identifiers: [redacted] | **Visit Number (FIN)** [redacted]

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ImmunoCAP ISAC

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2. IgE results sorted by protein group

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Egg white	Gal d 1	Ovomucoid	<0.3	ISU-E
	Gal d 2	Ovalbumin	11	ISU-E
	Gal d 3	Conalbumin/Ovotransferrin	<0.3	ISU-E
Egg yolk/chicken meat	Gal d 5	Livetin/Serum albumin	<0.3	ISU-E
Cow's milk	Bos d 4	Alpha-lactalbumin	29	ISU-E
	Bos d 5	Beta-lactoglobulin	14	ISU-E
	Bos d 8	Casein	6	ISU-E
	Bos d lactoferrin	Transferrin	<0.3	ISU-E
Alpha-Gal	Alpha-Gal	Gal-alpha-1,3-Gal (Alpha-Gal)	<0.3	ISU-E
Cod	Gad c 1	Parvalbumin	0,6	ISU-E
Shrimp	Pen m 2	Arginine kinase	<0.3	ISU-E
	Pen m 4	Sarcoplasmic calcium binding protein	<0.3	ISU-E
Cashew nut	Ana o 2	Storage protein, 11S globulin	0,5	ISU-E
	Ana o 3	Storage protein, 2S albumin	<0.3	ISU-E
Brazil nut	Ber e 1	Storage protein, 2S albumin	<0.3	ISU-E
Hazelnut	Cor a 9	Storage protein, 11S globulin	0,9	ISU-E
	Cor a 14	Storage protein, 2S albumin	<0.3	ISU-E
Walnut	Jug r 1	Storage protein, 2S albumin	<0.3	ISU-E
Sesame seed	Ses i 1	Storage protein, 2S albumin	<0.3	ISU-E
Peanut	Ara h 1	Storage protein, 7S globulin	<0.3	ISU-E
	Ara h 2	Storage protein, 2S albumin	34	ISU-E
	Ara h 3	Storage protein, 11S globulin	<0.3	ISU-E
	Ara h 6	Storage protein, 2S albumin	3,2	ISU-E
Soybean	Gly m 5	Storage protein, Beta-conglycinin	0,7	ISU-E
	Gly m 6	Storage protein, Glycinin	1,2	ISU-E

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Buckwheat	Fag e 2	Storage protein, 2S albumin	<0.3 ISU-E	
Wheat	Tri a 19.0101	Omega-5 gliadin	<0.3 ISU-E	
	Tri a aA_TI	Alpha-amylase / Trypsin inhibitor	37 ISU-E	
Kiwi	Act d 1	Cysteine protease	<0.3 ISU-E	
	Act d 5	Kiwellin	<0.3 ISU-E	

Parvalbumins are major allergens in fish and markers for cross-reactivity among different species of fish.

Mainly species-specific aeroallergen components

Grass pollen

Bermuda grass	Cyn d 1	Grass group 1	0,7 ISU-E	
Timothy grass	Phl p 1	Grass group 1	<0.3 ISU-E	
	Phl p 2	Grass group 2	<0.3 ISU-E	
	Phl p 4	Berberine bridge enzyme	1,1 ISU-E	
	Phl p 5	Grass group 5	<0.3 ISU-E	
	Phl p 6	Grass group 6	<0.3 ISU-E	
	Phl p 11	Ole e 1-related protein	<0.3 ISU-E	

Tree pollen

Birch	Bet v 1	PR-10 protein	<0.3 ISU-E	
Japanese cedar	Cry j 1	Pectate lyase	<0.3 ISU-E	
Cypress	Cup a 1	Pectate lyase	<0.3 ISU-E	
Olive pollen	Ole e 1	Common olive group 1	<0.3 ISU-E	
	Ole e 9	Beta-1,3-glucanase	<0.3 ISU-E	
Plane tree	Pla a 1	Putative invertase inhibitor	<0.3 ISU-E	

Ole e 1 is also a marker for ash sensitization.

Weed pollen

Ragweed	Amb a 1	Pectate lyase	<0.3 ISU-E	
Mugwort	Art v 1	Defensin	<0.3 ISU-E	
Goosefoot	Che a 1	Ole e 1-related protein	<0.3 ISU-E	
Wall pelitory	Par j 2	Lipid transfer protein (nsLTP)	<0.3 ISU-E	
Plantain	Pla l 1	Ole e 1-related protein	<0.3 ISU-E	
Saltwort	Sal k 1	Pectin methylesterase	<0.3 ISU-E	

Animal

Dog	Can f 1	Lipocalin	37 ISU-E	
	Can f 2	Lipocalin	<0.3 ISU-E	
	Can f 4	Lipocalin	15 ISU-E	
	Can f 5	Arginine Esterase	<0.3 ISU-E	
	Can f 6	Lipocalin	<0.3 ISU-E	
Horse	Equ c 1	Lipocalin	<0.3 ISU-E	
Cat	Fel d 1	Uteroglobin	>100 ISU-E	
	Fel d 4	Lipocalin	<0.3 ISU-E	
Mouse	Mus m 1	Lipocalin	<0.3 ISU-E	

Mold

Alternaria	Alt a 1	Acidic glycoprotein	<0.3 ISU-E	
	Alt a 6	Enolase	<0.3 ISU-E	
Aspergillus	Asp f 1	Mitogillin family	<0.3 ISU-E	
	Asp f 3	Peroxisomal protein	<0.3 ISU-E	
	Asp f 6	Mn superoxide dismutase	<0.3 ISU-E	
Cladosporium	Cla h 8	Mannitol dehydrogenase	<0.3 ISU-E	

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Mainly species-specific aeroallergen components

Mite			
B. tropicalis (HDM)	Blo t 5	Mite group 5	<0.3 ISU-E
D. farinae (HDM)	Der f 1	Cysteine protease	<0.3 ISU-E
	Der f 2	NPC2 family	<0.3 ISU-E
D. pteronyssinus (HDM)	Der p 1	Cysteine protease	<0.3 ISU-E
	Der p 2	NPC2 family	<0.3 ISU-E
	Der p 23	Peritrophin-like protein domain (PF01607)	<0.3 ISU-E
L. destructor (storage mite)	Lep d 2	NPC2 family	<0.3 ISU-E
Cockroach			
Cockroach	Bla g 1	Cockroach group 1	<0.3 ISU-E
	Bla g 2	Aspartic protease	<0.3 ISU-E
	Bla g 5	Glutathione S-transferase	<0.3 ISU-E

Other mainly species-specific components

Parasite			
Anisakis	Ani s 1	Serine protease inhibitor	<0.3 ISU-E
Latex			
Latex	Hev b 1	Rubber elongation factor	<0.3 ISU-E
	Hev b 3	Small rubber particle protein	<0.3 ISU-E
	Hev b 5	Acidic protein	<0.3 ISU-E
	Hev b 6	Hevein	<0.3 ISU-E

Cross-reactive components

Serum albumin			
Cow's milk/meat	Bos d 6	Serum albumin	30 ISU-E
Dog	Can f 3	Serum albumin	29 ISU-E
Horse	Equ c 3	Serum albumin	14 ISU-E
Cat	Fel d 2	Serum albumin	30 ISU-E

A protein present in different animal fluids and tissues, e.g blood, milk, meat (e.g. beef) and egg. Cross-reactions between albumins from different animal species are well known, for example between cat and dog or cat and pork.

Tropomyosin			
Anisakis	Ani s 3	Tropomyosin	<0.3 ISU-E
Cockroach	Bla g 7	Tropomyosin	<0.3 ISU-E
D. pteronyssinus (HDM)	Der p 10	Tropomyosin	<0.3 ISU-E
Shrimp	Pen m 1	Tropomyosin	<0.3 ISU-E

An actin-binding protein in muscle fibers. A marker for cross-reactivity between crustaceans, mites and cockroaches.

Lipid transfer protein (nsLTP)			
Peanut	Ara h 9	Lipid transfer protein (nsLTP)	3,6 ISU-E
Hazelnut	Cor a 8	Lipid transfer protein (nsLTP)	2 ISU-E
Walnut	Jug r 3	Lipid transfer protein (nsLTP)	3,6 ISU-E
Peach	Pru p 3	Lipid transfer protein (nsLTP)	3,7 ISU-E
Mugwort	Art v 3	Lipid transfer protein (nsLTP)	2,1 ISU-E
Olive pollen	Ole e 7	Lipid transfer protein (nsLTP)	0,7 ISU-E
Plane tree	Pla a 3	Lipid transfer protein (nsLTP)	1,9 ISU-E
Wheat	Tri a 14	Lipid transfer protein (nsLTP)	5,6 ISU-E

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Cross-reactive components

Lipid transfer protein (nsLTP)

Sensitization to LTPs is often associated with allergic reactions to fruit and vegetables in regions where peaches and closely related fruits are cultivated and is associated with systemic reactions in addition to OAS. LTP proteins are stable to heat and digestion causing reactions also to cooked foods.

PR-10 protein

Birch	Bet v 1	PR-10 protein	<0.3 ISU-E
Alder	Aln g 1	PR-10 protein	<0.3 ISU-E
Hazel pollen	Cor a 1.0101	PR-10 protein	<0.3 ISU-E
Hazelnut	Cor a 1.0401	PR-10 protein	<0.3 ISU-E
Apple	Mal d 1	PR-10 protein	<0.3 ISU-E
Peach	Pru p 1	PR-10 protein	<0.3 ISU-E
Soybean	Gly m 4	PR-10 protein	<0.3 ISU-E
Peanut	Ara h 8	PR-10 protein	<0.3 ISU-E
Kiwi	Act d 8	PR-10 protein	<0.3 ISU-E
Celery	Api g 1	PR-10 protein	<0.3 ISU-E

Birch or related Fagales tree pollens are often the primary sensitizer to PR-10 proteins in areas with high exposure to these pollens. The presence of PR-10 proteins in many plant foods can cause allergic reactions to fruits, nuts and vegetables due to cross-reactivity, and is often associated with local symptoms such as oral allergy syndrom (OAS). Many of these proteins are heat labile and cooked foods are often tolerated.

Thaumatine-like protein

Kiwi	Act d 2	Thaumatin-like protein	0,6 ISU-E

Act d 2 may cross-react with other thaumatin-like proteins.

Profilin

Birch	Bet v 2	Profilin	17 ISU-E
Latex	Hev b 8	Profilin	35 ISU-E
Annual mercury	Mer a 1	Profilin	24 ISU-E
Timothy grass	Phl p 12	Profilin	1,8 ISU-E

Profilins show great homology and cross-reactivity even between distantly related plant species. Seldom associated with clinical symptoms but may cause demonstrable or even severe reactions in a minority of patients allergic to e.g. citrus fruits, melon, banana, litchi and tomato.

CCD

CCD	MUXF3	CCD	1,5 ISU-E

Cross-reactive Carbohydrate Determinants (CCD) are rarely associated with allergic reactions, but may produce positive in-vitro test results to CCD-containing allergens from pollen, plant food, insects and venoms.

Polcalcin (Calcium binding 2-EF-hand protein)

Birch	Bet v 4	Polcalcin	<0.3 ISU-E
Timothy grass	Phl p 7	Polcalcin	<0.3 ISU-E

Markers for cross-reactivity between pollen.

ISAC Standardized Units (ISU-E)	Level
< 0.3	Undetectable
0.3 - 0.9	Low
1 - 14.9	Moderate / High

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≥ 15	Very High	[redacted]

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Non-approved QC

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