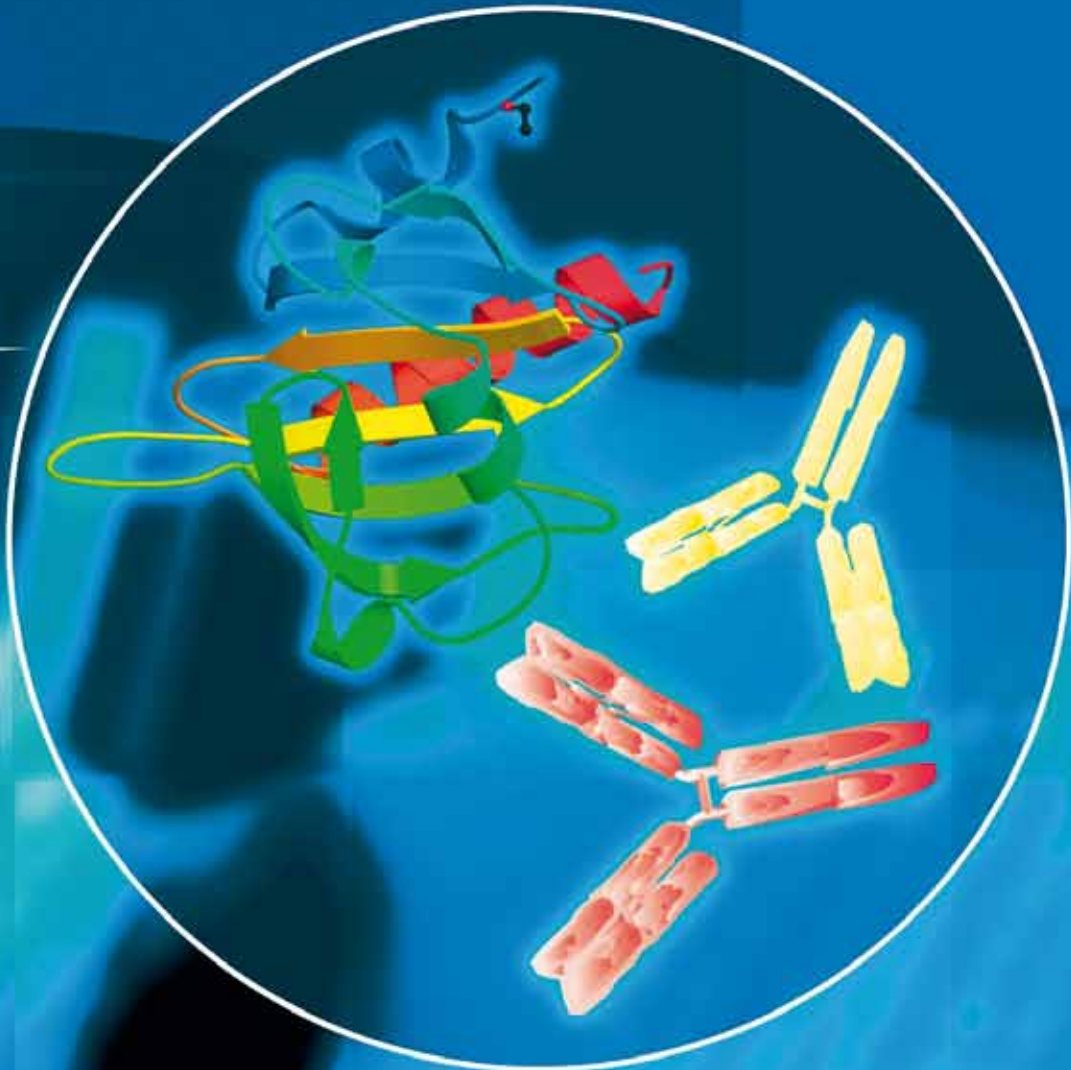
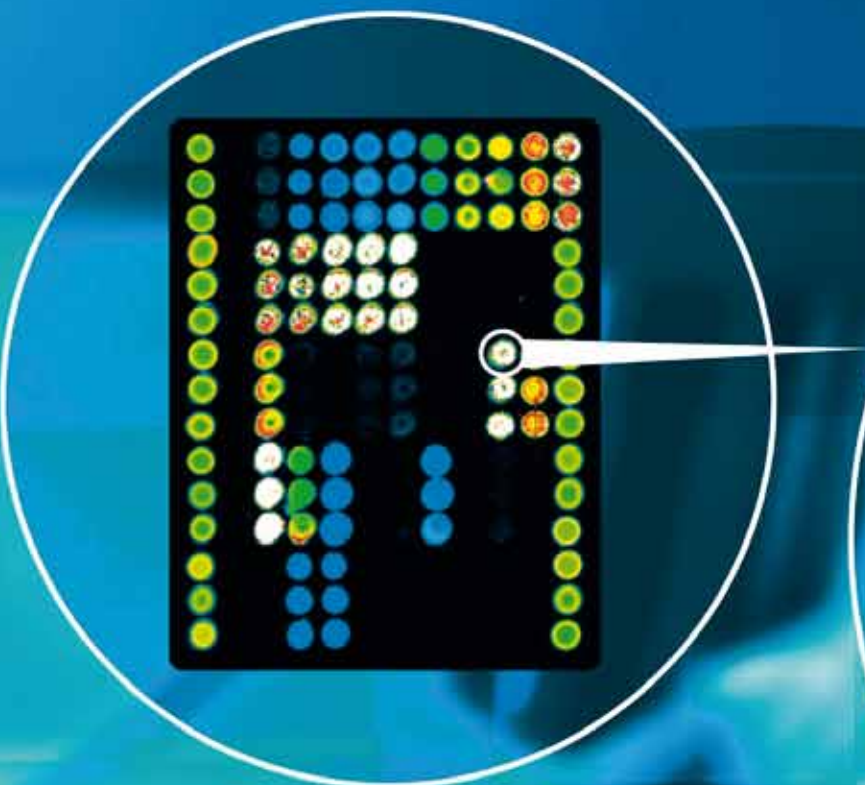
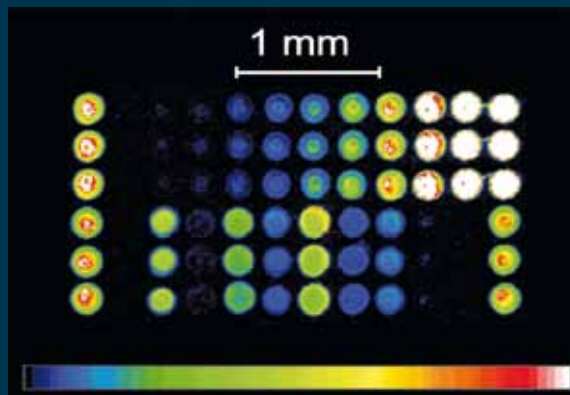


A woman in a lab coat is looking down at a large array of colorful biochips. The biochips are arranged in a grid pattern and are emitting a blue glow. The background is a solid blue color.

# FRONTLINE BIOCHIP TECHNOLOGY FEATURES AND BENEFITS IN ALLERGY DIAGNOSTICS



# IMMUNOCAP® ISAC — WHEN YOU NEED THE BIGGER PICTURE



ImmunoCAP® ISAC is a highly advanced tool for revealing the patient's IgE antibody profile. It is the result of a combination of innovative biochip technology with cutting edge research in molecular allergology. ImmunoCAP® ISAC is the only *in vitro* diagnostic test for simultaneous measurement of specific IgE antibodies to a broad spectrum of allergen components.

## Highly advanced technology answering the clinical questions

- Based on modern biochip technology, ImmunoCAP® ISAC is a miniaturized immunoassay platform where allergen components are immobilized in a microarray.
- This advanced technology enables a simultaneous measurement of IgE antibodies to a fixed panel of 112 components from 51 allergen sources in a single step, using only 30 µl of serum or plasma.
- Both capillary and venous blood sampling can be used, where capillary blood sampling enables a less invasive procedure e.g. for testing young children.
- ImmunoCAP® ISAC is the first multiplex *in vitro* diagnostic tool for the allergy specialist that is based exclusively on allergen components.



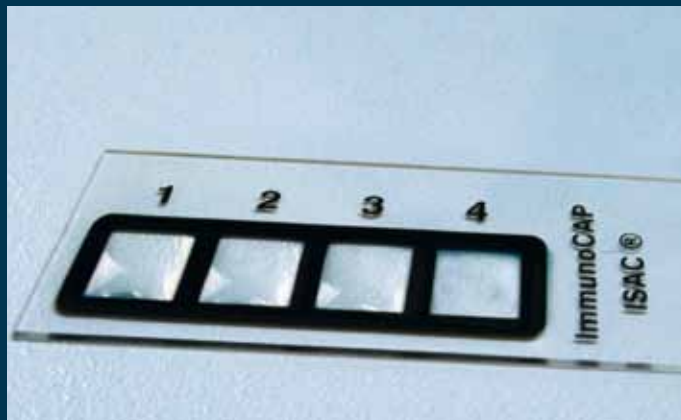




## THE FUTURE OF MULTIPLEX MOLECULAR ALLERGOLOGY

The great power of microarray-based miniature solid-phase immunoassays lies in their potential to investigate in parallel large numbers of analytes in a variety of biological samples.

ImmunoCAP® ISAC allows clinical evaluation of many allergen components using only very low volumes of patient samples.

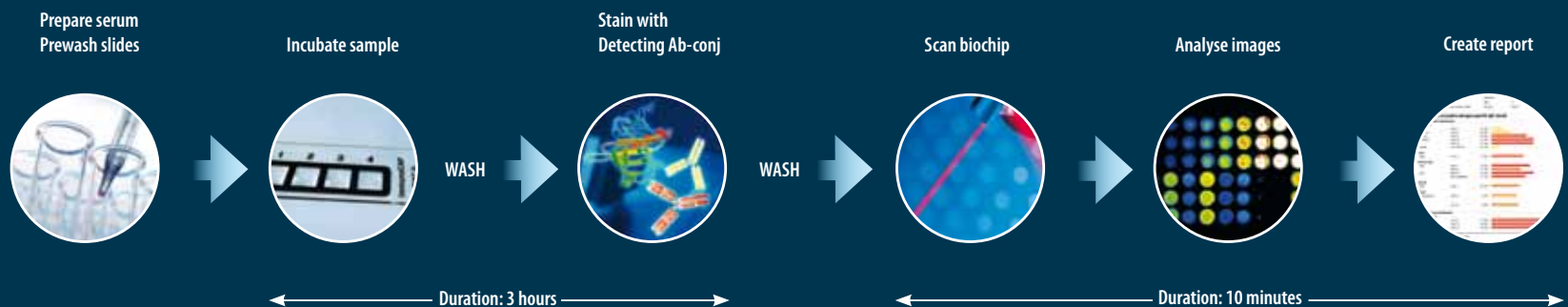


# PRINCIPLES OF THE TEST PROCEDURE

The allergen components are spotted in triplets and covalently immobilized to a polymer coated slide. Each slide contains 4 microarrays giving results for 4 different samples per slide.

- ImmunoCAP® ISAC is a two-step assay:
  1. IgE antibodies from the patient sample bind to the immobilized allergen components.
  2. Allergen-bound IgE antibodies are detected by a fluorescence-labeled anti-IgE antibody.
- The test procedure (including washing and incubation steps) gives a total assay time of less than 4 hours.
- Fluorescence is measured with a laser scanner and results are evaluated using Phadia Microarray Image Analysis (MIA) software. The MIA SW has a user-friendly interface and enables automatic readout and customized result reports.

ImmunoCAP® ISAC is a semi-quantitative test and results are reported in ISAC Standardized Units (ISU) giving indications of specific IgE antibody levels.



# TECHNICAL FEATURES

- Frontline biochip technology – a highly advanced *in vitro* diagnostic test using multiplexing technology for allergen specific IgE antibody measurements.
- Only allergen components – high-quality recombinant and purified allergen components are used.
- Efficient profiling tool – enables measurement of IgE antibodies to a fixed panel of the 112 most relevant allergen components from 51 sources in a single test.
- Small sample volume – only 30 µl of serum or plasma.
- Flexible sample taking – both serum and plasma (heparin) samples from capillary and venous blood can be used.
- Semi-quantitative determination – based on fluorescence measurements, results are reported within a measuring range of 0.3 – 100 ISU-E (ISAC Standardized Units) giving indications of IgE antibody levels. The ISU-E are standardized to ImmunoCAP® Specific IgE units.
- Performance: sensitivity varies from 0.3 – 1.0 ISU-E depending on the allergen component, no interference even from very high total IgE.
- CV% is < 25 for values > 1 ISU.
- Structured result report – a user-friendly software generates structured result reports including guiding comments for faster interpretation.

## ALLERGEN COMPONENTS BY SOURCE



ImmunoCAP® ISAC contains a wide array of proteins from various allergen sources.

# IMMUNOCAP® ISAC ALLERGEN COMPONENTS

ALLERGEN COMPONENT	ALLERGEN SOURCE COMMON NAME	LATIN NAME	PROTEIN GROUP
<b>Food Allergens</b>			
nGal d 1	Egg white	<i>Gallus domesticus</i>	Ovomucoid
nGal d 2	Egg white	<i>Gallus domesticus</i>	Ovalbumin
nGal d 3	Egg white	<i>Gallus domesticus</i>	Conalbumin/Ovotransferrin
nGal d 5	Egg yolk/chicken meat	<i>Gallus domesticus</i>	Livetin/Serum albumin
nBos d 4	Cow's milk	<i>Bos domesticus</i>	Alpha-lactalbumin
nBos d 5	Cow's milk	<i>Bos domesticus</i>	Beta-lactoglobulin
nBos d 6	Cow's milk and meat	<i>Bos domesticus</i>	Serum albumin
nBos d 8	Cow's milk	<i>Bos domesticus</i>	Casein
nBos d lactoferrin	Cow's milk	<i>Bos domesticus</i>	Transferrin
rGad c 1	Cod	<i>Gadus callarias</i>	Parvalbumin
nPen m 1	Shrimp	<i>Penaeus monodon</i>	Tropomyosin
new nPen m 2	Shrimp	<i>Penaeus monodon</i>	Arginine kinase
new nPen m 4	Shrimp	<i>Penaeus monodon</i>	Sarcoplasmic Ca-binding protein
rAna o 2	Cashew nut	<i>Anacardium occidentale</i>	Storage protein, 11S globulin
rBer e 1	Brazil nut	<i>Bertholletia excelsa</i>	Storage protein, 2S albumin
rCor a 1.0401	Hazelnut	<i>Corylus avellana</i>	PR-10 protein
rCor a 8	Hazelnut	<i>Corylus avellana</i>	Lipid transfer protein (nsLTP)
nCor a 9	Hazelnut	<i>Corylus avellana</i>	Storage protein, 11S globulin
new nJug r 1	Walnut	<i>Juglans regia</i>	Storage protein, 2S albumin
new nJug r 2	Walnut	<i>Juglans regia</i>	Storage protein, 7S globulin
new nJug r 3	Walnut	<i>Juglans regia</i>	Lipid transfer protein (nsLTP)
nSes i 1	Sesame seed	<i>Sesamum indicum</i>	Storage protein, 2S albumin
rAra h 1	Peanut	<i>Arachis hypogaea</i>	Storage protein, 7S globulin
rAra h 2	Peanut	<i>Arachis hypogaea</i>	Storage protein, Conglutin
rAra h 3	Peanut	<i>Arachis hypogaea</i>	Storage protein, 11S globulin
new nAra h 6	Peanut	<i>Arachis hypogaea</i>	Storage protein, Conglutin
rAra h 8	Peanut	<i>Arachis hypogaea</i>	PR-10 protein
new rAra h 9	Peanut	<i>Arachis hypogaea</i>	Lipid transfer protein (nsLTP)
nGly m 4	Soybean	<i>Glycine max</i>	PR-10 protein
nGly m 5	Soybean	<i>Glycine max</i>	Storage protein, Beta-conglycinin
nGly m 6	Soybean	<i>Glycine max</i>	Storage protein, Glycinin
new nFag e 2	Buckwheat	<i>Fagopyrum esculentum</i>	Storage protein, 2S albumin
new rTri a 14	Wheat	<i>Triticum aestivum</i>	Lipid transfer protein (nsLTP)
rTri a 19.0101	Wheat	<i>Triticum aestivum</i>	Omega-5 gliadin
nTri a A_T1	Wheat	<i>Triticum aestivum</i>	
nAct d 1	Kiwi	<i>Actinidia deliciosa</i>	Thaumatine-like protein
nAct d 2	Kiwi	<i>Actinidia deliciosa</i>	
nAct d 5	Kiwi	<i>Actinidia deliciosa</i>	
rAct d 8	Kiwi	<i>Actinidia deliciosa</i>	
			PR-10 protein



# IMMUNOCAP® ISAC ALLERGEN COMPONENTS

ALLERGEN COMPONENT	ALLERGEN SOURCE COMMON NAME	LATIN NAME	PROTEIN GROUP
Food Allergens			
rApi g 1	Celery	<i>Apium graveolens</i>	PR-10 protein
rMal d 1	Apple	<i>Malus domestica</i>	PR-10 protein
rPru p 1	Peach	<i>Prunus persica</i>	PR-10 protein
rPru p 3	Peach	<i>Prunus persica</i>	Lipid transfer protein (nsLTP)
Aeroallergens			
nCyn d 1	Bermuda grass	<i>Cynodon dactylon</i>	Grass group 1
rPhl p 1	Timothy grass	<i>Phleum pratense</i>	Grass group 1
rPhl p 2	Timothy grass	<i>Phleum pratense</i>	Grass group 2
nPhl p 4	Timothy grass	<i>Phleum pratense</i>	
rPhl p 5	Timothy grass	<i>Phleum pratense</i>	Grass group 5
rPhl p 6	Timothy grass	<i>Phleum pratense</i>	
rPhl p 7	Timothy grass	<i>Phleum pratense</i>	Polcalcin
rPhl p 11	Timothy grass	<i>Phleum pratense</i>	
rPhl p 12	Timothy grass	<i>Phleum pratense</i>	Profilin
rAln g 1	Alder	<i>Alnus glutinosa</i>	PR-10 protein
rBet v 1	Birch	<i>Betula verrucosa</i>	PR-10 protein
rBet v 2	Birch	<i>Betula verrucosa</i>	Profilin
rBet v 4	Birch	<i>Betula verrucosa</i>	Polcalcin
rCor a 1.0101	Hazel pollen	<i>Corylus avellana</i>	PR-10 protein
nCry j 1	Japanese cedar	<i>Cryptomeria japonica</i>	
nCup a 1	Cypress	<i>Cupressus arizonica</i>	
nOle e 1	Olive	<i>Olea europaea</i>	
new nOle e 7	Olive	<i>Olea europaea</i>	Lipid transfer protein (nsLTP)
new rOle e 9	Olive	<i>Olea europaea</i>	
rPla a 1	Plane tree	<i>Platanus acerifolia</i>	
nPla a 2	Plane tree	<i>Platanus acerifolia</i>	
new rPla a 3	Plane tree	<i>Platanus acerifolia</i>	Lipid transfer protein (nsLTP)
nAmb a 1	Ragweed	<i>Ambrosia artemisiifolia</i>	
nArt v 1	Mugwort	<i>Artemisia vulgaris</i>	
nArt v 3	Mugwort	<i>Artemisia vulgaris</i>	Lipid transfer protein (nsLTP)
new rChe a 1	Goosefoot	<i>Chenopodium album</i>	
rMer a 1	Annual mercury	<i>Mercurialis annua</i>	Profilin
rPar j 2	Wall pellitory	<i>Parietaria judaica</i>	Lipid transfer protein (nsLTP)
new rPla l 1	Plantain (English)	<i>Plantago lanceolata</i>	
nSal k 1	Saltwort	<i>Salsola kali</i>	
rCan f 1	Dog	<i>Canis familiaris</i>	Lipocalin
rCan f 2	Dog	<i>Canis familiaris</i>	Lipocalin
nCan f 3	Dog	<i>Canis familiaris</i>	Serum albumin
new rCan f 5	Dog	<i>Canis familiaris</i>	Arginine esterase

# IMMUNOCAP® ISAC ALLERGEN COMPONENTS

ALLERGEN COMPONENT	ALLERGEN SOURCE COMMON NAME	LATIN NAME	PROTEIN GROUP
Aeroallergens			
<i>new</i> rEqu c 1	Horse	<i>Equus caballus</i>	Lipocalin
nEqu c 3	Horse	<i>Equus caballus</i>	Serum albumin
rFel d 1	Cat	<i>Felis domesticus</i>	Uteroglobin
nFel d 2	Cat	<i>Felis domesticus</i>	Serum albumin
rFel d 4	Cat	<i>Felis domesticus</i>	Lipocalin
nMus m 1	Mouse	<i>Mus musculus</i>	Lipocalin
rAlt a 1	Alternaria	<i>Alternaria alternata</i>	Enolase
rAlt a 6	Alternaria	<i>Alternaria alternata</i>	
rAsp f 1	Aspergillus	<i>Aspergillus fumigatus</i>	Mn superoxide dismutase
rAsp f 3	Aspergillus	<i>Aspergillus fumigatus</i>	
rAsp f 6	Aspergillus	<i>Aspergillus fumigatus</i>	
rCla h 8	Cladosporium	<i>Cladosporium herbarum</i>	
<i>new</i> rBlo t 5	House dust mite	<i>Blomia tropicalis</i>	Tropomyosin
nDer f 1	House dust mite	<i>Dermatophagoides farinae</i>	
rDer f 2	House dust mite	<i>Dermatophagoides farinae</i>	
nDer p 1	House dust mite	<i>Dermatophagoides pteronyssinus</i>	
rDer p 2	House dust mite	<i>Dermatophagoides pteronyssinus</i>	
rDer p 10	House dust mite	<i>Dermatophagoides pteronyssinus</i>	
<i>new</i> rLep d 2	Storage mite	<i>Lepidoglyphus destructor</i>	
rBla g 1	Cockroach	<i>Blattella germanica</i>	Tropomyosin
rBla g 2	Cockroach	<i>Blattella germanica</i>	
rBla g 5	Cockroach	<i>Blattella germanica</i>	
nBla g 7	Cockroach	<i>Blattella germanica</i>	
Other			
rApi m 1	Honey bee venom	<i>Apis mellifera</i>	Phospholipase A2
nApi m 4	Honey bee venom	<i>Apis mellifera</i>	Melittin
<i>new</i> rPol d 5	Paper wasp venom	<i>Polistes dominulus</i>	Venom, Antigen 5
<i>new</i> rVes v 5	Common wasp venom	<i>Vespa vulgaris</i>	Venom, Antigen 5
rAni s 1	Anisakis	<i>Anisakis simplex</i>	Tropomyosin
rAni s 3	Anisakis	<i>Anisakis simplex</i>	
rHev b 1	Latex	<i>Hevea brasiliensis</i>	Profilin
rHev b 3	Latex	<i>Hevea brasiliensis</i>	
rHev b 5	Latex	<i>Hevea brasiliensis</i>	
rHev b 6.01	Latex	<i>Hevea brasiliensis</i>	
rHev b 8	Latex	<i>Hevea brasiliensis</i>	
<i>new</i> nMUXF3	Sugar epitope from Bromelain		CCD-marker

## Storage protein

- Proteins stable to heat and digestion causing reactions also to cooked foods.
- Often associated with systemic and more severe reactions in addition to OAS.
- Proteins found in nuts and seeds serving as source material during the growth of a new plant.

## LTP (non-specific Lipid Transfer Protein, nsLTP)

- Proteins stable to heat and digestion causing reactions also to cooked foods.
- Often associated with systemic and more severe reactions in addition to OAS.
- Associated with allergic reactions to fruit and vegetables especially in regions where peach and closely related fruits are cultivated.

## PR-10 protein, Bet v 1 homologue

- Most PR-10 proteins are sensitive to heat and digestion and cooked foods are often tolerated.
- Often associated with local symptoms such as oral allergy syndrome (OAS).
- Associated with allergic reactions to pollens, fruits and vegetables.

## Profilin

- Proteins sensitive to heat and digestion and cooked foods are often tolerated.
- Seldom associated with clinical symptoms but may cause local and even severe reactions in some patients.
- Profilins are present in all pollen and plant foods.

## CCD

- A marker for sensitization to cross-reactive carbohydrate determinants.
- Rarely causes allergic reactions, but may produce positive in-vitro test results to CCD-containing allergens from pollen, plant foods, insects and venoms.

## Tropomyosin

- Proteins stable to heat and digestion causing reactions also to cooked foods.
- As food allergen often associated with systemic and more severe reactions in addition to OAS.
- Actin-binding proteins in muscle fibers and a marker for cross-reactivity between crustaceans, mites and cockroach.

## Parvalbumin

- Proteins stable to heat and digestion causing reactions also to cooked foods.
- Often associated with systemic and more severe reactions in addition to OAS.
- Major allergens in fish and a marker for cross-reactivity among different species of fish and amphibians.

## Serum albumin

- Proteins fairly sensitive to heat and digestion.
- Proteins present in different biological fluids and solids in all animals e.g., cow's milk, blood, beef and epithelia.
- Cross-reactions between albumins from different mammalian species are well known, for example between cat and dog and cat and pig (pork).

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with cutting edge research in molecular allergology  
has resulted in ImmunoCAP® ISAC – the most advanced  
in vitro diagnostic test for simultaneous measurement  
of a broad spectrum of allergen components.*

