ImmunoCAP® allergy blood testing

Why, who and what difference it makes
Is it allergy or not?

Why test?
Many common illnesses that display symptoms commonly associated with allergy have quite different etiologies and, therefore, different treatments. A common blood sample can help you see whether or not these symptoms are actually due to allergy. What’s more, this ‘confirm or exclude allergy’ outcome is certain.

Using ImmunoCAP Specific IgE blood tests to evaluate if allergy contributes to the symptoms increases diagnostic precision and promotes the use of effective evidence-based medical care.

Allergy testing is a valuable aid to:
• Exclude allergy as a cause of the symptoms
• Identify allergy as the likely underlying reason for the inflammatory response
• Guide optimal treatment and medication
• Guide appropriate referral

Who to test?
Allergy testing is a very important prerequisite for early and correct identification and diagnosis of patients with respiratory, skin and gastrointestinal symptoms.

All patients with recurrent or persistent ‘allergy-like’ symptoms and/or an uncontrolled disease should be investigated with the help of ImmunoCAP Specific IgE blood testing.

ImmunoCAP can be performed irrespective of:
• Age
• Symptom
• Disease activity and/or severity
• Anti-histamine medication
• Pregnancy

ImmunoCAP® blood test – what difference does it make?

Diagnoses based on ImmunoCAP results, together with a case history and physical examination, achieve a better outcome for patient, physician and society alike.

Identifying to what the patient is allergic and the grade of allergy can:
❖ Reduce exposure
❖ Reduce inflammation
❖ Reduce symptoms
❖ Reduce the need for medication
❖ Increase patient quality-of-life
Signs to look for

• 1 in 3 infants and young children with eczema has underlying allergy
• 1 in 3 pre-school children with recurrent wheeze/coughing has underlying allergy
• 2 of 3 school children with recurrent wheeze/coughing have underlying allergy
• 7 of 10 children with rhinitis have underlying allergy

• 1 in 5 adults with eczema has underlying allergy
• 6 of 10 adults with seasonal rhinitis have underlying allergy
• 1 in 2 adults with chronic rhinitis or nasal congestion has underlying allergy
Who should I test for allergy?

Allergy can both cause and contribute to the symptoms that lead to upper or lower respiratory tract problems, skin problems or gastrointestinal problems. However, a number of diseases with symptoms similar to allergy can have completely different causes altogether.

At any one time, up to 50% of the population present with symptoms associated with allergy, but only about 1 in 4 suffer from IgE-mediated allergy, many unknowingly – which ones are they?

You should, therefore, test people of all ages who present with recurrent or persistent episodes of the following symptoms:

- Blocked or running nose
- Nasal catarrh
- Itchy running eyes
- Cough
- Breathing difficulties
- Dry itchy skin
- Diarrhoea
- Stomach pains

Immunocap® blood test – what difference does it make?

Symptoms can have different causes, and therefore require different treatment strategies. Trying to decide the original causes of the symptoms only with the help of anamnesis and a physical examination could thus be problematic.

An early-stage, clear and correct differentiation between allergic and non-allergic causes of symptoms is therefore essential if patients are to be managed effectively and without unnecessary and/or incorrect medication.

This is exactly what an Immunocap blood test helps with. It either:

- Identifies those patients where allergy is the reason behind the symptoms, or
- Excludes allergy as the probable cause of their symptoms.
Clear advantages of using ImmunoCAP test results

Specific IgE test results enable physicians to:
- Reduce the number of doubtful (uncertain) diagnoses
- Give significantly more patients a clear diagnosis of “you have allergy”
  or “you don’t have allergy”

References:
**Why should I test for allergy?**

Combining an IgE antibody blood test result with case history and a physical examination gives clear clinical advantages when making a diagnosis. The biggest clinical benefit is a major increase in diagnostic precision compared to physical examination and/or case history alone.

**ImmunoCAP blood test results:**
- Dramatically decrease the number of patients given an uncertain diagnosis from 50% to as little as 10%.
- Impressively increase the ‘non-allergic’ result group from 10% to 50%, which means that allergy can be dismissed as the cause of these patients’ symptoms.

**ImmunoCAP® blood test – what difference does it make?**

Allergy blood testing in everyday practice will help you make an early and correct diagnosis. If you don’t diagnose allergy, more attention can be given to identifying the actual cause of the patient’s symptoms.

**Knowing the IgE test result can reduce:**
- Unnecessary allergen exposure advice, e.g. avoiding certain foods
- Unnecessary and unsuitable medication
- The time and effort needed to find the actual cause, thus saving valuable resources

*This all improves patient quality-of-life.*
Individual allergens add up to symptoms

Patients with polysensitization may not display symptoms until their combined exposure to several individual allergens pushes them over the symptom threshold.
Why isn’t medical history sufficient?

Case history rarely tells the whole story. We therefore need a more complete picture. Before deciding on what measures to take, it is essential to understand the underlying disease process. We know, for example, that:

- 80% of allergy patients are polysensitized, i.e. allergic to more than one allergen
- Today’s average primary care patient is sensitized to four or more allergens

This combined sensitization can act in unison, promoting allergic inflammation and further increasing sensitivity at additional exposure.

What we need to know

Rather than identifying just the one allergen believed to have initiated the allergic response, it is therefore of utmost importance to map:

- All the allergens to which patients are sensitized
- The allergens that together contribute to their allergic symptoms

ImmunoCAP® blood test – what difference does it make?

Knowing the number of allergens to which a patient is sensitized (their allergen load) and reducing their exposure to one or more of these will:

- Reduce their symptoms
- Give a better picture of how serious their allergy is (the more provoking allergens, the greater the risk for disease)

Having as complete a picture as possible of the allergen load is essential for:

- Providing proper patient care
- An effective treatment plan
- Effectively reducing target allergen exposure
Allergy, a changeable march of symptoms and allergens
Why isn’t a one-time test enough?

As allergy is constantly evolving, an IgE antibody test taken at one specific time will only show the disease status at that particular moment. Only regular testing of specific allergens at specified intervals of time will provide the information needed to accurately follow disease development.

**Allergy changes over time**

Allergy undergoes dynamic changes over many years, and the term ‘Allergy March’ is often used to describe this characteristic disease progression. During a typical Allergy March sequence, sensitization and visible symptoms generally:
- Appear during specific age intervals
- Persist over a number of years
- Tend to spontaneously decrease with age

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*ImmunoCAP*® blood test – what difference does it make?

Allergy evolves over time, sometimes progressing into more severe conditions. Following the levels of a patient’s IgE antibodies then helps us understand how their allergic disease may develop in the future.

**Changes in ImmunoCAP IgE levels revealed by regular testing can:**
- Indicate possible improvement or worsening of the allergic status
- Help adjust the type and timing of the treatment
- Indicate development of tolerance to specific foods
**Relatively few allergens are responsible for the majority of allergies**

<table>
<thead>
<tr>
<th>Eczema</th>
<th>Wheeze/Rhinitis Child</th>
<th>Asthma/Rhinitis Adult</th>
</tr>
</thead>
<tbody>
<tr>
<td>🐱 e1 Cat</td>
<td>🐱 e1 Cat</td>
<td>🐱 e1 Cat</td>
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<tr>
<td>🐕 e5 Dog</td>
<td>🐕 e5 Dog</td>
<td>🐕 e5 Dog</td>
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<tr>
<td>🐟 f3 Fish</td>
<td>🌿 t3 Birch</td>
<td>🌿 t3 Birch</td>
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<td>🌿 t3 Birch</td>
<td>🌿 t3 Birch</td>
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<tr>
<td>🌿 f4 Wheat</td>
<td>🌿 t9 Olive</td>
<td>🌿 t9 Olive</td>
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<tr>
<td>🌿 f4 Wheat</td>
<td>🌿 t9 Olive</td>
<td>🌿 t9 Olive</td>
</tr>
<tr>
<td>🌿 f13 Peanut</td>
<td>🌿 w6 Mugwort</td>
<td>🌿 w6 Mugwort</td>
</tr>
<tr>
<td>🌿 f14 Soy bean</td>
<td>🌿 w21 Wall pellitory</td>
<td>🌿 w21 Wall pellitory</td>
</tr>
<tr>
<td>🌿 f17 Hazel nut</td>
<td>🌿 g6 Timothy</td>
<td>🌿 g6 Timothy</td>
</tr>
<tr>
<td>🐝 d1 House dust mite</td>
<td>🐝 d1 House dust mite</td>
<td>🐝 d1 House dust mite</td>
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<tr>
<td>🍳 f1 Egg</td>
<td>🍳 f1 Egg</td>
<td>🐞 i6 Cockroach</td>
</tr>
<tr>
<td>🥛 f2 Milk</td>
<td>🥛 f2 Milk</td>
<td>🐞 m6 Mould</td>
</tr>
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</table>
Which allergens should I test for?

The substances to which a patient is exposed will generally dictate the allergens to test. Nevertheless, some substances or allergens are more common as causes of allergy than others. Additional parameters to consider are:

- The patient’s age
- The symptoms
- Home environment (pets, hobbies, etc.)
- Where the patients live geographically

Specific IgE symptom profiles help physicians identify those patients whose common, everyday symptoms are contributed by allergy. The allergens are selected in accordance with EAACI Paediatrics Section recommendations for Europe.

- Step 1: Symptom profiles
  - Identify allergic patients
- Step 2: Follow-up testing
  - Explore other causative allergens

**ImmunoCAP® blood test – what difference does it make?**

Using recommended allergen selections simplifies choosing which to test.

*IgE antibody results against several different allergens give:*

- A better picture of the patient’s IgE profile, including allergens not immediately obvious from past medical history
- An opportunity to give individual, tailor-made advice to optimize management effect

**Significant benefits**

Relevant, tailor-made advice and suitable individual therapy make a big contribution to improved patient well-being. Together they:

- Reduce the risk of more serious allergic development and exacerbation
- Promote good patient care
Using ImmunoCAP® blood tests will dramatically improve allergy diagnosis accuracy.

Studies have shown that including a ImmunoCAP blood test in the allergy diagnosis protocol greatly increases the accuracy of diagnosis and means patient management can be more effective earlier.
Interpretation
## Symptoms vs. sensitization

<table>
<thead>
<tr>
<th></th>
<th>Clinical interpretation</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms without</td>
<td>Excludes allergy to the specific allergen as the cause of symptoms.</td>
<td>Further investigation of the cause is recommended.</td>
</tr>
<tr>
<td>IgE sensitization</td>
<td></td>
<td></td>
</tr>
<tr>
<td>without symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IgE sensitization</td>
<td>Excludes allergy to the specific allergen at the moment. However, consider the fact that an allergy may develop in the future.</td>
<td>Plan follow-up. Otherwise wait with further action.</td>
</tr>
<tr>
<td>without symptoms</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Symptoms with</td>
<td>Confirms IgE-mediated allergy.</td>
<td>Advise about reducing allergen exposure if possible. Plan follow-up, especially with children.</td>
</tr>
<tr>
<td>sensitization</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
How to interpret and act on symptoms vs. IgE antibody results

Exposure of the patient to the allergen in question is a prerequisite for developing clinical allergy/symptoms. In certain individuals, this exposure leads to the production of IgE antibodies, i.e. sensitization.

IgE antibodies can be detected very early in the blood, even before symptoms become evident. IgE sensitization can thus be regarded as a ‘risk marker’ for developing symptoms. This does not automatically mean, however, that the patient must suffer clinically. Nevertheless, an IgE-mediated allergic disease does require prior sensitization to the specific substance in question.

When will symptoms appear?

Exactly when the symptoms against an allergy-causing substance will develop varies between individuals. The time-point depends on a number of factors, including:

- The degree of exposure
- The levels of IgE antibodies
- The individual’s clinical reactivity

ImmunoCAP® blood test – what difference does it make?

Knowing and understanding the consequences of sensitization presents a better overall picture of patient situations and helps explain their disease status.

Interpreting sensitization vs. allergic disease information and acting accordingly enables physicians to prescribe the best strategy for managing the current disease as well as the development of possible new allergen sensitivity.

Understanding the sensitization results will:

- Enable tailor-made patient advice
- Facilitate an optimized treatment strategy
- Improve patient outcomes and quality-of-life
A model for probability of symptoms in relation to allergen-specific IgE antibody levels

Factors to consider for a final diagnosis:
- Age
- Degree of atopy
- Allergen load
- Type of sensitizing allergens
- Previous symptoms
- Other triggering factors

References:
1. Söderström L et al. A further evaluation of the clinical use of Specific IgE antibody testing in allergic diseases. Allergy 2003;58:921-8
How to interpret and act on quantitative IgE antibody results

Having a quantitative IgE test result when investigating patients with suspected allergy opens up important new possibilities.

Knowing a patient’s Specific IgE antibody levels for the substances to which they are sensitive increases the possibility of ranking how the different substances affect their symptoms.

Allergens found at low levels that today do not result in symptoms can nevertheless help predict future symptom development. Based on thousands of test results, the generic curve opposite indicates what an allergen-specific IgE antibody value can mean in relation to symptoms. Although a final diagnosis should always be based on the physicians’ overall picture of the situation, a general rule of thumb is that the higher the IgE antibody value, the greater the likelihood of symptoms appearing.

Allergy is not a black and white ‘yes or no’ disease. Classifying patients as such is therefore an over-simplification and should be restricted only to the very first stages of an allergy investigation.

ImmunoCAP® blood test – what difference does it make?

A quantitative ImmunoCAP blood test result has great value. Together with a previous medical history and a physical examination, it helps plan the best possible management for the allergy patient.

Value of ImmunoCAP test results

Knowing the ImmunoCAP test results helps physicians:

- See their patients’ baseline IgE antibody levels
- Evaluate which allergens are the most important for causing symptoms
- Follow changes in patients’ IgE profile over time to:
  - reflect the effect of and compliance with avoidance/reduction
  - optimize medical strategies
  - evaluate tolerance development (food allergy, specific immunotherapy)
  - avoid unnecessary food challenges
- Evaluate if specific immunotherapy is an option.
Other facts to consider prior to diagnosis

Before making the final diagnosis, remember that several other aspects of allergy should be borne in mind. Knowledge and understanding of the following topics will give a better overall picture of the patient’s situation.

**Age** Children under two years may suffer from allergic disease at lower concentrations of allergen-Specific IgE antibodies than older individuals.

**Degree of atopy** Patients with a family history of allergy should be considered to be at high risk of developing allergic disease. However, the majority of allergic children have non-allergic parents. Multiple allergen sensitization indicates a high degree of atopy.

**Allergen load** Take into account the total allergen sensitization, even if only one or a few allergens seem important at the time of the investigation. Different sensitizations may accumulate and it may be the least obvious that leads to symptom development. Multiple allergen sensitization indicates a higher risk of developing severe allergic disease.

**Type of sensitizing allergen** Some allergens (e.g. peanut and tree-nuts) are considered to be particularly dangerous as they more often provoke severe symptoms such as anaphylaxis and asthma.

**Previous symptoms** If the patient has experienced severe symptoms such as anaphylaxis and/or asthma in the past, even low IgE antibody levels must be considered.

**Other triggering factors** Bacterial and viral infections as well as pollution frequently exacerbate symptoms in the allergic patient.

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**ImmunoCAP® blood test – what difference does it make?**

Adding the above considerations to an IgE antibody test result, combined with previous medical history and a physical examination, means that the allergy investigation can be fine-tuned to give a highly informative picture. The ImmunoCAP Specific IgE test result then forms a sound, scientific basis for a correct diagnosis, prognosis and follow-up of the allergic patient.
Cases
Eczema

A 27-month-old boy with eczema. The mother noticed skin alterations on his cheeks and trunk several months ago, but they were mild and easily treated with baby cream. However, since the occurrence of an upper respiratory infection 2 weeks ago, the eczema has become much more severe, with intense itching.

Physical examination
- Erythematous eruptions on the cheeks.
- Eczematous lesions behind the ear lobes, showing signs of secondary infection.
- Extensive involvement of the trunk and extremities, showing oozing and crusting, as well as numerous excoriations.
- No involvement of the scalp.

Suspected diagnosis
- Atopic eczema?
- Secondary infection – Staphylococcus aureus?

Diagnosis & follow-up
IgE antibodies in the blood were determined with ImmunoCAP to relevant allergens in connection with eczema symptoms. The boy tested positive for egg and milk, and was placed on an elimination diet. The diet improved the eczema and it was now easily treated with emollient lotion. The decreasing level of allergen-specific IgE antibodies that was shown later in follow-up testing helped in deciding when the foods could be reintroduced.
Rhinitis

A 12-year-old girl with constant nasal obstruction. She has been healthy throughout childhood, except for having mild eczema during infancy. She has always had a tendency to catch colds very easily. During the past 6 months, she seems to have been chronically congested and often complains of irritated, itchy eyes, especially in the morning.

Physical examination
• Slightly inflamed conjunctivae
• Pale blue nasal mucosa

Suspected diagnosis
• Infection?
• Allergy?
• Non-specific nasal hyperresponsiveness?

Diagnosis & follow-up
IgE antibodies in the blood were determined with ImmunoCAP to relevant allergens in connection with rhinitis symptoms. The girl tested positive for house dust mites. Removal of the carpet and wall hangings in the girl’s bedroom and using allergen-protective bed covers have reduced her problems.
Wheeze

A 6 ½-year-old girl was referred by her school nurse for chronic cough. During her entire childhood she has been considered to be very sensitive to infections, with long periods of coughing. Since school started 3 months ago, the problem has been accentuated. Her teacher considers her to be fretful and whiny, especially during gym classes, in which she often interrupts activities with her coughing.

Physical examination
• Underweight
• Raised shoulders
• Hyperinflation
• Slightly prolonged expiration
• Reduced breathing sounds, basally and bilaterally
• Cough and rhonchi after light exertion in the consulting room

Suspected diagnosis
• Asthma?
• Respiratory infection?

Diagnosis & follow-up
IgE antibodies in the blood were determined with ImmunoCAP to relevant allergens in connection with wheezing symptoms. The girl tested positive for grass pollen, cat and dog. A ß-agonist was prescribed as inhalant spray and the child was taught to use it whenever necessary.

As prophylactic treatment, inhalant steroids were prescribed. After removal of the family cat from the home and providing the teacher with information about warming up before exercise, the child’s symptoms are now well under control.