Cellular Allergy Diagnosis

Flow CAST® Applications

There is more to allergy than just IgE

- IVD Challenge Test for
  - Drugs
  - Food
  - Venoms

- More than 160 allergens

- Non-IgE- & IgE-mediated allergies

- Immunotherapy follow-up

Supplied by

BÜHLMANN

alpha laboratories
The aim of the study was to evaluate the diagnostic workup in case of immediate-type beta-lactam allergy using the test systems mentioned in the figure below for PPL, MDM, benzylpenicillin, amoxicillin and ampicillin. 10 European centers with KOLs in drug allergology participated and followed the same ENDA protocol.

By adding the CAST® assays to the routine protocol, 60% of challenges could be avoided. If only skin prick test and sIgE had been applied, 30 instead of 12 challenges would have been necessary.

**Summary of diagnostic workup with commercially available in vitro and in vivo diagnostic tests.**

### Beta-Lactam Antibiotics

**Multicenter Study, De Weck et al. 2009**

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### History

- 124 patients
  - 30% Negative
  - 70% Positive

### Skin Test

- 37 patients
  - 30% Negative
  - 70% Positive

### sIgE

- 30 patients
  - 19% Negative
  - 81% Positive

### CAST® Assays

- 12 patients
  - 40% Negative
  - 60% Positive

### Challenge Test

- 12 patients
  - 13% Negative
  - 87% Positive

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### Beta-Lactam Antibiotics

**A new Basophil Activation Test using CD63 and CCR3 in Allergy to Antibiotics, Eberlein et al. 2010**

24 patients with clear history of immediate type beta-lactam allergy (penicillin, amoxicillin, cefuroxime, ciprofloxacin) were recruited and skin prick test, sIgE and Flow CAST® were carried out.

**Table: Flow CAST®**

<table>
<thead>
<tr>
<th></th>
<th>Flow CAST®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sensitivity (Overall)</td>
<td>55%</td>
</tr>
<tr>
<td>Specificity (Overall)</td>
<td>80%</td>
</tr>
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<td>Sensitivity (Cefuroxim)</td>
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### Aspirin

18 patients and 11 healthy controls with aspirin hypersensitivity with urticarial and/or angioedema were tested with Flow CAST®.

**Table: Flow CAST® highsens**

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<tbody>
<tr>
<td>Sensitivity (Aspirin)</td>
<td>44%</td>
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<td>Specificity (Aspirin)</td>
<td>91%</td>
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**Sensitivity & Specificity of Flow CAST® are outstanding compared to other commercially available IVD tests.**
Food Hypersensitivity

In this study the test performance of BAT to discriminate between peanut allergy and peanut tolerance was evaluated in comparison with SPTs, specific IgE to peanut and Ara h 2 in a Oral Food Challenge (OFC) defined population of 104 patients.

<table>
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<th>Cut off</th>
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<td>% CD63</td>
<td>8.11</td>
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With impressive sensitivity and specificity, BAT proved to be superior to other diagnostic tests in discriminating patients with peanut allergy and tolerance.

Especially in difficult cases, BAT reduced the need of OFCs to achieve the correct allergy diagnosis.

Starting from this exhaustive clinical validation ‘future studies will determine whether BAT can add to the OFC as an in vitro gold standard’.

The benefit of Flow CAST® in predicting a child’s reaction to oral challenge was evaluated and compared to skin prick test (SPT) and sIgE.

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NPV and PPV of Flow CAST® is superior to sIgE. Therefore it is the test of choice for decision making when milk can be reintroduced into the diet of affected children.

The severity of the clinical reaction (absent, mild, moderate, severe) extremely well correlated with the intensity of the basophil activation.

Flow CAST® is a valuable tool in helping decide when oral challenge can safely be undertaken during the follow-up of cow milk allergy.

Diag nostic algorithm using Flow CAST®, sIgE and SPT.

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**Bee & Wasp Venom**

The presence of the most relevant honey bee (Apis mellifera) and yellow jacket (Vespula vulgaris) venom allergen components in different diagnostic and therapeutic venom preparations were analyzed via immunoblotting.

The BÜHLMANN yellow jacket and honey bee venom allergens were the only ones which contain major allergen components, such as Api m 1, Api m 2, Api m 3 and Api m 10.

These allergen components are being relevant. If only Api m 1 is used, genuine sensitization to other major allergens might be missed.

**Allergen Composition of Therapeutic and Diagnostic Venom Preparations, Poster: Blank et al. 2011**

![Immunoblottings of different extracts.](image)

- c.v. = crude venom extract from Apis mellifera
- diag. ex. = BÜHLMANN honey bee venom allergen (BAG2-I1)
- prep.1-3 = therapeutic preparations for immunotherapy from 3 different manufacturers

**SIT Follow-up**

In this study, CAST® assays (Flow CAST® and CAST® ELISA) where used to investigate their suitability as follow-up markers for specific immunotherapy (SIT).

A decreased basophil responsiveness could be demonstrated in bee venom allergic patients after SIT compared to patients before SIT.

Furthermore, using Flow CAST® with different bee venom concentrations allows to identify those bee venom allergic subjects who need higher SIT doses or a longer duration of SIT for full protection.

**Basophil Activation Tests in Bee Venom Immunotherapy, Poster: Hausmann et al. 2014**

![Immunotherapy follow-up with honey bee and yellow jacket venom.](image)

- prior SIT
- after SIT
- Max
- EC50

**Immunotherapy follow-up with honey bee and yellow jacket venom.**