

# Cellular Allergy Diagnosis

Food Additives  
CAST<sup>®</sup>-Assays

There is more  
to allergy than  
just IgE



Cellular Allergy Assays are reliable tools for the diagnosis of non IgE-mediated food additive intolerances

Flow-CAST<sup>®</sup> and Flow2 CAST<sup>®</sup> have excellent sensitivities for commonly used food additives

To optimise sensitivity the recommended allergen combination to be tested is Benzoate, Nitrite and Salicylate

# Cellular Allergy for Food Additives Intolerance

The diagnosis of food additive intolerance is very difficult. According to scientists, immunological reactions not related to sIgE seem to be the primary cause for the patients symptoms. Cellular allergy assays like the BÜHLMANN Flow-CAST® and Flow2 CAST® are reliable tools to detect intolerances by the *in vitro* stimulation of basophil cells by standardised allergens using surface CD63 expression as a read out system.

## Common Food additives

Food additives are widely used as colorants, preservatives in order to maintain the quality of food concerning texture, taste, shelf life and odor.

**Sodium benzoate E211** the sodium salt of Benzoic acid is commonly used as a preservative in products like soft drinks, juices, and chilly pastes. Benzoates have antibacterial and antifungal properties. They occur naturally in prunes, cinnamon, tea, and berries and may cause urticaria, asthma and angioedema.

**Sulphites** like potassium metabisulphite are colorants of the E220 group (E220 - E227). Typical products are beer, soft drinks, dried fruit, juices, wine, vinegar, potato products. They are used to preserve smoked and processed meat, and salad. Sulphites may cause oral allergy syndrome, urticaria and angioedema when ingested.

**E 250 Sodium Nitrite** is used as additive in meat and fish products maintaining the colour of the fresh product. The growth of bacteria like Clostridium botulinum can thus be prevented. It may provoke adverse reactions like (chronic) urticaria, and is also potentially carcinogenic.

**Salicylates** can induce urticaria, asthma and nasal polyps. They can be detected in curry powder, paprika, fruits and fruit skins, tea, and honey. Salicylate sensitive individuals also tend to have adverse reactions to benzoates and tartrazine.

## Study description

The aim of this study was to investigate the expression of CD 63 in patients suspected of food additive intolerances using Flow-CAST®. The study was performed in a routine laboratory and reflects day to day routine in an allergy lab. (Tringali et al. , in prep.)

Flow-CAST® is based on the isolation of leucocytes, *in vitro* stimulation and flow-cytometric analysis of CD63 expression on the basophil surface.

EDTA blood was stimulated after the isolation with 4 food additives known to be the most common allergens, in three different concentrations. The following food additive allergens were tested: Sodium Benzoate (E211), Sodium Nitrite (E250), Potassium Metabisulphite (E224), Sodium Salicylates (E 218).

Two groups of subjects were included: 1) 56 patients suspected of food/food additive intolerance

2) 15 non allergic blood donors as a control group

The Cut-off used in the evaluation was: the expression of CD 63  $\geq$  5% and SI (= Stimulation index)  $\geq$  2 for all allergen concentrations.

## Results

Flow-CAST® was positive in 68% of patients suspected of food additive intolerance when using the combination of E211, E250 and E224 for the stimulation.

All 56 patients and 15 healthy controls were included in the data evaluation of the positivities in one allergen concentration only.

Allergen	Positives	specific relevance
E211	48%	100%
E250	27%	93%
E224	27%	100%
Salicylate	32%	100%
Combination 1*	71%	93%
Combination 2**	68%	93%

BÜHLMANN recommends:

In case of suspected food additive intolerance, Flow-CAST® and Flow2 CAST® testing is a powerful diagnostic tool. Measuring the allergens E211, E250 and E224 in combination using one concentration, a very high percentage of patient samples can be classified as positive with a high correlation to patients' history.

\*Combination 1: Sodium Benzoate (E211), Sodium Nitrite (E250), Potassium Metabisulphite (E224), Sodium Salicylates (E 218)

\*\*Combination 2: Sodium Benzoate (E211), Sodium Nitrite (E250), Potassium Metabisulphite (E224)

