



of Allergy

CAST

Cellular Antigen Stimulation Test

Marinda is a 28-year-old legal secretary.

She was married 8 months ago, and travelled overseas for the first time on honeymoon. During the trip she began to develop an intermittent, raised, red, itchy rash on her chest and thighs. It would appear spontaneously and resolve after a few hours.

A doctor in Italy diagnosed urticaria and gave her some anti-histamine tablets which afforded her some relief from her symptoms.

Following her return home her condition intensified. Over the past few months the rash has been present almost daily and it is more extensive, also involving her abdomen and upper arms. The antihistamines are no longer controlling the symptoms, although she seems to be better on weekends.

Dr Do-a-lot takes a detailed history and finds that Marinda has not suffered from this condition before. She had no asthma, allergic rhinitis or eczema as a child, and there is no family history of atopy. At junior school she used to develop a red patch near her lip on the left if she drank orange squash or ate large quantities of treats at parties. She is on no medications apart from the antihistamines that she takes for her urticaria and an oral contraceptive pill.

She does not smoke, and has one glass of white wine most evenings.

She exercises at the gym 6 days per week. Her diet is high in fruits and vegetables and she avoids red meat. At work she orders sushi or a salad for lunch and a bottle of vitamin-enriched flavoured water every day.

On examination Marinda is well, slim and fit. Her skin is clear and her systems are intact.



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We are still discussing investigations in allergy.

This article explores the use of the CAST.

References

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www.Buhlmannlabs.ch

Assessment

Dr Do-a-lot considers Marinda's story: She has **chronic urticaria**, which is worse on weekdays and was possibly triggered by the stress of her wedding and first trip overseas.

She does not have a history of **atopy** and there is nothing in her history to suggest that this is an IgE-mediated reaction.

In fact, the cause of inflammatory mediator release in urticaria and angio-oedema is seldom specific IgE.

There are **many mechanisms and molecules** that can have this effect, including IgE, complement, drugs, foods, chemicals, IgG and other auto-immune mechanisms. Very often the cause is not found; hence the diagnosis of **chronic idiopathic urticaria**.

In Marinda's case, however, the mention of her possible previous sensitivity to 'orange squash' might be a **clue** to the cause of her urticaria. Most commercially prepared drinks have a **pre-servative** agent, very commonly sodium benzoate or sulphur dioxide.



Dr Do-a-lot remembers that Marinda has a bottle of **flavoured vitamin-enriched water** every day during the week. Marinda has not checked the ingredients but she does not think that there are preservatives in it because it is a 'health drink'.

Dr Do-a-lot decides to test her for sensitivity to preservatives, and asks her to bring a bottle of the brand of flavoured water with her next week when she returns for follow up so that she can check the ingredients.

Because the mechanism for preservative sensitivity is not mediated via IgE, a **specific IgE test** (or RAST) is not available for these substances.

The **CAST** (cellular antigen stimulation test) is a newer test that has been developed by Buhlmann Laboratories, a company based in Switzerland. It detects sensitivity to substances including **antibiotics, analgesics, food additives, food colourants, both local and general anaesthetics, as well as latex and carboxymethylcellulose**. Tests for **bee and wasp venoms, foods, pollens and other aeroallergens** are also available.

The test involves stimulation of basophils which produce leukotrienes which are then measured.

It is a **sensitive test** but specificity may be low.

Dr Do-a-lot asks Sister Sweet to draw two EDTA tubes of venous blood. She sends them on the same day to the laboratory, ensuring that the courier transports them safely and on ice.



The CAST

Peripheral white blood cells are incubated with a specific antigen.

The stimulated cells release sulphido-leukotrienes where individuals have been sensitised.

Following centrifuging, the white blood cells form a sediment and the concentration of sulphido-leukotrienes in the supernatant is measured by means of an ELISA test.

The concentration is expressed in pg/ml.



Fig. 2. Two EDTA tubes.

Follow up

Marinda visits Dr Do-a-lot the following week. She brings a bottle of the drink with her. The preservative listed on the label is sodium benzoate.

The results show that she is in fact sensitive to sodium benzoate.

The result is 225 pg/ml, with a negative cut off of < 90 pg/ml.

The potassium-metabisulphite result is negative.

Marinda is advised to avoid drinks and foods containing this (now ubiquitous) preservative. An appointment is made with a dietician to assist her with the interpretation of labels and to learn which foods she should avoid. She should still use antihistamines as required.

Marinda telephones the practice 2 weeks later, having followed Dr Do-a-lot's advice. She has not had a reaction in 5 days, and is feeling much better on a preservative-free diet.

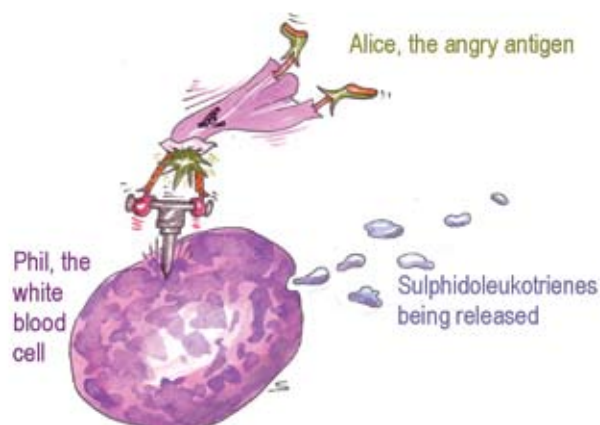


Fig 1. Cartoon diagram of an antigen stimulating a basophil in the cellular antigen stimulation test.

How to take a CAST specimen

Take two EDTA (purple-topped) tubes of venous blood.

You need to draw about 3 ml of fresh blood.

Transport the specimens on the same day, on ice, wrapped in paper towel or bubble wrap to prevent damage to cells.

This test is not offered at all laboratories, but in large centres laboratories collaborate to make the test available to the public.