Basophil degranulation test (BDT) as an alternative to the prick test or CAP test for type I allergies

The basophil degranulation test (also known as basophil activation test [BAT] or CAST test) reproduces the allergic immediate type reaction in the test tube after addition of the suspected allergen to basophil granulocytes enriched from the patient blood. In case of allergic sensitisation, released leukotrines are detected.The test thus resembles the reaction in the prick test but with the advantage of being independent of antihistamine ingestion, dermatographic urticaria and other factors that influence skin tests. There is also no risk of triggering anaphylaxis with an *in vitro* test.

The procedure involves the following steps:

1. Isolation of the basophil granulocytes from EDTA or heparin blood collected from the patient
2. Priming of the basophils with Interleukin 3
3. Stimulation with the suspected allergen extracts, native materials or (new) recombinant allergen components
4. Measurement of the histamine-associated allergy mediators (leukotrienes) released in response with existing sensitisation
5. An increase in the leukotriene release > 200 pg/ml compared to baseline is considered evidence of an allergic sensitisation.

Advantages of the BDT

Unlike IgE detection in the CAP test, the BDT also detects basophil-bound allergen-specific IgE antibodies and is therefore very sensitive.

As a classic 'in vitro provocation test' the BDT is also suitable for the detection of immediate type hypersensitivity reactions not mediated by IgE (pseudoallergies/idiosyncrasies to some medications, work-place and environmental allergens, food additives and dyes).

Regarding sensitivity and specificity, the BDT has proven to be clearly superior in our laboratory compared to other in vitro provocation tests such as the histamine release test or the CD63 test.

Applications for the BDT test

Detection of IgE-mediated type I sensitisations:

1. To allergen extracts with negative or questionable specific IgE in the CAP test or prick test despite strong clinical suspicion.

The classic applications are:

- hymenoptera toxins (bees, wasps, hornets)
- house dust and flour mite allergens
- moulds
- animal dander (dog and cat hair)
- food
- α-amylase, latex, formaldehyde, etc.

2. To allergens that are not available for automated IgE measurement

- many medications (primarily NSAID)
- acrylates and other plastic components
- animal dander, yeasts, flour dust
- varnishes and resins, e.g., in the building industry
- latex gloves, disinfectants
- perfumes, solvents, biocides, etc.

The advantage of the BDT is that it can also be carried out on toxic and carcinogenic native materials because there is no contamination of the patient using this laboratory test. The native materials must be sent to the laboratory together with the blood sample.

3. To food dyes and food additives (17 substances in 4 screening groups, see reverse).

On the reverse you will find a list of the validated allergens available in the laboratory.
For allergens not listed an allergen sample (for medications tablet or ampoule and for other materials about 2 g or 0.5 ml of substance) must be sent together with the blood sample.

Material

2 ml heparin blood or EDTA for each allergen

Sample receipt within 24 hrs has to be ensured. The sample should be stored and transported at room temperature. Within the Berlin city area, we offer a courier service (+49 (0)30 7701- 250). For collections beyond Berlin, please contact our complimentary courier service (+49 (0)30 77001-450).

Invoicing

The costs are 18.47 € per inhouse allergen or 28.86 € per send in allergen with an additional one time fee of 23.31 € for the cell preparation.

Do you have questions? Our serviceteam will be happy to support you: +49 (0)30 770 01-220.

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The following allergens are always in stock as standard test allergens in the laboratory.
For allergens not listed here, there is the option of sending in a sample which can be tested directly in the BDT (BDT special allergen).

Medications
Antibiotics
Amoxicillin
Ampicillin
Cefaclor new
Cefamandole new
Cefazolin new
Ceftriaxone new
Cefuroxime new
Cephalosporin C new
Ciprofloxacin
Clarithromycin new
Clavulanic acid new
Clindamycin new
Doxycycline new
Erythromycin new
Levofloxacin new
Moxifloxacin new
Penicillin G
Penicillin V
Rifampicine new
Sulfamethoxazole new
Trimethoprim new
Tetrazycline

Analgesics
Aspirin / acetylsalicylicacid
Diclofenac
Ibuprofen
Indomethazin
Mefenamic acid new
Metamizole new
Paracetamol
Phenylbutazone new
Propyphenazone new
Tramadol new

Muscle relaxants
Atracurium new
Mivacurium new
Pancuronium new
Propofol new
Rocuronium new
Suxamethonium new
Vecuronium new

Local anaesthetics
Articaine
Lidocaine
Mepivacaine
Prilocaine
Ubistesin

Beta-blocker
Bisoprolol new

ACE inhibitor
Ramipril new

Other
Chlorhexidine

House dust and flour mites
Acarus siro (d70)
Dermatoph. farin. (d2)
Dermatoph. pter. (d1)
Mite mixture contains house dust mites d1 and d2 Storage mite mixture contains Acarus siro d70, Glycyphagus domesticus d73, lepidoglyphus destruc. d71, Tyrophagus putreus d72

Moulds
Alternaria alternata
Aspergillus fumigatus
Aspergillus versiocolor new
Botrytis cinerea
Candida albicans
Chaetomium globosum new
Cladosporum herbarum
Geotrichum candidum new
Malassezia pachydermatis new
Penicillium chrysogenum
Rhizopus nigricans
Trichophyton mentagrophytes
Stachybotrys spp.
Mould mixture contains Penicillium chrysogenum m1, Cladosporum herbarum m2, Aspergillus fumig. m3, Candida allb. m5, Alternaria tenius m6

Insects
Anisakis new
Bee toxin i1
Hornet toxin i75
Paper wasp toxin i4
Wasp toxin i3

Animal epithelia
Cat epithelium e1
Dog epithelium e2

Dental materials
BISGMA
BISDMA
Bisphenol A
Butanediol-1-4-methacrylate (BDMA)
Camphorquinone
Diurethane dimethacrylate
Endomethasone
Ethylene glycol dimethacrylate
Gutta-percha
Methyl metacrylate (MMA)
N,N-dimethyl-4-toluidine
TEG-DMA
2-hydroxyethyl metacrylate (HEMA)

Workplace allergens
Alpha amylase (baker´s asthma)
BTX
Chlorpyrifos
Dichlofluanid
Formaldehyde
Latex
Lindane
PAK mix
PCB
Permethrin
Phthalic acid anhydride
Pentachlorphenol (PCP)
Tris(2-chloroethyl) phosphate
Tris(2-butoxylethyl) phosphate
Tris(2-ethylhexyl) phosphate

Food additives
Food colouring agent mixture I contains amaranth, azorubine, quinoline yellow, cochineal red, sunset yellow
Food colouring agent mixture II contains erythrosine, patent blue, indigotine, brilliant black
Food additives I contains tartrazine, sodium benzoate sodium nitrite, potassium metabisulphite, sodium salicylate
Food additives II contains benzoic acid, propyl-p-hydroxybenzoate, glutamate

Individual tests
Amaranth E123
Azorubine E122
Benzoic acid new
Brilliant black E151
Carboxymethylcellulse
Cochineal red E124
Erythrosine E127
Glutamate (glutamic acid)
Indigotine E132
Patent blue E131
Polysorbate 80 E433 new
Potassium metabisulphite
Propyl-p-hydroxybenzoate
Quinoline yellow E104
Sodium nitrite
Sodium salicylate
Sunset yellow E110
Tartrazine

Food
Almonds
Alpha-lactalbumin
Aniseed
Apple
Asparagus
Avocado
Beef
Baker´s yeast
Banana
Barley
Beta-lactoglobulin
Brazil nuts
Brewer's yeast
Carp
Carrots
Cashew nuts new
Casein (milk)
Cauliflower
Celery
Chicken
Cinnamon
Cocoa beans
Cod
Codfish
Coffee beans
Coriander
Corn
Cow's milk
Crawfish
Duck
Eel
Egg yolk (chicken's egg)
Egg white (chicken's egg)
Garlic
Gluten (gliadin)
Goose
Grapefruit
Grapes
Halibut
Hazelnuts
Herring
Hops
Kiwi fruit
Lemon
Lobster
Mandarin
Mutton
Onion
Oysters new
Paprika
Peach
Peanuts
Pear
Peas
Pepper (black)
Pineapple
Pistachios
Pork
Potatoes
Prawns
Oats
Orange
Rice
Rye
Salmon
Sesame
Shrimp
Sole
Spelt
Spinach
Squid new
Soy
Strawberries
Tea (black)
Tomatoes
Trout
Tuna
Turkey
Vanilla
Walnuts
Wheat

Grass pollens
Bermuda grass g2
Cocksfoot g3
Timothy grass g6
Perennial ryegrass g5
Rye pollen g12
Grass mixture contains timothy grass g6, cocksfoot g3, meadow fescue g4, perennial rye grass g5, smooth meadow grass g8, common velvet grass g13

Tree pollens
Alder t2 new
Birch t3
Hazelnut t4
Oak t7
Olive t9

Herb pollens
Common ragweed new
Mugwort w6
Ragweed w1 new
Ragweed mixture
Wall pellitory new
Ribwort new