

FOOD ALLERGY & HYPERSENSITIVITY 2016



ABSTRACTS

EuroSciCon 

5TH - 7TH JULY 2016
LONDON, UK

Food allergy has now reached epidemic proportions where the personal, social and economic cost extends across nations. The aim of this EuroScicon summit on Food Allergy is to provide a wider perspective on the research and treatments being developed.

This event has [CPD accreditation](#)

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#FoodAllergy2016

This abstract book will be finalised two weeks before the event

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Invited Speakers Abstracts

Beyond Tropomyosin in Shrimp Allergy

Dr Sara Anvari, Texas Children's Hospital, Houston, TX, United States

Shrimp allergy is a common cause of food allergy with tropomyosin identified as the major allergen. Currently, gold standard for diagnosis is an oral food challenge (OFC), which is time-consuming, costly and entails risk of having an allergic reaction. The evidence supporting the role of non-tropomyosin allergens such as hemocyanin and myosin light chain in the clinical manifestations of shrimp allergy and the usefulness of shrimp component testing will be discussed.

The effects of polyphenol-enriched diets on food allergy

Dr. Margarida Castell, University of Barcelona, Barcelona, Spain

The role of nutrition on the immune system is a trending topic today. In this regard, when a disorder of the immune system appears, nutrition becomes even more important. Polyphenols, including flavonoids present in many vegetable foods, are able to attenuate allergies and food allergies. The talk will focus not only on studies demonstrating the protective effect of polyphenols in animal models of food allergies, but also on the cellular mechanisms that are proposed to explain these effects. Furthermore, evidences of the beneficial effects of these compounds on human health will also be discussed.

Oral Immunotherapy for Food Allergic Patients

Dr Rebecca Chinthrajah, Stanford University, Stanford, CA, United States

Discuss clinical trials ongoing at Stanford University to treat food allergic patients

Peanut epicutaneous immunotherapy

Professor Christophe Dupont, MD, PhD, Pediatric Gastroenterology, Head, Necker-Enfants Malades Teaching Hospital, Paris, France

EPIT, innovative new approach to the treatment of allergies, utilizes a novel delivery of allergen to the skin surface through application of an allergen-containing patch to activate skin Langerhans cells with subsequent migration to lymph nodes and down-regulation of effector cell responses. In one of the most important food allergies, peanut EPIT, achieving an increase of the threshold to peanut in peanut-allergic individual, is currently under active clinical development in Europe and North America, with the goal of being available in clinical practice in the coming years. Preclinical studies in animals indicate a potential application in therapeutics.

Beyond Tropomyosin in Shrimp Allergy

Associate Professor Carla Mcguire Davis, Pediatrics-Allergy & Immunology, Baylor College of Medicine, Houston, TX, United States

Shrimp allergy is a common cause of food allergy with tropomyosin identified as the major allergen. Currently, gold standard for diagnosis is an oral food challenge (OFC), which is time-consuming, costly and entails risk of having an allergic reaction. The evidence supporting the role of non-tropomyosin allergens such as hemocyanin and myosin light chain in the clinical manifestations of shrimp allergy and the usefulness of shrimp component testing will be discussed.

What is the role of food allergy in EGID?

Dr. Anne Marie Ditto, Northwestern University, Chicago, United States

Eosinophilic Gastrointestinal Disease (EGID) describes a heterogenous group of diseases associated with eosinophilic inflammation in the gastrointestinal (GI) tract. Symptoms are characterized by GI dysfunction and can vary depending on the age at presentation as well as the segment of the GI tract involved. Eosinophils, cells commonly associated with allergic inflammation, normally reside in the GI tract, with the exception of the esophagus. However numbers are increased in EGID and thus they are thought to play a pathologic role. This talk will discuss the role of food allergy in EGID.

Microneedles for allergy immunotherapy

Associate Professor Harvinder S. Gill, Department of Chemical Engineering, Texas Tech University, Lubbock, TX, United States

Coated microneedles can painlessly deliver allergens into the skin and can enable allergy immunotherapy. In this presentation, the coated microneedle technology, human data related to their painless nature, and the ability of allergen-coated microneedles to treat allergies in a pre-clinical mouse model will be described.

Food Allergy: risk, responsibility and regulation

Hazel Gowland, Allergy Action, St Albans, United Kingdom

From due date to dotage, food allergy risks are increasingly well understood. Prevention through strategic feeding and 'cure' through immunotherapy are already having an impact. For those who need to avoid food allergens for life, the challenge continues. Sourcing correctly labelled food without risk of allergen contamination may be compromised by food fraud and confused by the possibility of 'traces.' The regulatory framework to protect those at risk continues to develop through food safety and composition, health and safety, negligence, manslaughter and associated civil action.

Long Term Immune Modulation through Maternal Dietary Intervention

Dr. Astrid Hogenkamp, Utrecht University, Utrecht, Netherlands

The perinatal environment can shape your life. This has been obvious for years and it is common knowledge that women should take care what to eat when they are pregnant or breastfeeding. As some dietary components are known to have immunomodulatory characteristics, it seems feasible that maternal consumption of certain foods may contribute to long term immune development. We have focused on the effects of maternal dietary intervention with non-digestible oligosaccharides. Results from our studies in mice show that these compounds beneficially affect immune development, resulting in a reduction of (food) allergic symptoms in offspring of supplemented mothers.

Treating the Atopic March with Traditional Chinese Medicine (TCM)

Dr. Xiu-Min Li, Icahn School of Medicine at Mount Sinai, New York, United States

Food allergies are part of a succession of allergic diseases that can be treated safely and effectively using herb-based therapies. Traditional medicines developed over centuries to treat the skin, the airways, and intestinal parasites can modulate imbalances that are manifest in atopic dermatitis, asthma, environmental allergies, food allergies and other immune disorders. We use these medicines in practice and simultaneously research their biochemistry with the goal of creating prescribable drugs and treatments.

Nanoparticle-Mediated Complement Activation Related Pseudoallergy

Professor Seyed Moein Moghimi, Centre for Pharmaceutical Nanotechnology and Nanotoxicology, Copenhagen, Denmark

1. Symptoms of nanopharmaceutical-mediated infusion-related reactions;
2. The role of complement in infusion-related reactions;
3. Overcoming complement activation related pseudoallergy;
4. Translational aspects and future prospects

Peanut and hazelnut allergy: improvements and limitations by measuring specific IgE to components

Dr. Thuy-My Le, University Medical Center Utrecht, Utrecht, Netherlands

Peanut allergy can be life threatening and is worldwide one of the most common food allergies. The gold standard to diagnose peanut allergy is the double blind, placebo-controlled food challenge, but this test is time consuming, burdensome for patients and requires high standard hospital facilities. Measuring specific IgE to components has improved the diagnosis of peanut allergy, but has also limitations. Ara h 2 has the best diagnostic accuracy in both adults and children to diagnose peanut allergy. Although specific IgE to Ara h 2 is correlated with severity, it does not discriminate between mild and severe allergy in individual patients.

Psychological Aspects of Food Allergy Management

Assistant Professor Catherine C. Peterson, Eastern Michigan University, Ypsilanti, MI, United States

Successful management of food allergies involves numerous psychological and behavioral challenges, including adherence to medical recommendations; monitoring of anxiety and social functioning; and managing bullying and quality of life concerns in school-age children. Families report significant burden and activity limitations due to childhood food allergy, and few psychological resources have been widely implemented to assist families in reducing distress and maintaining adherence to allergy management guidelines. Literature on psychological functioning of families with food allergy will be reviewed, and future directions for empirically-informed behavioral interventions will be discussed to address food allergy management.

The role of infant nutrition in the development of allergic diseases

Dr. Caroline Roduit, University Children's Hospital Zurich and CK-CARE (Christine Kühne - Center for Allergy Research and Education), Switzerland

Nutrition is an important environmental factor, especially during the early postnatal period, as the infant gut is first exposed to different food antigens, and these exposures might influence the development of immune tolerance. Strategies based on avoiding allergens during the infancy showed to be ineffective and the prevalence of food allergy has increased over the last decade. Current guidelines no longer recommend food allergens avoidance or delaying introduction in the infant diet to prevent allergic diseases. Moreover, recent studies have suggested a protective effect of early introduction of complementary food. We could show that an increased diversity of food within the first year of life leads to a decrease risk of developing asthma and food allergy.

Basophil and mast cell activation assays: a new era in food allergy diagnosis?

Dr Alexandra Santos, Clinical Senior Lecturer in Paediatric Allergy, Kings College London, London, United Kingdom

The basophil activation test has emerged as a novel diagnostic test for food allergy. Being a functional test it has the potential to resemble more closely the clinical phenotype of patients than tests that detect the presence of IgE. The basophil activation test can be seen as an in vitro challenge, where instead of exposing the patient to the food, basophils are stimulated with food allergens in a test tube. In recent studies, the basophil activation test showed high accuracy to diagnose peanut and other food allergies and reduced the need for oral food challenges.

Gender and Dose Dependent Ovalbumin Induced Hypersensitivity Responses in Murine Model of Food Allergy

Dr Ondulla Toomer, Center for Food Safety and Applied Nutrition, Food and Drug Administration, Laurel, MD, United States

Federal regulations mandate the labeling of major food allergens; however food allergen thresholds have yet to be determined. The aim of this project was to identify the lowest ovalbumin (OVA) dose causing hypersensitization responses. Mice were sensitized weekly for 5wks with 250 µg OVA. At 6wks, mice were orally challenged with OVA in Trmt1-Control, Trmt2-PBS, Trmt3-1mg, Trmt4-40mg and Trmt5-75mg. There were gender and treatment differences in plasma OVA-IgE and splenic lymphocytes of OVA challenged mice, with male mice having significantly greater levels than the female mice of Trmt3 and Trmt4. These results suggest that gender may strongly influence food allergen sensitization mechanisms and should be further explored.

FAST: Towards safe and effective subcutaneous immunotherapy of persistent life-threatening food allergies

Dr. Laurian Jongejan, Academic medical center Amsterdam, Experimental Immunology, Amsterdam, Netherlands

Within FAST (Food Allergy Specific Immunotherapy) we aim to develop a safe and effective treatment of food allergies, targeting prevalent, persistent and severe allergy to fish by replacing food extracts with a hypo-allergenic recombinant major allergen (rCyp c 1). rCyp c 1 was produced under GMP conditions, tested pre-clinically (toxicology testing and efficacy in mouse models), and safety was tested in a SCIT phase I/IIa randomized double-blind placebo-controlled (DBPC) clinical trial with alum-adsorbed hypoallergen. A Phase IIb clinical trial with the DBPC food challenge as primary read-out has just started.

Poster Presentation Abstracts

Poster abstracts will be finalised weeks before the event

COCOA AS A NUTRACEUTICAL TO AVOID PRECLINICAL ORAL SENSITIZATION

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Food allergies have increased in recent decades and are currently considered a public health concern. Sensitization is the first step in developing an allergy. Focus on the prevention of food allergies is required and, in this context, the role of nutraceuticals has gained interest.

As cocoa powder has different effects on the immune system, both in intestinal and systemic compartments, the purpose of the present study was to establish the role of a cocoa-enriched diet in a rat oral sensitization model, using ovalbumin (OVA) as allergen and cholera toxin (CT) as adjuvant.

Three-week-old female Lewis rats were fed a standard diet or an isoenergetic diet containing 10% cocoa throughout the 28 days of the study. One group of rats from each diet were orally sensitized with OVA (50 mg/rat) and CT (30 µg/rat) three days per week for three weeks. During the length of the study, blood and faecal samples were collected weekly to determine specific serum anti-OVA antibodies and total intestinal IgA by ELISA.

The oral sensitization induced anti-OVA antibody response from the 7th day, being significantly higher at day 28 in comparison to the non-sensitized group. The antibodies belonged to IgG1, IgG2a, IgG2b and IgM isotypes. The cocoa diet inhibited the synthesis of anti-OVA antibodies IgG1, IgG2b and IgM. Regarding the intestinal compartment, there was a progressive increase of intestinal IgA concentration during the study in rats fed with standard diet, whereas it was attenuated by the cocoa diet from the 7th day in both non-sensitized and sensitized animals.

From all these data, we can conclude that a 10% cocoa diet for 28 days is able to attenuate the development of serum-specific antibodies and total intestinal IgA in a rat oral sensitization model. These results suggest the potential role of cocoa as a nutraceutical to prevent food allergies.

PREVENTING FOOD ALLERGY AND FOOD INTOLERANCE IN THE ELDERLY: THE CONTRIBUTION OF THE NUTRIAGEING WEBSITE

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Food allergy and food intolerance in older adults is becoming a growing problem as evidenced by their occurrence over the past few decades. Prevention is the first step to overcome this issue, and nutrition literacy gives an important contribution for the purpose.

PERSSILAA (PERsonalised ICT Supported Service for Independent Living and Active Ageing) is a project that develops and validates a new service model, to screen for and prevent frailty in community dwelling older adults. A multidisciplinary team from five countries, The Netherlands, Spain, Italy, Portugal and Ireland, is providing a combination of skills to develop remote services for screening, monitoring and training modules, aiming to contribute to good health habits on the nutritional, physical and cognitive domains. The *Nutriageing* website is integrated in the PERSSILAA platform, and was created aiming at the transfer of scientific knowledge

into advice to the general public. It is an interactive and easy-to-use website, and offers several modules to promote rational nutrition, being structured around healthy eating, organic vegetable gardens, and cooking recipes with videos. One of these videos is exactly focused on the problem of allergens in human nutrition and a recipe was specifically created by a professional Chef to alert for this problem. In the video, simple but accurate dialogues between the Chef and three scientists become a fun but effective way to inform and to alert the elderly and the general public for the danger of allergenic ingredients present in some of our daily food. This communication highlights the contribution of the *Nutriageing* website to the eHealth literacy aiming at the prevention of food allergy and food intolerance in older adults.

Acknowledgements: This work was supported by the European project “PERsonalised ICT supported Service for Independent Living and Active Ageing”, FP7-ICT-2013-10, GA 610359, 2013-2016. The authors are grateful to the European Commission for approval of the INOVAFUNAGEING commitment. The sponsorship of IUPAC (project 2013-054-1) is also gratefully acknowledged.

ALLERGENS ASSOCIATED WITH MUSCLE FOODS

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Food allergy is one of the major health concerns worldwide where immunological mechanisms are involved. Muscle foods, consisting of fish, red and poultry meats, are the major protein sources in human diet. Allergy to muscle foods, except to seafood, is rare, however, it might affect both children and the adults. A calcium-binding sarcoplasmic protein parvalbumin is the major allergen in fish. Parvalbumin is heat-stable, thus fish flesh often retains its allergenicity after cooking while in some cases a reduction in allergenicity is observed. Tuna, skipjack and swordfish contain lower levels of parvalbumin, hence could be expressed as less liable to be allergic than bottom dwelling fish such as cod, flounder and whiff. Clinical association of fish allergy with poultry meat allergy has been reported as a consequence of high similarity of chicken myosin light chains with some fish species. Myosin light chains have recently been recognized as major allergens in chicken meat. Chicken alpha-parvalbumin might also cause severe allergic reactions. Ingestion of meats from chicken and turkey, or chicken broth could promote swelling of tongue and oral mucosa, as well as vomiting and hypotension. In recent years, beef allergy incidence is also frequently reported where bovine serum albumin (BSA) is the major allergen. Lamb and turkey could be used as beef substitutes, however, cross-reactivity might occur between beef and these alternative protein sources. It has been also indicated that beef-allergic population react more to ovine serum albumin. Cross reactivity between cow milk and veal is also frequent due to allergy to BSA which is thermolabile. It is the case that adequate heating of meat may reduce the allergenicity. Immunoglobulin E antibody specific for the carbohydrate galactose-alfa-1,3-galactose (alfa-Gal) has been identified as a novel cause for allergic reactions. It has been confirmed that the tick bites cause an increase in alpha-Gal antibodies due to the existence of an unknown substance in tick saliva. Both adults and children can develop IgE antibody to alfa-Gal. It has been found that Alfa-gal allergy is an important cause of delayed urticaria, angioedema and anaphylaxis which occur three or more hours after eating red meat. Potential allergenic ingredients, like egg, soybean, wheat etc., are commonly added as emulsifier or as substitute for muscle proteins to reduce costs in processed meats and this might generate additional allergen risks. Industrial processes such as freeze-drying and homogenization affect the complex protein matrix of meat and reduce the reactivity. There are a few recent studies indicating that high hydrostatic pressure treatments might be effective in reducing allergenicity in meat products. Even traces of the responsible allergens may be fatal for allergic consumers. For that reason, precautions such as adequate labelling and informing consumers on possible risks should be taken to minimize allergy risk resulting from these valuable foods.

Key Words: Muscle foods, beef meat, poultry meat, food allergens

NEW APPROACHES TO REDUCE FOOD ALLERGENITY: HYPOALLERGENIC FOODS AND NON-CONVENTIONAL FOOD PROCESSING TECHNOLOGIES

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Food allergy has increased worldwide affecting both children and adults and it depends on genetic background, exposure to the offending food and geographical eating habits. According to World Health Organization, food allergy is one of the most common and relevant public health problems and it is becoming a growing concern. It can be defined as an IgE-mediated abnormal immune response to normally tolerated food proteins. Recent developments in fabricating foods and food processing technologies are offering a significant number of opportunities to circumvent this problem. These new strategies allow to attain high quality products capable of fulfilling the high demand for healthy food by conscious consumers, regulatory agencies and the food industry at large. In order to reduce or eliminate the allergens in foods, even rendering them harmless, these novel approaches are contributing quite significantly to overcome this major issue. Among these approaches, hypoallergenic novel foods and ingredients have been developed to enhance the quality of life of food-allergic individuals. This could be achieved by removing deleterious allergens from foods via physical elimination, genetic modification or alternative processing methods. Significant research has focused on genetic modification of rice, soybean, tomato and peanuts by removing the allergen proteins to produce novel hypoallergenic foods. Furthermore, some novel processing technologies modify or eliminate allergenicity of some foods. High pressure treatments decrease immunoreactivity of allergen proteins such as sesame protein isolates, almond milk, crushed peanuts and some muscle foods. It has been shown that cold plasma removes, quite efficiently, allergens from the surface of food processing equipment. At the same time, pulsed ultraviolet light and cold atmospheric pressure plasma are effective to reduce soy immunoreactivity. Gamma-irradiation is another useful technology to reduce IgE-binding reactivity, and the higher the dose the more inhibition is attained. Although these aforementioned processing technologies appear to be effective in reducing allergenicity in foods, combination of different techniques might provide even better results to circumvent the problems created by food allergy. These novel technologies, either alone or in combination, are promising alternatives to produce hypoallergenic food products but research in these areas is scarce. Based on what is known on allergen management and allergenic risk assessment, these novel approaches are offering great opportunities in reducing food allergen risks.

Key Words: Food allergens, hypoallergenic novel foods, novel processing technologies

ASSESSING EFFICACY OF BASOPHIL ACTIVATION TEST IN THE CONTEXT OF FOOD ALLERGY

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Background: Food allergy occurs at a prevalence of up to 5% in children within the first years of life. Some food allergies are associated with a high likelihood of tolerance development up to the age of five whereas others are not. The reasons are not fully understood. Currently, markers used to confirm food allergy such as specific IgE levels are not appropriate to monitor tolerance development or define sensitized non-allergic individuals. Basophil Activation Test (BAT) using CD63 as a readout parameter has been described to be superior in assessing tolerance in peanut sensitized, tolerant individuals as compared to other tests.

Methods: In order to assess the sensitivity and specificity of the BAT aiming a reduction in the number of Oral Food Challenges, food-sensitized children's basophils were evaluated for CD63 and CD203c surface expression via flow cytometry.

Results: Analysis of 50 BATs allowed to set a cut-off for nuts of 12.5% positive basophils for CD63. Basophil Activation Test showed a sensitivity of 85.71% and a specificity of 88.89% for nuts and milk.

Conclusions: BAT showed to be sensitive and specific for nut and milk-sensitized patients and may be helpful to provide a more accurate risk assessment before oral food challenge and the conventional sensitization measurements used in clinical routine settings