Food Allergy and Anaphylaxis Meeting 2011

Venice, Italy. 17-19 February 2011

Edited by Antonella Muraro. Co-Editors René Crevel, Stefan Vieths, Susanne Halken, Andrew Clark, Graham Roberts, Anthony Dubois, Thomas Werfel, Karin Hoffman-Sommergruber, Philippe Eigenmann and Clare Mills

Published: 12 August 2011

These abstracts are available online at http://www.ctajournal.com/supplements/1/S1

INVITED SPEAKER PRESENTATIONS

S1
Mechanisms of immune-tolerance to allergens on the mucosal surfaces
Cezi Akdis
Swiss Institute of Allergy & Asthma Research, Department of Immunology, Davos, Switzerland
Clinical and Translational Allergy 2011, 1(Suppl 1):S1

The immune system is a highly interactive network, which makes it’s decisions on the basis of all body tissues, infections, normal flora bacteria and almost any environmental agents. In recent years, regulatory T cells (TReg) cells have become a prime target for strategies aimed at inducing tolerance to food antigens. Immune tolerance in the context of allergy can be defined as persistence of efficacy following discontinuation of treatment, implying an altered allergen-specific memory T and B cell response. Various populations of TReg cells have been shown to play a central role and their identification as key regulators of immunological processes in peripheral tolerance to food- and aero-allergens has opened an important era in the prevention and treatment of allergic diseases. Both naturally occurring CD4+ CD25+ TReg cells and inducible populations of allergen-specific interleukin-10 (IL-10)-secreting T regulatory type 1 (Tr1) cells inhibit allergen-specific effector cells in experimental models. Skewing of allergen-specific effector T cells to a regulatory phenotype appears as a key event in the development of healthy immune response to allergens and successful outcome in allergen-specific immunotherapy. FoxP3+ CD4+CD25+ TReg cells and Tr1 cells contribute to the control of allergen-specific immune responses in several major ways, which can be summarized as suppression of dendritic cells that support the generation of effector T cells; suppression of effector Th1, Th2 and Th17 cells; suppression of allergen-specific IgE; induction of IgG4; suppression of mast cells, basophils and eosinophils; interaction with resident tissue cells and remodeling, suppression of effector T cell migration to tissues. Current strategies for drug development exploit these observations with the potential for preventive therapies and cure for allergic diseases.

S2
What makes an antigen a food allergen?
Clare Mills
Institute of Food Research, Norwich, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):S2

A limited number of foods are responsible for the majority of reactions in IgE-mediated food allergy, seafood, peanut and tree nut allergies predominating in adults whilst cow’s milk and hen’s egg are important allergenic foods for infants. Over the past 10 years there has been an explosion in the numbers of well characterized allergens which have been sequenced and collected into a number of databases which has facilitated bioinformatic analyses and allowed food allergens to be classified according to their structural and biological properties. This has shown that food allergens belong to only a limited number of protein superfamilies, with animal and plant derived food allergens showing similar distributions, the majority of allergens in each group falling into just three to four families with a tail of between 14 to 23 families comprising between 1-3 allergens each. Thus, around 65% of plant food allergens belong to just four protein families, the prolamin, cupin, Bet v 1-like, and profilin families whilst animal food allergens can be classified into three main families, the tropomyosins, EF-hand proteins, and caseins. Such patterns of behavior beg the questions what makes some foods such as peanut so much more allergenic than other closely related foods such as pea? Why do certain protein scaffolds dominate the landscape of allergen structures? Can we identify structural features that predispose certain proteins to becoming allergens? That the relationship between protein structure and allergenicity is not straight forward is indicated by the fact that previous detailed analysis of the secondary structure elements in proteins has not shown any relationship with allergenicity. It is further complicated by factors such as food processing and modification of allergen structures during digestion. Only a small number of the total number of proteins expressed in, for example an edible seed such as peanuts, have been defined as allergens and abundance alone does not account for the allergenic potency of certain proteins. Another factor that may be involved in determining allergenic potential of certain proteins is their stability to conditions commonly used in processing foods, especially in food such as peanuts which are rarely consumed raw. Lastly, in order for food proteins to either sensitize or elicit an allergic reaction they must also be bioaccessible, i.e. released from the food matrix and then survive gastrointestinal processing to be presented to the mucosal immune system in an immunologically relevant form. Structural therefore factors may contribute to the allergenicity of certain protein scaffolds and may vary between different scaffolds. Future work will focus on how the food matrix may modulate the bioaccessibility and digestion properties of these proteins and the route by which specific proteins drive class switching in B cells. Only by combining the knowledge and skills of allergen biochemists, immunologists and clinical allergists will the step-changes in thinking be achieved to address these questions in future.

Acknowledgements: ENCM was supported by the UK Biological and Biotechnological Sciences Research Council through a strategic program and grant to IFR.
Immunotherapy of food allergy: what is effective?
Harald Rerup
Institute of Laboratory Medicine and Pathobiocchemistry, Molecular Diagnostics, Marburg, Germany
Clinical and Translational Allergy 2011, 1(Suppl 1):S3

Allergic asthma as a complex outcome of pathogenic immunological, cellular and functional modifications of the airways is initiated by allergic reactions as a response mostly to inhalant allergens. Dysregulation of innate and adaptive immune functions contribute to the pathogenesis of the disease. A hallmark is the development of a TH2-driven inflammatory response in the airways. The underlying TH2-skewed balance is the result of a multi-functional process in which genetic predisposition and environmental exposures interact as major players. Maturation of the immune system already starts in utero, the most critical phase in the ontogenetic programming of the offspring. Endogenous as well as exogenous exposures may influence the maturation and differentiation of immune cells of the fetus and may thereby contribute to disorders such as allergies and asthma later on in life. Epigenetic mechanisms are proposed to modulate these effects. A comprehensive overview on the interaction of fetal exposures and the developing immune system will be provided that may contribute to or protect the progeny against the development of asthma. The new and exciting field of epigenetics will be highlighted with respect to T-cell differentiation and early allergic disease development. Furthermore, we emphasize new investigations that aimed to analyze fetal host innate immune responses to environmental microbial microorganisms and their possible future application in asthma protection.

Epidemiology of food allergy in European infants
Kirsten Beyer
Charité, Klinik für Pädiatrie m.s. Pneumologie und Immunologie, Berlin, Germany
Clinical and Translational Allergy 2011, 1(Suppl 1):S4

The prevalence and causes of food allergy in Europe is still unclear. Individual studies show very different data. Within the EU-funded collaborative translational research project EuroPrevall, a meta-analysis was performed to assess the prevalence of food allergy. The foods assessed were cow’s milk, hen’s egg, peanut, fish, shellfish, and an overall estimate of food allergy. The prevalence of self-reported food allergy was ranging from 3% to 33% for any food and was very high compared with objective measures. Interestingly, there was marked heterogeneity between studies regardless of type of assessment or food item considered. Whether this reflects real differences or is a problem of different study designs could not be answered. In order to obtain comparable prevalence data for food allergy in Europe a multi-centre birth cohort study was started within EuroPrevall in 2005. A total of over 12,000 newborns from nine countries of four climatic regions across Europe were recruited. Standardised telephone interviews were scheduled at birth, 12, 24 and 30 months. In addition, parents were asked to immediately report to the study centres in case of the development of an atopic disease such as atopic dermatitis or about allergies in the rural populations. Due to dietary difference, the patterns revealed that the prevalence of allergies was very low. In order to get a better understanding of the pattern of food allergies in developing countries, we have conducted a cross sectional study of food allergies in primary schoolchildren from China and India. Children from China, Russia, and India were studied using the standardized EUROPREVALL protocol. Random samples of schoolchildren aged 6-11 years were recruited from Hong Kong, urban and rural Beijing, Bangalore and Mysore, India. A total of 41,280 children enrolled in the study. The reported prevalence of having adverse reactions to food of 4 times or more were 3.9% in Hong Kong, 2% in Beijing city but only 0.9% in rural Beijing and 0.8% in India. A random case-control subsample of 3,848 children was recruited for SPT and sera were obtained for determination of specific IgE. Defining probable food allergy as having symptoms with a certain food within 2 hrs of ingestion and SPT to that food greater or equal to 3 mm, the prevalence of probable food allergy in Hong Kong was 3.8%, while they were 2.6% in Beijing and only 0.2% in rural Beijing (P < 0.001). Peanut allergy was uncommon in all three countries. The common allergens in China were shellfish, fish, and peach. Milk and egg allergies were rather uncommon. Similarly, the prevalence rates of probable food allergy were only 0.35% and 0.9% in India and Tomsk, Russia. Although the prevalence is low in Russia, the pattern of allergy was similar to that in European children. In conclusion, the prevalence of food allergies was very low in rural populations of China and India. Due to dietary difference, the patterns of allergy are different than those found in Europeans. Further analyses may reveal factors that are associated with the protection against food allergies in the rural populations.
Challenges in assessing the potential allergenicity of biotechnology products
Richard Goodman
University of Nebraska-Lincoln, Food Allergy Research and Resource Program, Dept. of Food Science & Technology, Lincoln, NE, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):S11

Regulatory guidelines for assessing the safety of new food crops developed using biotechnology were published in the early 1990s, before the introduction of genetically modified (GM) crops. Many GM crops are now widely adopted as 77% of global soybean and 26% of maize production is from GM varieties. The early safety assessment guidelines seem to work as there are no proven cases of harm from these products. The greatest potential risk of food allergy would be the transfer of a gene encoding an allergen or protein sufficiently identical to an allergen to a different food crop so that unexpected reactions might occur upon ingestion. These risks can be evaluated using sera from subjects allergic to the source or with a sequence matched to an allergen based on FASTA or BLASTP. Some potential risk is also possible due to de novo sensitization as nearly every food may cause occasional allergies, for only a few foods and proteins present great risk. The current paradigm considers stability of the protein in pepsin under fixed conditions, abundance of the protein in foods and the potential impact of heating and processing, features common to some major allergens. Those methods are not fully predictive and will likely be improved through experience. However, proposed revisions by the European Food Safety Authority (EFSA) as well as demands from some regulators to include the use of short-amino acid sequence matches, animal models and evaluation of potential changes in endogenous allergen expression using proteomics approaches could reduce the effectiveness of the assessment. The value of new tests should be rigorously tested. It is clear that absolute safety is not possible and that demands for these tests have never been applied to new crop varieties derived through inter-specific hybridization, mutagenesis or the introduction of a whole new food crop.

Allergenicity assessment of GMOs by the European safety authority
Jean Michel Wai
Service de Pharmacologie et Immunologie (SPI), Laboratoire d’Immuno-Allergie Alimentaire, Gif sur Yvette cedex, France
Clinical and Translational Allergy 2011, 1(Suppl 1):S12

The risk of genetically modified organisms (GMOs) and foods derived from GMOs for human health and particularly their allergenicity must be assessed before they are authorized to be put on the market in the European Union. Data from the studies performed by the Applicant are evaluated by the GMO Panel of the European Food Safety Authority (EFSA). It then publishes a scientific opinion including a conclusion on the food safety for the information of the Risk Manager (i.e. the European Commission). Recommendations for allergenicity assessment have been provided by international scientific committees and particularly by EFSA in recent reports. Both the risk of de novo sensitization of genetically predisposed consumers and of elicitation of an allergic reaction in consumers already sensitized (e.g. to cross reacting allergens) must be assessed on a case by case basis. Two issues must be addressed:

i) The allergenicity of the newly expressed protein(s) encoded by the transgene inserted in the GMO. The assessment is based on the so called weight of evidence approach because no characteristics can allow to definitely predict the (absence of) allergenicity of a protein. Information of different nature including origin, structure, immunological and physicochemical properties of the protein, obtained using in silico, in vitro and possibly in vivo tests are considered to conclude on the likelihood of allergenicity.

ii) The allergenicity of the whole GM food. Applicant must test that no unintended effect of the genetic modification, e.g. resulting in an over-expression of endogenous allergen(s), has occurred by comparing the allergen repertoire of the GMO and its non GM counterpart. This may be performed by profiling methodologies using –omics technologies, generally in association with the use of allergic human sera as probes.

For both cases, scientific grounds for the design and interpretation of strategies and testing methods that may be used on a case by case basis will be discussed in the presentation.

Risk assessment of biotechnology products
Corinne Herouet-Guichery
Bayer S.A.S, Bayer CropScience, BioScience Regulatory Toxicology Bioscience, Sophia-Antipolis Cedex, France
Clinical and Translational Allergy 2011, 1(Suppl 1):S13

A number of crop products generated by using biotechnology have been introduced to the marketplace. These biotechnology products have been carefully evaluated for their overall safety from an agronomic, environmental, performance, and equivalence perspective, and the safety of the newly expressed protein(s). One aspect of the safety evaluation is the question concerning potential allergenicity. The allergy risk to consumers from crops enhanced through biotechnology may be placed into one of three categories. The first category involves the transfer of a known allergen or cross-reacting allergen into a food crop. The second risk category is the potential for increasing the allergenicity of a crop by increasing the expression of endogenous allergens. The last category involves expression of transgenic proteins that may become allergens de novo. Approaches to identifying potential food allergens for purposes of safety assessment have been developed and modified over the past 15 years. However, no single factor has been recognized as the primary indicator for the allergenic potential of proteins, and no validated animal model that is predictive of protein allergenicity is currently available. Therefore, the evaluation of protein allergenicity is currently based upon a ‘weight of evidence’ approach, which takes into account a variety of factors that have been associated with allergens, such as stability to pepsin digestion or other enzymes in vitro, glycosylation status, food processing effects, protein abundance in the crop, homology to known allergens, and the safety of the gene(s) source. In addition, as part of the ‘weight-of-evidence’ assessment, the biotechnology crop product endogenous allergen levels are compared to those of its non-biotechnology comparator to make sure that the transformation does not impact known endogenous allergens naturally present in the host crop. This presentation will provide a general introduction and overview of the current ‘state of the art’ for evaluating potential allergenicity of biotechnology crop products.

Anaphylaxis associated with exercise
George Du Toit
St Thomas’ Hospital, London, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):S14

Exercise-induced Anaphylaxis (EIA) is a rare, unpredictable, potentially fatal, syndrome characterised by anaphylaxis associated with exercise. Anaphylaxis is associated with a mortality rate of between 1-2%; importantly, some 5-15% of anaphylactic episodes are caused by/or are associated with exercise. EIA may occur independently of food allergen ingestion, or may require the ingestion of a food allergen around the time of exercise, known as Food-dependent exercise-induced anaphylaxis (FDEIA). Concomitant medication use may also be required as an additional facilitating factor, known as ‘summation anaphylaxis’. There are now more than one hundred reviews on the topic of EIA (food dependent and non-food dependent) upon which much of our current knowledge of the condition is based. The aim of this presentation is to draw on key clinical features of these conditions; we will then either support, or challenge, existing hypotheses with respect to exercise-induced pathophysiological mechanisms that may underlie EIA. This will be in the context of recent advances in our understanding of exercise physiology.
Anaphylaxis to foods.

...under optimal control at the time of the OFC. Discontinuation of medications that may interfere with the OFC may be needed. Usually it is recommended to obtain written informed consent from the parents.

With the OFC may be needed. Usually it is recommended to obtain written informed consent from the parents.

OFC performed under controlled professional supervision. Patients must be in good health, and their allergic diseases should be under optimal control at the time of the OFC.

Discontinuation of medications that may interfere with the OFC may be needed. Usually it is recommended to obtain written informed consent from the parents.

References


Recipes for use in DBPCFC and the importance of blinding

Beiber Vlieg-Boerstra 1,2, Carina Venter 1

1Emma Children's Hospital AMC, Pediatric Respiratory Medicine and Allergy, Amsterdam, Netherlands, 2University of Portsmouth, Portsmouth, UK

Clinical and Translational Allergy 2011, 1(Suppl 1):S17

One of the crucial features of double-blind, placebo-controlled food challenge test (DBPCFC) is sufficient blinding of the allergenic food.

Blinding is important to avoid any bias during the food challenge. Neither the patient nor the health care professionals involved in the test should be able to identify when the placebo or active test food are being administered. Only if this is guaranteed, the test is actually performed in a double blind fashion. Therefore, without the availability of blinded challenge materials (recipes), true double-blind test conditions cannot be achieved. The validation of challenge materials for adequate blinding can be achieved by sensory testing. Sensory testing should preferably be performed in a professional food laboratory using professional panellists. The second best option is to base the validation on the assessments of volunteers. There is a need for a broad range of validated recipes for the most common allergenic foods in order to cover all age groups, all allergenic foods, to meet the preferences and dislikes of fussy eaters and to take into account cultural eating habits. During the session the availability of validated DBPCFC recipes will be discussed. Participants will be given the chance to participate in a sensory tasting session.

Aims of controlled oral food challenges are both to prove that a certain allergen plays a role for the individual clinical symptoms and to exclude food allergy in order to prevent the child from unnecessary or even harmful elimination diets. There are such types of challenges in the clinical practice: open, single-blind, or double-blind, placebo-controlled. Open OFC is an unmasked, blinded feeding with a food in its natural form. However, it has the highest potential for bias, which may depend on age, personality, and type of symptoms. In the single-blind OFC, the observer but not the patient knows the food being tested. In the double-blind OFC, challenge material is provided by a third party, such as a dietician, whereas the patient, the patient's family, and the observer are unaware of when the test food is given. All suspected foods should be strictly avoided for a sufficient period before OFC. The elimination period will usually last 1-4 weeks depending on the symptomatology and should abolish or at least markedly reduce symptoms. OFC should always be performed under controlled professional supervision. Patients must be in good health, and their allergic diseases should be under optimal control at the time of the OFC. Discontinuation of medications that may interfere with the OFC may be needed. Usually it is recommended to obtain written informed consent from the parent or guardian for OFC. It is necessary to examine the patient and record all data in the challenge protocol. Also it is necessary to prepare rescue medication, calculate the dosage and record in the challenge protocol. Intravenous access should be available always if a severe reaction is expected. The patient should be re-examined before each dose is administered. In case of an allergic reaction to OFC, treatment should be initiated promptly.

Threshold studies in food allergy

Barbara Ballmer-Weber

Leitende Ärztin Allergeiestaustion und Epikutantest, Dermatologische Klinik, Universitätsspital Zürich, Zürich, Switzerland

Clinical and Translational Allergy 2011, 1(Suppl 1):S19

Thresholds constitute a critical piece of information in assessing the risk from allergenic foods at both the individual and population levels. Knowledge of the minimum dose that can elicit a reaction of great interest to all food allergy stakeholders. Threshold is defined as a limit below which a stimulus causes no reaction. Associated with the concept of threshold are the toxicological terms of No Observed Adverse Effect Level (NOAEL) defined as the highest dose of a substance observed in a study not to produce any adverse effect and Lowest Observed Adverse Effect Levels (LOAEL) defined as the lowest dose that is observed to produce an adverse effect. Many factors can affect threshold values. In particular it has been demonstrated that the fat content of the matrix has an impact on the amount of allergens leading to an
How to manage food allergy in restaurants, cafeterias and fast food outlets?

Sue Hattersley
Food Allergy Branch, Food Standards Agency, London, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):S20

Food allergen ingredient labelling is now a mandatory requirement in many countries, including those in the European Union, but this only applies to foods sold pre-packaged. There is a general assumption that for foods sold unpackaged, including in catering establishments, it is possible for the consumer to ask the person selling the food about the ingredients used and, based on that information, to make an informed choice about whether or not to buy and consume that food. However it is known that the majority of food allergic reactions occur after eating food that is unpackaged.

Whilst ongoing negotiations in the European Union on a new Food Information Regulation are expected to result in a legal requirement to provide allergen information for foods that are unpackaged, in addition to the existing requirement for pre-packed foods, this is likely to take up to 12 months to complete, and for there to be a transition period before the requirement comes into force. The UK Food Standards Agency recognised the need for best practice guidance on the provision of allergen information for unpackaged foods, and a document was published in 2008 which was aimed at both retailers selling unpackaged foods and caterers. The purpose of this voluntary guidance was to provide practical advice on how such information could be given and to highlight potential problems. This presentation will cover the key messages in the guidance regarding communication between the consumer and the business, the staff training needed and the importance of having access to information about the ingredients used, both in the foods prepared on the premises and also in foods bought in. The presentation will also give some examples of issues that may arise in different types of businesses providing unpackaged foods.

Bioinformatic analysis of allergens

Steven Gendel
Food and Drug Administration, Center for Food Safety and Applied Nutrition, Office of Food Additive Safety, Maryland, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):S22

The number of resources containing data on the sequence, structure, and evolution of allergenic proteins has increased significantly in the last several years. At the same time, informatics resources related to the functioning of the immune system continue to mature rapidly. This proliferation creates a need for effective means to locate, extract, and integrate data from multiple sources to advance our understanding of allergens and allergy. Effective data integration rests on the development and application of both a system of data descriptors (metadata) and methods for data exchange between information repositories and analytic resources. A well designed metadata system for allergens should include descriptors for primary data, annotations, and data manipulation tools. An effective system would also allow integration with electronic clinical, nutrition, labeling, and health resources. The process of developing such a system for allergens creates an opportunity to identify and formalize important concepts that are widely used but often poorly defined. For example, formal terminology could be developed such that allergen databases could include descriptors for the evidence used to identify epitope sequences or cleavage sites. An XML schema called AllerML has been described that demonstrates the implementation of a terminology system for allergen data. One of the benefits inherent in using a system of shared data descriptors is that database developers can use it as the basis for implementing “application program interfaces” (APIs) that permit analysis software to directly access data within a database. The essential next steps in the creation of an integrated bioinformatics system for allergens based on currently existing opportunities and resources will be described.
evaluate the stability of the primary structure of novel food proteins. SGF results are currently used as one component in a WOE approach for predicting the risk that a novel food protein will become an allergen. The SGF assay was adopted based on an initial investigation that indicated several known allergens were more resistant to SGF compared with several non-allergens. Subsequent investigations have called this correlation into question. In addition, artifacts associated with interpretation of stability results using semi-quantitative approaches have been identified and more classical stability models have been used to enable quantitative comparisons among proteins; however, improved data interpretation has not supported a strong correlation between digestion stability in SGF and the allergenic status of food proteins. Potential interactions between proteins and food matrices have been identified as one factor that may contribute the poor predictive capability of this assay, as has the non-physiological conditions present in SGF. More physiological digestion models that include the food matrix have been suggested based on expert opinion, but as yet, no such assays have been shown to better discriminate food allergens from non-allergens compared with the SGF assay. More useful elements of the WOE approach include the source of the gene/protein, the prevalence of the protein in food, and the structural relationship with known allergens.

**S24**

**Atopic dermatitis and food allergy: when and how to test**

Fabienne Rancé
Hôpital des Enfants, Allergologie – Pneumologie, Toulouse Cedex, France

Clinical and Translational Allergy 2011, 1 (Suppl 1):S24

Food allergy may provoke flares of atopic dermatitis. The prevalence of food allergy in infants with atopic eczema (AE) may be estimated at 40%. Most of cases of food allergies concern young children (infants aged under one year), and affected by recur eczema under appropriate treatment. Cow’s milk, hen’ eggs and wheat’ flours are the main food allergens involved in food allergies associated with AE. Food allergies can be identified by clinical history, skin prick test and, IgE specific assays, and the diagnosis confirmed by double-blind, placebo-controlled food challenges (DBPCCF). Oral food challenge is the gold standard to diagnose food allergy in the majority of cases. Nevertheless, method used for oral food challenge should be prolonged on several days according to the late eczematous reactions. Atopic Patch Testing is an approach to diagnose food-induced eczema when the immediate allergic tests are negative. When an allergy is diagnosed, the elimination of an offending food allergen should be added to the medical management of AE. Food can induce eczematous lesions in young children. Risk factors of food allergy are young age, moderate to severe AE and early onset of AE. Allergic testing recommendations should be done to prove that relationship.

**Reference**


**S25**

**Atopic dermatitis and food allergy: when and how to test**

Margitta Worn
Allergy-Center-Charité, Charité Campus Mitte, Universitätsmedizin Berlin, Germany

Clinical and Translational Allergy 2011, 1 (Suppl 1):S25

Atopic dermatitis is a multifactorial skin disease. Epidermal barrier dysfunction, bacterial colonisation, psychological stress, but also type I allergens may aggravate this chronic remittent skin disease. Food allergens may play a role as aggravating factors in a subgroup of patients with atopic dermatitis, however the eliciting allergen profile differs between children and adults. In children such potential food allergens are milk, egg and wheat. These allergens are rarely of importance in adults. Here, if present, more frequently pollen associated food allergens may play a role as an aggravating factor. In principal much more patients assume allergic reactions against food being responsible for triggering eczematous reactions worsening the eczema. Therefore the identification of such patients who indeed will benefit from an elimination diet is important and will also result in the avoidance of unnecessary diets. The gold standard for the diagnosis of food dependent reactions is the performance of a placebo controlled, double blind oral provocation test because specific IgE, skin prick test and the patients history often do not correlate with clinical reactivity. In particularly in atopic eczema such procedure is extremely important for differentiation between food as a cause of a trigger of eczematous skin reactions. Before the performance of an oral provocation test a diagnostic elimination diet over a limited time frame is necessary. If several sensitisations are suspected an oligo allergenic diet and afterwards a subsequent implementation of defined food items can be performed. If the diagnostic elimination diet improves the severity of the eczema e.g. measured by SCORAD score oral provocation tests should be performed. As late phase reactions may develop slowly it is recommended to assess the SCORAD score not only the day after the provocation test but also after 24 hours followed by a second provocation if the first one did not aggravate the eczema (increase of SCORAD at least of 10 points). In particular in children the clinical relevance of food allergens should be re-evaluated every one to two years as the development of tolerance in particular towards milk is possible. The value of the atopy patch test for the diagnosis of type I clinical relevant type I sensitisation has been excessively studied, however due to the fact that no standardised extracts for testing are available it is not recommended for daily practise. In atopic eczema three clinical reaction patterns are possible (non-eczematous skin reactions e.g. urtica, isolated eczematous delay skin reactions, excorciation of pre existing eczematous skin lesions after several hours or one to two days or a combination of non-eczematous early reactions and eczematous late reactions).

**Take home message:** Suspected food allergy is frequent in patients suffering from atopic dermatitis, however to maintain quality of life a stepwise diagnostic approach is necessary. Double blind placebo-controlled oral provocation is the gold standard to prove a clinical relevant food allergy in patients suffering form atopic dermatitis.

**References**


**S26**

**How to manage multiple food allergies in children**

Susanne Lau
Charité, Berlin, Germany

Clinical and Translational Allergy 2011, 1 (Suppl 1):S26

Approximately 25% of infants with atopic dermatitis are found to be affected by food allergy. In Germany, overall prevalence of food allergy in infants and preschool children is 1-3%. Although several studies have examined the prevalence of food allergy, for instance longitudinally in the EuroPrevall study, there is less information on multiple food allergy. Estimates of prevalence of children allergic to multiple foods is difficult to ascertain because those with allergy to one food may avoid additional foods for concerns related to cross-reactivity, positive tests, or suspected reactions, or they may be reluctant to introduce foods known to be common allergens. Diagnosis relies on accurate history, skin or serum-IgE testing and supervised food challenge. Reasonable diets, patient
education and emergency medications can help to manage multiple food allergies. However, there is a considerable burden on caregivers in terms of social limitations, and impaired quality of life due to various reasons. Especially caregivers, whose children had been to the emergency department for food allergy, experience a negative impact on their life.

S27 How to manage multiple food allergies in children
Carina Venter
University of Portsmouth, Portsmouth, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):S27

Food hypersensitivity (FHS) is the umbrella term used for food allergies that involve the immune system and food intolerances that do not involve the immune system. It is generally accepted that FHS affect about 6% of children and 3% to 4% of adults. It is less clear what the prevalence of multiple food allergies is, but allergies to two or three foods are often seen in highly atopic children. FHS has a huge impact on quality of life and any dietary advice given should aim to minimise this effect. This is a particular problem in children and adults suffering from multiple food allergies. A clear diagnosis of the food allergies involved is very important as it well-known that patients often avoid more foods than indicated by a medical diagnosis. Despite many advances made in diagnosing and managing patients with FHS, the cornerstone of management still remains avoidance of the relevant food or foods. Patient will need information on food avoidance, understanding food labels and issues surrounding cross-contamination. In order to ensure that the diet is nutritionally sound, advice should be given about suitable food choices and following a healthy balanced diet including nutrient dense foods, whilst taking into account the dietary restrictions. Growth and development of children should be closely monitored and adult weight should be regularly assessed.

Practical issues that also need to be addressed include going on holiday, travelling and eating away from home, including school trips. The dietitian plays a crucial role in this process, but the need for a multidisciplinary team should never be underestimated. There are no standardised documents or protocols for the management of FHS and practices differ within and between countries. Finally, if adrenaline auto-injectors are prescribed, correct administration should be demonstrated and reviewed on an ongoing basis and other atopic conditions should be closely monitored.

S28 Molecular approach to food allergy diagnosis and therapy
Ronald van Ree
Academic Medical Center at the University of Amsterdam, Amsterdam, Netherlands
Clinical and Translational Allergy 2011, 1(Suppl 1):S28

Over the past decades, major allergens of the most important allergenic foods have been identified, isolated, cloned and expressed as recombinant molecules. This development has sparked off a revolution in allergology towards molecular approaches for diagnosis and therapy. The roles of individual molecules in clinical phenotypes are being elucidated rapidly. One of the first clear examples that individual molecules are associated with clinical phenotypes is allergy to Rosaceae fruits such as apple and peach. We now know that fruit allergy caused by pollen-related PR-10 proteins and profilins is mild and restricted to the oral cavity. On the other hand, fruit allergy caused by lipid transfer proteins is often at the basis of more severe systemic reactions. Molecular diagnostics based on such observations are a promis for the future and will increasingly replace extract-based diagnostics. Availability of recombinant major food allergens has also revived the interest in immunotherapy for food allergy. First attempts towards the end of the last century to treat food allergy with aqueous extracts were upset by extremely high incidence of side-effects. The advent of recombinant technology now allows evaluation of safer approaches of immunotherapy for food allergy. Recombinant food allergens can be modified into hypoallergenic molecules that do not cause unacceptable levels of side-effects.

In 2008, the European Commission decided to fund a consortium to develop hypo-allergenic molecule-based immunotherapy for the treatment of fish and fruit allergy. The FAST project has now selected the most promising hypo-allergenic variants of fish parvalbumin and peach lipid transfer protein. GMP production has started and toxicity studies and Phase I trials are being planned. The coming years will learn whether these approaches meet the expectations to provide a safe and effective treatment for food allergy.

S29 Clinical utility of thresholds versus CRD
Carsten Bindlev-Jensen
Odense University Hospital, Department of Dermatology and Allergy Center, Odense, Denmark
Clinical and Translational Allergy 2011, 1(Suppl 1):S29

Since food challenge is time consuming and not always without a risk for the patient, surrogate parameters have been introduced. Among the best studied are case history, size of Skin Prick Test and the level of specific IgE towards a food allergen. In the later case, decision points (i.e. the level of specific IgE above which there would be a 95% probability of the patient being challenge positive) have been introduced for various foods, including, egg, milk, nuts and peanuts. Two major problems arise, however, from such an approach. Firstly, the decision point may vary considerably between centres. This has been shown for hen’s egg, where different centres have published decision points varying from >0.35 to above 14 kIU/l. Secondly, in many cases, cross reacting antibodies may limit the validity of the decision point. An example is seen in peanut allergy, where a level above 10 kIU/l is considered positive in most published papers; but higher levels of peanut IgE are often detected in pollen allergic patients with high levels of IgE towards grass and birch. Most foods contain several allergenic proteins, with varying clinical relevance. Peanut contain several allergens, of which some are clinically irrelevant but important due to cross reaction with IgE against pollen whereas others, especially the protein ara H2, are directly correlated the clinical disease. Component resolved diagnostics (CRD) may thus present a major step forward in the search for surrogate parameters. The ideal surrogate parameter should be able to discriminate between positive and negative challenge and also to correlate to disease severity and clinical sensitivity (threshold). Threshold is an important parameter to establish both in the single patient, facilitating tailor made guidelines for the patient, and in the community. Measurement of specific to CRD’s would hopefully result in a better correlation to threshold than conventional techniques, but this idea remains yet to be proven. In the peanut example above, although a very nice decision point for ara H2 was established, less convincing correlations to clinical threshold in the patient population was found.

S30 Abstract not submitted at time of publication
Clinical and Translational Allergy2045-7022/011/Suppl 1530

S31 Atopic dermatitis
Thomas Werfel
Klinik fur Dermatologie, Allergologie und Venerologie, Abteilung Immun dermatologie und exp. Allergologiem Medizinische Hochschule Hannover, Hannover, Germany
Clinical and Translational Allergy 2011, 1(Suppl 1):S31

Among food allergens, cow’s milk, hen’s egg, wheat, soy, tree nuts and peanuts are most frequently responsible for exacerbation of atopic dermatitis (AD) in infancy. In older children, adolescents and adults pollen-related food allergy should be taken into account. Different types of clinical reactions to food have been described in patients with atopic dermatitis: Early reactions occur within 120 minutes after the administration of the allergens. Late phase responses, manifesting as eczematous lesions, occur after 2-48 hours or some days. After oral food challenge, about 50% of children with AD who reacted to food showed...
both immediate and delayed reactions and 15% showed worsening of eczema only. The personal history is often not helpful predicting late reactions to food with a positive predictive value of only 30% as opposed to 80% for immediate reactions. Sensitizations to food can be identified by means of in vivo (skin prick tests, prick-prick tests) and in vitro tests (serum specific IgE). In addition, patch tests proved to be useful for studying delayed food-related skin reactions. In vitro tests are valuable when skin prick tests, cannot be applied (e.g. dermographism). Moreover, in vitro specific IgE to food allergens give better quantitative data for the grade of sensitization which helps to estimate the probability of the risk of a clinical reaction (although precise decision points are not available) and it offers the opportunity to test single recombinant allergens. Atopy patch tests (APT) which better reflect a T-cell mediated reaction are performed with self-made food material applied to the back with large test chambers for 48-72 hours. Food APT are not standardized for routine use but have demonstrated to improve the accuracy of skin testing in the diagnosis of allergy to cow’s milk, egg, cereals, and peanuts in AD patients. However, food challenge is not replaced by patch testing. The double-blind placebo-controlled food challenge (DBPFCF) is considered the gold standard for diagnosing food allergy. In AD the evaluation of delayed reactions after 24h or 48h by trained personal is mandatory as stated by a position paper of the EAACI.

532
Genetics of eosinophilic esophagitis (EOE)
Antonella Cianferoni
The Children’s Hospital of Philadelphia, University of Pennsylvania, Pediatrics Allergy and Immunology Division, Philadelphia, USA

EOE is a global health condition, with an incidence of ~1 per 10,000 people in the US. Symptoms of EoE greatly impair quality of life. Individuals with EoE are predominately young males with a high rate of atopic disease, and the diagnosis of EoE is made by endoscopy and biopsy findings of isolated eosinophils in the esophagus. Although the underlying cause remains unknown, EoE as other atopic diseases is recognized as complex genetic disorders, where multiple genes interact with each other and with the environment to trigger variable expression of the atopic phenotype. Accumulating evidence suggests that EoE has a strong familial association. Molecular analysis of esophageal biopsies and mouse models have indicated a clear role for the T helper 2 pathway, in particular interleukins 5 and 13, in this disease. In recent years, the genetics of atopy, asthma and EoE have been investigated using genome-wide linkage analyses and candidate gene association studies. Using such approach a single-nucleotide polymorphism (SNP) in the human eotaxin-3 gene has been found to be associated with EoE in about 15% of the patients. Such research approach in EoE as in atopy and asthma, while providing certain valuable insights into the genetics of atopic diseases, has achieved only limited success in identifying the genetic determinants of these related disorders. More recently, however, critical information provided by the Human Genome Project and the International HapMap Project has prompted the development of unprecedented genotyping technology and tools such as genome-wide association (GWA) studies to more comprehensively investigate the genetic basis of complex diseases such as atopy and EoE. In the past year, such research approach has led to the identification of single nucleotide polymorphisms in the gene encoding thymic stromal lymphopoietin (TSLP), and subsequently in the gene encoding its receptor, as disease susceptibility markers for EoE. Identification of this molecule and its receptor suggest the potential for new treatment options in the future.

533
Celiac disease
Riccardo Troncone
University Federico II, Department of Pediatrics & European Laboratory for the Investigation of Food-Induced Diseases, Naples, Italy

Celiac disease is a T-cell mediated chronic inflammatory disorder with an autoimmune component. Altered processing by intraluminal enzymes, changes in intestinal permeability, and activation of innate immunity mechanisms seems to precede the activation of the adaptive response. Significant progress has been made in the understanding of the cellular and molecular basis of CD and in the consequent identification of potential targets for therapy. Recently, it has been shown that gliadin peptides are highly resistant to digestive processing by pancreatic and brush border proteases. Enzyme supplement therapy using bacterial prolyl endopeptidases has been proposed to destroy T-cell multipotent epitopes. The identification of T-cell stimulatory gliadin sequences is important. Breeding programs and/or transgenic technology may lead to production of wheat that is devoid of biologically active peptide sequences. The identification of specific epitopes may also provide a target for immunomodulation of antigentic peptides. Other promising areas include preventing gliadin presentation to T cells by blocking HLA binding sites, use of tTG inhibitors, and assessing IL-10 as a tool for promoting tolerance. However, evidence that gluten toxicity is not dependent only on T-cell recognition is growing; activation of innate immunity has been demonstrated and antibodies to IL-15 proposed, particularly in refractory sprue because of the IEL activating role of IL-15. However, one should realize that CD is a benign disease and dietary treatment is safe, although strenuous. An immunomodulatory approach will need to have a safety profile equivalent to that of the GFD, but with the advantage of increased compliance. Another area of important changes for CD concerns the diagnostic protocol. In 1990 ESPGHAN has revised its former diagnostic criteria laid down in 1970. The two requirements mandatory for the diagnosis of celiac disease (CD) remain: 1) the finding of villous atrophy with hyperplasia of the crypts and abnormal surface epithelium, while the patient is eating adequate amounts of gluten; and 2) a full clinical remission after withdrawal of gluten from the diet. However, important changes that might have an impact on the diagnostic procedures for CD, have occurred in recent years. Tests based on the detection of anti-endomysium antibodies (EMA), and subsequently of anti-tTG, have been increasingly used as an initial screen for CD. Serological tests are largely responsible for the recognition that CD is not a rare disease; moreover, with the notion of the relatively high prevalence of CD has become increasingly recognised its broad spectrum of clinical presentations. The growing contribution of serology, together with the recognition of a wider spectrum of histological changes (see below), and the contribution by genetic tests, demonstrate the necessity to move on to a revised diagnostic approach, but until serological methods are improved, the genetic make up of celiac patients is better defined, it seems wise for a diagnosis of celiac disease still rely on a combined approach based of clinical criteria, histology, serology and genetics.

534
Introductory lecture: Biochemical properties of food allergens
Lars K Poulsen
National University Hospital, Allergy Clinic, Copenhagen, Denmark

The biochemical properties of food allergens exert a large influence on how these allergens act when ingested, and determines important aspects such as cross-reactivity, lability to degradation during digestion or stability during processing of the food. One of the targets for biochemical characterization of food allergens is to establish a link between the biochemical data and the biological activity of the allergen in a certain food. The biological activity of food allergens or mixtures thereof may be determined by various in vivo and in vitro methods that may quantitatively or semi-quantitatively express the combined effects of individual allergenic molecules in a mixture. Even in the rare case of testing an individual food allergen molecule, a response will emerge that is only declared relatively to other allergenic substances or mixtures. Thus, an important feature of testing the biological activity of mixtures is the lack of a response which cannot be directly linked to individual molecular entities, and this put special emphasis on the definition of both the test systems and the mixtures that are tested. As an example, the lessons learned by the recent outbreak of reactions to the so-called Meripro 711, a wheat-derived hydrolyzed protein, will be discussed in the context of what is known about the type of patients that react, and how this may be related to the biochemical properties of the product.
S35
Introductory lecture: Pollen food allergy syndrome
Riccardo Asero
Ambulatorio di Allergologia, Clinica San Carlon Paderno Dugnano (MI), Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):S35

The term pollen-food allergy syndrome (PFAS) defines a series of clinical symptoms appearing shortly after the ingestion of plant-derived foods in subjects with pollen allergy. The patients with PFAS are primarily allergic to pollen and subsequently react to food allergens as a consequence of the homology between pollen and plant-food proteins. The two highly conserved proteins responsible for the large majority of cases of pollen-food allergy syndrome are the pathogenesis-related proteins group 10 (PR-10), including the major birch pollen allergen Bet v 1 and homologous proteins in different fruits and vegetables, and profilin, a plant pan-allergen present in cell structure of all the vegetable kingdom. Although it has been generally thought that the clinical expression of the pollen food-allergy syndrome is uniquely the so-called “oral allergy syndrome”, recent reports suggest that the ingestion of particular foods may be associated with systemic symptoms as well. Recombinant PR-10 proteins and recombinant profilins from different sources are presently available for diagnostic purposes. The presentation will review the available data about the clinical expression, diagnosis, and therapy of the pollen-food allergy syndrome.

S36
Abstract not submitted at time of publication
Clinical and Translational Allergy 2045-702201111Suppl 1S36

S37
Milk and wheat allergy, and celiac disease
Mika Mäkelä
Helsinki University Central Hospital, Department of Allergy , Skin and Allergy Hospital, Helsinki, Finland
Clinical and Translational Allergy 2011, 1(Suppl 1):S37

Cow’s milk, egg, wheat, soy, peanut, and fish account for about 90% of the food allergies but there are considerable differences from one country to another. Milk allergy is among the best characterized food allergies, particularly in infants and small children. Only part of the children with early allergy to cow’s milk grow into school-age with milk allergy but those that do often have severe symptoms and high specific IgE level to milk. In accordance, attaining tolerance to cow’s milk is associated with decreased epitope binding by IgE and a concurrent increase in corresponding epitope binding by IgG4. Recent data point that analysis of IgE response to milk components may help in determining those with higher risk for persistent or more severe milk allergy. Among wheat allergic patients, co-sensitization to cow’s milk and hen’s egg is common. Wheat ingestion may trigger immunoglobulin E (IgE)-mediated immediate symptoms, including urticaria, angioedema, bronchial obstruction, nausea and abdominal pain, or in severe cases, even systemic anaphylaxis. Delayed reactions include gastrointestinal symptoms and worsen-ing of atopic dermatitis. In addition to food allergy, wheat ingestion may cause exercise-induced anaphylaxis, or celiac disease (CD), and inhalation and handling of wheat flour allergens may lead to respiratory allergy, or contact urticaria on the skin. Wheat IgE is commonly found in all ages of atopic children when whole grains are used as an antigen either in skin prick tests or serum IgE measurements. The specificity of this IgE re-sponse in identifying clinical disease, however, is poor. It is of importance to recognize dis-ease-determining components in the IgE response. Several studies have shown that sensiti-zation particularly to omega-5 gliadin is associated with challenge-proven wheat allergy. Moreover, recent data imply that gliadin-positive patients have more likely severe reactions after wheat ingestion. A well-characterized severe clinical entity is also wheat-dependent, ex-ercise-induced anaphylaxis in which sensitization to omega-5 gliadin is a prerequisite.

We have analyzed especially the gliadin-sepcific responses in wheat allergy. Sensitization to gliadin with a SPT wheal of ≥5 mm at the time of the diagnostic challenge was associated with a slower course of recovery from wheat hypersensitivity (p = 0.019), and a SPT wheal of ≥3 mm to gliadin at any time was associated with the development of asthma. Recently, we examined IgE response to 22 wheat components in children with challenge positive wheat allergy and their controls. The results show that wheat-allergy diagnosis can be improved considerably by component-based approach. In the future, wheat IgE diagnosis should include at least measurement of IgE to gli-ads. Gluten and its major component, gliadin, is essential also in the pathogenesis of celiac disease. Gliadin can be a target of both cellular and humoral immune responses. Approximately 90 percent of patients with celiac disease have the HLA-DQ2 haplotype, explaining the family-association of the disease but still leaving open the wide variability in prevalence between dif-ferent Caucasian populations. Both IgA and IgG antibodies can be seen in CD patients but the most sensitive diagnostic work-up is to define tissue transglutaminase (tTG) transglutami-nase IgA antibodies.

S38
Abstract not submitted at time of publication
Clinical and Translational Allergy 2045-702201111Suppl 1S38

S39
Soy, milk and wheat allergy
Itu Korne
Aichi Children’s Health and Medical Center, Department of Allergy, Obu, Japan
Clinical and Translational Allergy 2011, 1(Suppl 1):S39

Food allergies affect 5-10% of infants, 2-5% of toddlers, and 1.3-2.6% of school children in Japan. Egg, milk and wheat are the major three food allergens. Soybean is one of the eight foods causing immediate allergic reactions, sometimes anaphylaxis. Fermented soybeans, miso and shoyu, are used in most of the traditional Japanese foods, and exposure to soybeans in Japanese children begins as one of the first solid foods, typically in the form of tofu. Sensitization to soy, milk and wheat occurs in many atopic babies. Some are the primary sensitizations to the foods through oral or cutaneous route, but others may be the secondary sensitization through cross-reactive foods or pollens. Component-specific IgE tests provide us more sensitive and specific diagnostic tools. We have found that casein, one of the most classically known allergen components in milk, can be a more specific marker in the diagnosis of milk allergy, especially in the older children. Recombinant α-5 gliadin ImmunoCAP® provides almost 100% positive predictive value of immediate type wheat allergy in children at 17.5 kUA/L, as well as wheat-dependent exercise-induced anaphylaxis in adults. Gly m 5 and Gly m 6 from soybean can be a marker of severe primary soy allergy in Japanese children. On the other hands, patients with secondary soy allergy in adults, who have allergic reactions exclusively to soy milk, but not to tofu, are predominantly sensitized to Gly m 4 (PR-10), possibly due to the cross-reactive pollen allergens. In conclusion, allergen component testing is an excellent clinical tool from a diagnostic point of view but also provide us with new insights into food allergy.

S40
Assessment of risk from food allergens cross-contamination
Anton Alldrick
Campden BRI, Science Division, Chipping Campden, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):S40

Successful food-safety management relies on a clear identification of the hazards to be addressed. In the case of issues relating to food allergens the hazard may be defined as: The inadvertent consumption of a food allergen by a sensitive individual. Ensuring that the risk (probability) of this hazard occurring is maintained at an appropriately low level within the context of modern food-manufacturing often presents issues. These
reflect the facts that modern food-processing businesses rely on the efficient use of both equipment and the associated manufacturing environment. Such reliance often precipitates against the dedicated use of a particular manufacturing line, still less a manufacturing facility, for a single product. This multiplicity of products is often the source of many of the issues relating to food allergen cross-contamination. At a philosophical level, the issue of cross contamination presents a unique hazard in terms of food safety management since the contaminant is an integral part of a food and considered nutritious to most consumers. Furthermore, levels of cross contamination capable of eliciting an adverse reaction are often lower than those associated with loss of consumer acceptance. Risk assessment cannot be seen in isolation and has to be considered within the additional context of risk management and risk communication. Risk management therefore requires an understanding not only of both events taking place within the manufacturing facility but also within the suppliers of the raw materials used to make the finished product. As such successful management of food allergen issues places heavy reliance on pre-requisite programmes operating within the food business (e.g. sanitation, training and supplier quality assurance). Finally it is necessary to ensure that relevant information concerning any remaining hazards presented to the food allergic consumer are clearly communicated on the wrapper.

**Results:** The analysis revealed 4 main themes: ‘The reality of living with risk’; ‘maintaining a balance’; ‘feeling informed and in control of risk management’; ‘communicating thresholds’. Current risk hazard approaches reinforce uncertainty and that consumers and clinicians want a clear set of risk thresholds and management approaches.

**Conclusion:** The themes will form a basis for further discussion with parents, children, teens and adults living with food allergy, and the health professionals who diagnose and advise them. Consumer engagement can ensure communication tools and methods are valid and relevant to both majority groups and sub-groups.

---

**Introduction lecture: Diagnosis of food allergy: when is an oral challenge positive**

Bodo Niggemann
Pädiatrische Allergologie und Pneumologie, Hedwig-von-Rittberg-Zentrum, DRK-Kliniken Berlin, Berlin, Germany

Clinical and Translational Allergy 2011, 1(Suppl 1):S43

Oral food challenges still remain the gold standard in the diagnosis of food related symptoms and are performed to obtain a clear “yes” or “no” response. However, this is often difficult to achieve, and so proposals may be appropriate for criteria on when to stop oral food challenges and declare a challenge as positive or negative. In daily practice it makes sense to challenge until clear objective symptoms occur without harming the patient. Clinical symptoms should be objective and/or: (a) severe or (b) reproducible or (c) persisting. A sensitive parameter for a beginning clinical reaction is a general change of mood. The sooner symptoms appear, the more likely they are to represent a “true” positive reaction, and the more organ systems are involved the easier it is to assess an oral food challenge as positive. In the case of subjective symptoms, the number of placebo doses should be increased. In unclear situations, the observation time until the next dose should be prolonged or the same dose repeated. Transient objective clinical symptoms usually end up in a positive challenge result. There are a number of causes for false positive and false negative challenge results, which should be considered. The aim of all oral challenge testing should be to hold the balance between two conflicting aspects: on the one hand the need to achieve clear and justified results from oral food challenges in order to avoid unnecessary diets, and on the other hand to protect patients from any harm caused by high doses of a potentially dangerous food.

---

**Modelling food allergy with mice models**

Udo Herz
Mead Johnson Nutrition, Research & Development, Nijmegen, Netherlands

Clinical and Translational Allergy 2011, 1(Suppl 1):S44

Food allergies are adverse immune reactions to food proteins that can range from immediate, potentially life-threatening reactions to chronic disorders such as atopic dermatitis and allergic gastrointestinal disorders. These adverse reactions can be IgE-mediated; cells mediated or result from a combination of both. No effective preventive strategy or curative protocol is currently established. Various mouse models have been developed which mirror some of the key elements of food allergies to a high degree. These models have extended our understanding on the immunological and pathophysiological mechanisms of the allergic immune response and have been used for the initial testing of preventive and therapeutic agents. In particular the prenatal and early postnatal period seem to be a critical window for the establishment and maintenance of a normal immune response towards food allergens. This presentation will focus on the role of the maternal adaptive immune response and the nature of the diaplacental antigen transfer during the prenatal period in preventing the onset of allergies in the offspring. In addition, during the early postnatal period several host factors can influence the acquisition of oral tolerance. The interaction of the developing immune system with microbial structures seems to play a decisive role for the induction of local and systemic tolerance. Several studies demonstrated that continuous administration of live Lactobacillus rhamnosus GG (LGG) during gestation and the breastfeeding period inhibited the onset of allergen-induced sensitization and airway disease.
in the offspring which is associated with the induction of T-regulatory cells. Recent findings suggest that heat treated and soluble factors may also have the ability to suppress the allergic immune response. These data may help to interpret previous data from successful clinical trials and provide an outlook on future intervention strategies.

**S45 Immune system in the intestine and mucosal inflammation**
Liam O’Mahony
Swiss Institute of Allergy and Asthma Research (SIAF), University of Zurich, Molecular Immunology, Davos, Switzerland
Clinical and Translational Allergy 2011, 1(Suppl 1):S45

The gastrointestinal tract is home to the largest accumulation of leukocytes in the body where they are constantly being exposed to a wide array of foreign antigens. Complex signalling networks between multiple cell types ensure that the appropriate balance is maintained between immune protection from infection and tolerance of harmless antigens, such as the resident bacterial flora and dietary antigens. Disturbance of this balance results in inappropriate immune activation, as observed in patients with Inflammatory Bowel Disease or food allergy. The intestine is highly adapted to facilitate immunological sampling of intestinal contents. Specialized epithelial cells, M cells, actively transport antigen to underlying lymphoid follicles for immunological processing while dendritic cells extend dendrites between epithelial cells in order to sample adherent bacterial species. We will focus on the mechanisms by which the intestinal immune system samples luminal antigen and the controlling features that determine immunological tolerance. In particular, the molecular mechanisms by which intestinal microbes induce tolerogenic responses within the gut and the relevance of intestinal T regulatory cell responses to protection from intestinal inflammation will be discussed.

**S46 Immunological changes related to oral tolerance**
Stephan Strobel
UCL Institute of Child Health, London, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):S46

**Background:** The default response to protein antigens in the intestine is the induction of systemic and local hyporesponsiveness (OT). There is increasing interest in the role of dietary manipulation and probiotics in the development and prevention of allergic and other diseases. Little is known how the environment and nutritional factors modulate systemic and local immune responses. This presentation addresses immunological mechanisms at the interface of innate and adaptive immunity that determine how the body responds to orally administered proteins and how local microbiota may modify these.

**Recent findings:** There is evidence that dendritic cells in the intestinal mucosa play a particular part in OT induction. They take up dietary proteins, which may be sampled in the lumen and migrate to the draining mesenteric lymph node, where they induce regulatory CD4+ T-cell differentiation. An important role of retinoic acid (Vitamin A) in this event has been identified. The regulatory properties of (tolerised) T cells are discussed and it is proposed that the gut microenvironment maintains homeostasis by conditioning dendritic cells to remain in a quiescent state. Inhibitory signalling via Toll-like-Receptors (TLRs) by commensal bacteria possibly contributes to this process.

**Conclusion:** A regulatory innate and adaptive network controls how dietary antigens are taken up and presented to T lymphocytes by specialized antigen-presenting cells. Elucidating their nature and how they are influenced by external factors, including changes in the host's microbiota may help develop novel therapies for allergy and help understand diseases such as coeliac disease. Current immunotherapeutic approaches to specific oral tolerance induction (SOTI) will be discussed within the framework of oral tolerance induction in humans. Recent advances in our understanding of oral tolerance, the interactions between the innate and adaptive immune system, and the way in which intestinal microbiota may affect the outcome of intestinal antigen exposure will be addressed.

**S47 Epidemiology of food allergy in the community**
Kiris Jarvinen
Mount Sinai School of Medicine, Pediatric Allergy and Immunology, New York, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):S47

Food allergy is the most common cause of anaphylaxis outside the hospital setting. Peanut, tree nuts, milk, egg, and shellfish are the most commonly implicated foods. Most cases of anaphylaxis are reported to occur in the home, but one-fifth of the reactions occur at school or work and a similar proportion in restaurants and other food establishments. Although the majority of reactions in schools occur in subjects with known food allergies, nearly 25% of peanut/tree nut-induced allergic reactions were reported before the diagnosis. The majority of reactions occur in the classroom (many due to craft projects), followed by health office, playground, and cafeteria. Numerous studies have identified deficiencies in establishing and implementing written emergency action plans (EAP) and general or individualized plans for prevention in schools, and inadequacies in recognizing and treating anaphylaxis. Although there are no studies directly comparing the effect of banning peanut schools on the incidence of reactions, such practice from preschool to lower elementary school is not uncommon. Reactions to nuts occurring in food establishments most commonly include Asian food restaurants, ice cream parlors and bakeries/dough nut shops. Allergen is commonly found in dessert foods or hidden in sauce, dressing etc. Cross-contamination during preparation and serving is another important source of error, and in addition to reactions due to ingestion of food not intended for the subject, buffet items, or casual contact. Importantly, the establishment is often not notified of the allergy. Lack of timely treatment with epinephrine is a universal risk factor and adolescents/young adults are the peak age group for a fatal food-induced anaphylaxis. Furthermore, up to one-fifth of food-induced anaphylactic reactions may need more than 1 dose of epinephrine. Therefore, there is an urgent need for education and access to epinephrine in food-induced reactions occurring in the communal setting.

**S48 Abstract not submitted at time of publication**
Clinical and Translational Allergy 2011, 1(Suppl 1):1548

**S49 Managing exercise food induced anaphylaxis**
Eiben Eiler
Odense University Hospital, Department of Dermatology and Allergy Center, Odense, Denmark
Clinical and Translational Allergy 2011, 1(Suppl 1):S49

Food dependent exercise induced anaphylaxis (FDEIA) is an IgE mediated adverse reaction to specific foods, where symptoms only appear in combination with physical activity. In absence of exercise, subjects with FDEIA tolerate the offending food. FDEIA can, as the nomenclature indicates, be life threatening, but most common symptoms are urticaria, flushing, pruritus and angioedema. The mechanism behind FDEIA is unclear, but a number of hypotheses have been proposed, such as altered GI permeability, blood distribution or activation of mucosal mast cells. Managing FDEIA is characterized by avoidance of the offending food in combination with physical activity. However, in order to give proper guidelines for managing FDEIA, a precise diagnosis is crucial. The diagnosis of FDEIA is based on case history, relevant sensitization, exclusion of cholinergic urticaria and “regular” non-exercise induced food allergy and finally reproduced by an exercise test. Different foods are known to elicit FDEIA, wheat being the most common. The aetiology of wheat dependent exercise induced anaphylaxis (WDEIA) is better understood than symptoms caused by other allergens. The wheat protein component Q-5 Gliadin is known to be involved in WDEIA, but the precise role, clinical relation and relevance of in-vivo/vitro measurement is unclear. Further, the type and intensity of the exercise as well as the kinetics and time perspective need further focus. Food processing such as
heat treatment, cooking and baking also influences the diagnosis and thereby the management of exercise induced food anaphylaxis. Standard diagnostic procedure in order setting include initial careful case history followed by skin prick testing with various wheat extracts, measurement of specific IgE to wheat and available wheat components followed by a histamine release from basophils, stimulated with a variety of raw and processed wheat preparations. Ultimately, a standardised treadmill exercise is performed.

Epidemiology of cow’s milk allergy: has it changed?
Cansin Sackesen
Hacettepe University School of Medicine, Pediatric Allergy and Asthma Unit, Ankara, Turkey
Clinical and Translational Allergy 2011, 1(Suppl 1):S50

Our knowledge about the time trend of cow’s milk allergy prevalence is very limited, however there some indirect data favoring the increase of the cow’s milk allergy prevalence. There are several studies reporting that food allergy is increased among children of all ages, both gender and different races/ethnicities. Several national health surveys in USA recently indicated that food allergy prevalence and/or awareness has increased 18% (p=3.4; p<0.01) from 1997 through 2007. Another study from UK determined that hospital admissions for food allergy rosed from 5 to 26 per million in general population, this was particularly apparent in children where rates rose sevenfold from 16 to 107 per million. There are limited studies focusing on a specific food allergy prevalence. Several studies from UK and USA focusing on peanut showed that the prevalence of peanut allergy doubled in children. However another study searching the time trends of the food-induced anaphylaxis in the pediatric emergency department indicated that the number of visits was increased not only because of peanut–induced anaphylaxis but for multiple food allergens including cow’s milk. Another study from Australia determined an four-fold increase of food allergy in 0-5 year-old children from 1995 to 2006. The common triggers of food allergy in Australian children were peanut, hen’s egg, cow’s milk and treenuts and the prevalence of food allergy was increased with time for each food including cow’s milk allergy. A final study from China investigating time trends in the prevalence of food allergy in 0-2 year-olds infants from 1999 to 2009 determined that the prevalence of food allergy increased more than 2.2-fold between 1999 and 2009 and the prevalence of cow’s milk allergy increased from 1.6% to 3.5% over a decade. All the studies from different parts over the world support the opinion that the prevalence of food allergy rises and this rise covers the prevalence of the cow’s milk allergy especially in children.

CMA: how long does it last for?
Nikolaos Papadopoulos
University of Athens, Athens, Greece
Clinical and Translational Allergy 2011, 1(Suppl 1):S51

The natural history of cow’s milk allergy is usually benign. Among non-IgE mediated forms, proctocolitis resolves in practically all cases close to the first year of life; FPIES is dealt with more conservatively, nevertheless, it also resolves in most cases before the age of 5 years. All studies focusing on IgE mediated CMA have demonstrated a time-dependent decrease of prevalence due to the development of tolerance in increasing proportions of the relevant populations. Epidemiological studies have also been ubiquitous in confirming that, in contrast to childhood, cases of IgE-CMA in adults are very rare. Although it is not clear whether such cases have a childhood onset, there is no doubt that only a handful of pediatric patients will continue to suffer post adolescence. Nevertheless, it has been suggested that CMA may currently last longer than previously suggested, with proportions developing tolerance at school age dropping from ~90% to ~40% in the two most cited studies. In order to inform such discussion, factors that may affect the natural history should be taken into account. These include, but are not confined to, severity of the disease, pattern of IgE sensitization and events relevant to antigen exposure. The infant diet may be crucial, however, few studies have addressed the effects of different variations of it on natural history. A considerable proportion of CMA children may tolerate partially hydrolyzed and/or heated milk, however the effects of these on the natural history are not clear. Finally, several successful attempts to introduce CM in the context of SOTI protocols, seems to be able to permit milk consumption in these children, while inducing tolerance in some.

What has changed in the diagnostic approach?
Alessandro Fiocchi
Macedonio Melloni Hospital, Department of Paediatrics, Milan, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):S52

Food allergy in general, and CMA in particular, are an unique case in which a systematic approach can be applied even to single cases. As the disease involves not only the patient, but the whole family and her social supports, these can be protagonist of the diagnosis itself. As in any field of medicine, diagnosis starts from the suspicion. In patients reports for milk allergic reactions, an accurate medical history can clarify many aspects of the diagnosis. If history does not exclude the possibility of a CMA, in particular in delayed manifestations, in primary setting there is the possibility to take a period of tentative avoidance of milk, followed by an open reintroduction. When avoidance coincides with symptom-free periods, an open reintroduction can be useful to identify the offending food (if severe symptoms are anticipated, the procedure should be done under supervision in a medical facility). This elimination - reintroduction phase does not eliminate the necessity of challenge tests, but can give some indication on the possibility of CMA. We have several methods to evaluate milk sensitization. Basically, they are:
- Skin testing, including immediate skin prick test (SPT), intradermal reactions and atopy patch test (APT)
- The evaluation of serum food -specific IgE using one of the several methods we have at disposition.

Performance, accuracy, and the diagnostic positioning of these have been afforded in the DRACMA Guidelines. Following these analyses, the following considerations can be formulated:
- Challenge is the best for diagnosing CMA
- If not available, challenge is not necessary in case of:
  a. high pre-test probability and SPT+ (classify as CMA)
  b. high pre-test probability and sIgE+ (classify as CMA)
  c. low pre-test probability and SPT- (exclude CMA)
  d. low pre-test probability and sIgE- (exclude CMA)
- Challenges remain necessary in all cases of uncertainty (medium pre-test probability)
- If challenge is necessary in a research setting, sensitisation tests may not be necessary.
  a. Atopy patch test is not useful
  b. Component-resolved diagnosis may be useful, but further data are necessary
  c. Molecular diagnosis may be useful, but more data are needed.

Clinical impact of food processing
Joseph Baumert
University of Nebraska-Lincoln, Food Allergy Research and Resource Program, Department of Food Science & Technology, Lincoln, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):S53

Food processing unit operations can have effects on food allergens and their capacity to provoke reactions. The vast majority of food allergens are proteins, although most individual proteins in foods do not possess allergenic activity. Thus, the physical removal of proteins e.g. oil refining can eliminate the allergenic activity as is well documented for highly refined peanut oil. Furthermore, the chemical and/or enzymatic hydrolytic destruction of proteins can dramatically decrease allergen risk as evidenced by the use of extensively hydrolyzed casein, a major milk allergen, in hypoallergenic infant formula intended for milk-allergic infants. However, since exposure to trace amounts of allergenic proteins...
can provoke reactions in some allergic individuals, the efficacy of these unit operations in eliminating allergen risk is of considerable concern. The assessment of the residual allergenicity of processed foods can be difficult. The methods employed in such assessments must yield results that can predict allergenicity upon ingestion of the processed food. Clearly, blinded oral challenges on allergic individuals are the ultimate approach to document the safety of a particular processed food product. However, this approach is arduous, expensive and potentially risky. Because the allergenic activity of a protein depends upon its ability to bind to specific IgE antibodies from the blood sera of allergic individuals, the effect of processing on the IgE-binding capacity of an extract of the processed food may offer some indication of its allergenic potential. However, IgE binding is often assessed by immunoassay, an approach that depends upon the solubility of the processing-modified protein. Processing can diminish the solubility of proteins and thereby decrease apparent IgE binding in immunoassays. But the possibility exists that insoluble allergens may remain allergenic after ingestion. A full understanding of the effects of processing on allergenicity, the specific allergens, and detection methods does not exist for any allergenic food.

S54 Abstract not submitted at time of publication
Clinical and Translational Allergy 2011, 1(Suppl 1):S54

S55 Impact of a new European regulations on functional food market – an overview
Martinus Lokvik
Norwegian Institute of Public Health and Norwegian University of Technology and Science, Department of Environmental Immunology and Institute for Cancer Research and Molecular Medicine, Oslo and Trondheim, Norway
Clinical and Translational Allergy 2011, 1(Suppl 1):S55

Functional foods are defined as foods that provide health benefits in addition to their basic nutritional value. These additional health benefits form the basis for producers’ health claims on foods. Legislation demands that health claims should be based on and substantiated by generally accepted scientific evidence. The main topic of this presentation will be how the European Food Safety Authority (EFSA) approaches the issue of substantive substantiation of health claims on foods. Health claims can be categorized in different ways, or improving a biological function (function claims), and on the treatment of symptoms in the case of ingestion. A paradigmatic example is that of wheat, which that can cause a range of reactions such as IgE-mediated food allergy, anaphylaxis and asthma, exercise-induced systemic reactions, such as celiac disease. The major allergens of cereals are represented by alpha-amylase inhibitors, some prolamins, such as gliadins in wheat and zeins in maize, and Lipid Transfer Proteins. These allergens are also differently implicated in the various clinical forms. So that their positivity in many cases actually can be considered diagnostic. The clinical diagnosis of allergy to cereals, because of their nutritional importance, should always be verified by double-blind placebo-controlled food challenged. Long term prognosis is quite favourable and the therapy is based essentially on their elimination, and on the treatment of symptoms in the case of ingestion.

S56 Food allergen protein families and their structural characteristics: new data from Europrevail
Karin Hoffmann-Sommergruber
Medical University of Vienna, Department of Pathophysiology, Vienna, Austria
Clinical and Translational Allergy 2011, 1(Suppl 1):S56

In the past decade the number of identified food allergens has tremendously increased. Nevertheless, these proteins can be assigned to only a limited number of protein families with certain biological functions such as hydrolysis of proteins/polysaccharides, binding, transport and storage of ligands and cytoskeleton association. In depth knowledge about the 3D structures of individual food allergens, their biological activity and stability will help to fine-tune in vitro diagnosis of food allergy and assess the risk of cross reactive allergies to other food sources. Therefore, the Europrevall project set out for a p collection of highly purified, characterised and authenticated food allergens from animal and plant food sources. The allergen library included both, recombinant and natural proteins. A catalogue of harmonised quality criteria of the purified allergens was agreed and up to date methodologies such as mass spectroscopy, circular dichroism spectroscopy, fourier-transform infrared spectroscopy and 1D-NMR analysis were applied to define them. Plant food allergens were purified from fruits (apple, peach, and kiwi), vegetables (carrot, celeriac, tomato and soybean) and grains, nuts and spices (wheat, hazelnut, peanut, walnut, sesame seeds, sunflower seeds and mustard). These allergens derived from the most important protein families such as the seed storage proteins from the prolamin and cupin superfamilies, profilins, Bet v 1 related proteins, and oleosins. From animal foods allergenic proteins from cow’s and goat’s milk, hen’s egg, fish and shrimp were purified and included members of the following protein families: lipocalins, caseins, C-type lysozymes, various protease inhibitors, tropomyosins, and parvalbumins. Subsequently selected sets of allergens e.g. from kiwi or celeriac were used to compare conventional in vitro diagnosis with the allergen specific approach. Additionally, these well defined proteins were enabled further in depth studies investigating the impact of food processing or digestion on the structural features of the individual allergen.

S57 Wheat and maize allergy: which allergens are involved and relationship with symptoms severity
Elide Anna Pastorelli1,2, Giuseppe Scibilia1, Laura Farioli1
1Niguarda Ca’ Granda Hospital, Allergy and Immunology, Milano, Italy; 2Niguarda Ca’ Granda Hospital, Biochemical Unit, Milano, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):S57

Cereals are the basis of human nutrition; they are the food source most intensively produced in the world, surpassing 2000 million tons annually. The production of wheat, corn and rice makes up over the 70% of the total cereal production and thus dominates world agriculture. All 3 cereal crops can determine adverse reactions with different mechanisms of immune-mediated hypersensitivity and through various routes of exposure (digestive, inhalation and contact). A paradigmatic example is that of wheat, which that can cause a range of reactions such as IgE-mediated food allergy, anaphylaxis and asthma, exercise-induced systemic reactions, such as celiac disease. The major allergens of cereals are represented by alpha-amylase inhibitors, some prolamins, such as gliadins in wheat and zeins in maize, and Lipid Transfer Proteins. These allergens are also differently implicated in the various clinical forms. So that their positivity in many cases actually can be considered diagnostic. The clinical diagnosis of allergy to cereals, because of their nutritional importance, should always be verified by double-blind placebo-controlled food challenged. Long term prognosis is quite favourable and the therapy is based essentially on their elimination, and on the treatment of symptoms in the case of ingestion.

S58 Peach allergy: different clinical profiles across Europe
Montserrat Fernandez-Rivas
Hospital Clínico San Carlos, Servicio de Alergia, Madrid, Spain
Clinical and Translational Allergy 2011, 1(Suppl 1):S58

Rosaceae fruit allergy is the most common food allergy in Europe in patients over 5 years of age. The two fruits most frequently involved are peach and apple. Different clinical phenotypes of peach allergy are observed across Europe in relation to different allergen sensitisation patterns to the peach allergens Pru p 1 (Bet v 1 homologue), Pru p 3 (peach lipid transfer protein, LTP), and Pru p 4 (peach profilin). In areas rich in birch trees of Central and Northern Europe peach allergy is linked
to birch pollenosis and apple allergy, and the major allergen involved is Pru p 1. These patients present mild oropharyngeal symptoms (oral allergy syndrome, OAS) upon peach ingestion. Profilin co-sensitisation is also found in a minority of patients, but the clinical presentation is similarly OAS. In contrast, in the Mediterranean areas free of birch trees, peach allergy may result from a primary sensitisation to Pru p 3, or be linked to pollen allergy with sensitisation to pollen profilin and secondary to Pru p 4, or a combination of both. In patients monosensitised to Pru p 4, peach allergy is linked to a pollen allergy, generally to grass pollen, and the phenotype is mild with OAS in all the patients. When sensitisation to Pru p 3 and Pru p 4 are combined systemic reactions are less frequently observed than in patients monosensitised to Pru p3, and OAS is more frequently reported. Sensitisation to Pru p 2, the thaumatin like protein in peach, may be found in combination with Pru p 3 and 4, but its clinical relevance has not yet been established. Peach allergy across Europe is an interesting model food allergy that illustrates how different allergen sensitisation profiles determine the clinical phenotypes of fruit allergy. The reason for the (almost) lack of sensitisation to Pru p 3 in Central and Northern Europe still remains unclear.

**S59** How to manage food allergy in restaurants, cafeterias and fast food outlets?  
Frans Timmermans  
European Anaphylaxis Taskforce - Nederlands Anafylaxis Netwerk, Dordrecht, Netherlands  
**Clinical and Translational Allergy** 2011, 1(Suppl 1):S59

**Background:** The stress of raising a child with food allergies affects each family differently, depending, in large part, on how the physician initially presents the information and the family’s coping style. Based on how the information is presented they can leave the doctor’s office terrified and unsure whether they will be able to prevent the next reaction, or concerned but confident that they can keep their child safe. We educate patients to be informed and to communicate and are encouraged to “live a normal life while taking precautions”.

**Methods:** Food businesses were asked different aspects, by questionnaire and interview, on how they dealt with food allergic guest.  

**Results:** 95% of the respondents (n=115) indicated that they would provide a safe meal, but only 26% has had a food allergen training. 55% of the respondents believed that heat would destroy the allergen en 46% believed that a small amount of allergen would do no harm. About half of the respondents thought that a buffet would be safe if it was kept clean and some 21% thought that removing the allergen from a prepared meal (like nut topping) would make the meal safe to eat. 85% recognized peanut, tree nuts, milk and egg as main allergens and 18% indicated that they had a procedure to identify severe reactions in children at risk, how to do it or when to call an ambulance. Education by a skilled pediatric nurse their overall understanding of how to manage allergic reactions and how to use an EpiPen increased to around 95%. Thus, there is a need for education and training of families with children at risk for anaphylaxis, and studies indicate that such educational programmes may increase both knowledge and abilities of the families to avoid risk situations and to manage emergencies.

**S60** Preparing families and institutions to manage anaphylaxis  
Susanne Falken  
Hans Christian Andersen Children’s Hospital, Odense University Hospital, Odense, Denmark  
**Clinical and Translational Allergy** 2011, 1(Suppl 1):S60

Anaphylaxis is a pediatric emergency, but most cases occur in the community outside a healthcare setting. It is therefore essential that the families, schools, nurseries and other child care professionals understand how to avoid, recognise and manage severe allergic reactions. Food allergy is the most common cause of anaphylactic reactions in children. If children are to avoid the food allergens, both their parents and the children themselves need to know exactly what food products to avoid and how to do it. This knowledge is best taught by a dietician with expertise in pediatric allergy. It is also important that the child’s other carers are trained. In a recent study it has been shown that parents to children with severe food allergy had a very poor understanding of how to avoid further contact with the trigger food. After education by an experienced dietitians these families’ knowledge increased significantly from 55% to 70%. Unfortunately, even with the best education, children are going to come into contact with foods they are allergic to. The child and their family therefore need to know how to recognise an allergic reaction and appropriately deal with it. This is facilitated with the use of personalised management plan that take into account the child’s personal risk of anaphylaxis and coexistent medical problems. This plan should include both prescription and training of the child and family in self-administration of adrenaline. It has been shown that at initial presentation to a tertiary clinic, only half of the families understood how to manage an anaphylactic reaction and they did not know when to carry an EpiPen, how to use it or when to call an ambulance. After education by a skilled pediatric nurse their overall understanding of how to manage allergic reactions and how to use an EpiPen increased to around 95%. Thus, there is a need for education and training of families with children at risk for anaphylaxis, and studies indicate that such educational programmes may increase both knowledge and abilities of the families to avoid risk situations and to manage emergencies.
Anaphylaxis is a paediatric emergency but most cases occur in the community. Children with suspected food allergy need to be assessed and the trigger foods identified (Roberts 2007). The family then require dietetic education to help avoid further exposure (Roberts 2008). With increasing replacement of home-cooked products with manufactured ones, the avoidance of trigger food allergens has become increasingly difficult. It is therefore essential that families, schools, nurseries and other child care professionals understand how to avoid, recognise and manage allergic reactions (Muraro 2007; Muraro 2010). The child and their family therefore need to know how to recognise an allergic reaction and appropriately deal with it. This is facilitated with the use of personalised management plan that take into account the child’s personal risk of anaphylaxis and coexistent medical problems. These plans also need to be shared with the children’s other carers. With this approach, we have an opportunity to reduce the future morbidity and mortality that our patients with food allergy experience.

References
2003/89/EC and 2006/142/EC. This obligation only concerns the use of allergenic ingredients according to recipe. However, allergens may also be present in food due to cross contamination in food production facilities or contamination of raw materials or ingredients. Pele et al. (2007), WVA (2007) and Spanjersberg et al. (2010) have demonstrated the presence of considerable amounts of allergens in many food products that did not carry any warning for the presence of these allergens. The presence of allergens without accompanying warning obviously poses a risk to allergic consumers, as these individuals have no opportunity to judge the appropriateness of the concerning food products for them to eat (Spanjersberg et al. 2010, Sheth 2010).

In contrast to the absence of any warning on many products that do contain certain allergens, there appear to be many food products in the market that carry a precautionary (often called "may contain") labelling to warn consumers for the possibility of unintended presence of allergens. In many cases, such precautionary labelling seems not to be based on a relevant risk but is meant as a disclaimer in case the producer cannot exclude a risk for 100%. This seems to lead to a non-selective use of this precautionary labelling, which causes other problems, such as a reduced food choice for allergic consumers and devaluation of the information value of such warning (Health Council of the Netherlands 2007). The concern with regard to peanut allergy is described in cookies in cookies: there are many products in the market with a warning while there is no or only a very small (negligible) risk and that, at the same time, there are many products without a warning that contain (sometimes very high amounts of) allergens. Precautionary labelling seems to provide the allergic consumers with no useful information anymore. Risk analysis principles can be applied to solve this problem and to bring guidance, harmonisation and transparency in information delivery regarding possible unintended presence of allergens in food products. For practical application of a risk analysis-based approach, a risk assessment methodology is essential.

We developed a risk assessment method to quantify the number of allergic consumers that may suffer allergic reactions to specific levels of allergens in food products or to calculate concentration action levels that can be based on predefined tolerable risks (Spanjersberg et al. 2007 and 2010, Kruizinga 2008). Clinical threshold data are of major importance in this methodology. Clinical threshold data are available for most major food allergens for which management of cross contamination risks is needed. Suitability for use in risk assessment will be discussed and it will be demonstrated how such clinical thresholds can be used in allergen risk assessment and risk management.

References

From start to finish: quantitative allergen risk assessment of foods containing peanut advisory labeling
Ben Remington, Joaan Brantjes, Dave Ranx, Steve Taylor
University of Nebraska, Lincoln, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):S66

Foods with allergen advisory/precautionary labeling (i.e. "may contain, processed in the same facility, etc") continue to be prevalent and may be increasingly ignored by allergic consumers. We sought to determine the residual levels of peanut in various packaged foods bearing advisory labeling, compare similar data from 2005 and 2009, and determine any potential risk for peanut-allergic consumers. This practical section details exactly how each risk assessment input variable was determined and used within our simulations. To examine peanut-allergic consumers' risk of an allergic reaction we chose to look at nutrition bar consumption, the product category with the highest levels of peanut in the advisory labeling study. United States consumption data for nutrition bars were extracted from the National Health and Nutrition Examination Survey (NHANES) using a combination of the 2003-04 and 2005-06 surveys. The analytical data from nutrition bar products from the 2005 and 2009 surveys were combed into one group to provide more samples for statistical testing. The probabilistic risk assessment model for food allergens is described and all statistical tests were done in SAS (version 9.2). Probabilistic risk assessment showed the risk of a reaction within the peanut-allergic population from nutrition bar consumption was 4 in 100,000 on a daily basis. However, many foods with advisory labeling did not contain detectable levels of peanut residue and as a result may not warrant the use of advisory labeling. The use of probabilistic modeling would provide the food industry with a quantitative risk assessment method to assist with determining when advisory labeling is appropriate.

Immunotherapy of food allergy: what is effective?
Hugh Sampson
Mount Sinai School of Medicine, Pediatrics, New York, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):S67

Food-induced anaphylaxis is the single leading cause of anaphylaxis seen in emergency departments. Consequently, a number of therapeutic strategies to treat food allergies are being pursued. Two non-allergen-specific therapies have been investigated in man: monoclonal anti-human IgE antibodies and a Chinese herbal formulation, FAHF-2. A trial with HU-901 anti-IgE was shown to raise the threshold of reactivity significantly to peanut in a study of peanut-allergic patients. FAHF-2, which was found highly effective in blocking anaphylaxis in a murine model of peanut allergy, was found safe in a phase I safety trial and is now being evaluated in a phase II efficacy trial. Other non-specific approaches showing promise in preclinical studies include the administration of Trichuris suis; Lactococcus lactis transfected with IL-10 or with IL-12 and food β-lactoglobulin, and a Toll-like receptor 9 agonist. A number of allergen-specific therapies are also being investigated in clinical trials: oral immunotherapy (OIT), sublingual immunotherapy (SLIT), epicutaneous immunotherapy (EPIT), modified recombinant peanut proteins within heat-killed E coli (EMP-123), and administration of baked (heat-denatured) foods. OIT appears to effectively "desensitize" the majority of patients treated, although adverse reactions remain problematic and whether "tolerance" can be induced remains to be determined. SLIT appears promising in initial trials with fewer adverse reactions, but whether tolerance can be established is not clear. EPIT and EMP-123 are in early clinical trials, although a small uncontrolled trial of milk-EPT suggested a beneficial effect with minimal adverse symptoms. In one clinical trial, administering baked milk-containing products to children who tolerated this form of the food (~80% of milk-allergic children) was found to lead to "tolerance" in ~60% of the children over a 2 - 3 year period. Other approaches that have shown promise in preclinical studies include peptide (T-cell epitope) immunotherapy, plasmid immunotherapy, immunostimulatory sequence (CpG) conjugated proteins, Human immunoglobulin Fc-Fc fusion proteins, and mannose-conjugated protein (BSA).
New perspectives on immunological pathways underlying peanut-induced anaphylaxis

Manel Jordana
McMaster University, Department of Pathology and Molecular Medicine, Centre for Gene Therapeutics, Hamilton, ON, Canada
Clinical and Translational Allergy 2011, 1(Suppl 1):S68

Background: Food-induced anaphylaxis is often a severe allergic reaction characterized by multi-organ dysfunction and a potentially fatal outcome, and accounts for one third to one-half of anaphylactic reactions treated in emergency departments worldwide. Presently, the role of specific effector cells, immunoglobulins and other effector molecules to food-induced anaphylaxis remains to be fully elucidated.

Methods: To investigate the relative contribution of immunoglobulin-dependent effector pathways to anaphylactic responses to peanut, wild-type and various mutant mice were sensitized with peanut protein and cholera toxin via oral gavage, once weekly for four weeks. Mice were subjected to different cellular depletion and Fc receptor blocking strategies prior to intraperitoneal challenge with peanut one week following the last sensitization. A number of clinical, physiological and immunological outcomes were evaluated.

Results: Our data indicate that pathways, other than the classical mast cell-IgE pathway, contribute to the full spectrum of anaphylactic reactions to peanut. We show that, remarkably, the combined deficiency of mast cells and macrophages, but not mast cells and basophils, or single depletion of macrophages or basophils, averted nearly all clinical and physiological signs of anaphylaxis. However, the single deletion of mast cells, basophils or macrophages prevented the most significant clinical outcome, death. Furthermore, our data show that using IgE- and IgG1-deficient mice as well as FcRRII blockade, both IgE and IgG1 signalling are necessary to fully abolish anaphylactic responses to peanut. While mast cell responses occurred via IgE and IgG1, macrophage responses were fully mediated through IgG1.

Conclusions: Peanut-induced anaphylaxis is a process that involves the concerted action of multiple immune effector pathways, and thus interventions targeting one single pathway (e.g. mast cell/IgE) may not be sufficient to fully prevent anaphylactic responses.

What is new in the treatment of eosinophilic oesophagitis?

Amal Assaad
Cincinnati Children’s Hospital Medical Center, Division of Allergy & Immunology, Cincinnati, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):S69

In November 2009, in the beautiful city of Venice, Italy, at the first EAACI Pediatric Allergy and Asthma Meeting, I discussed Eosinophilic Esophagitis (EoE) as an emerging disorder. I discussed the diagnosis of the disorder based on histopathologic findings of eosophageal eosinophilia of >15 cells per high power field, after 3 months of treatment with a proton pump inhibitor. I discussed several therapeutic modalities that are used in practice, some with good evidence, others without: dietary interventions: elimination diets, six food elimination diet and elemental diets; medical management: topically administered steroids, aerolized fluticasone or budesonide; and experimental therapies: anti-IL-5 and anti-IgE antibodies. Now in 2011, I am pleased to return to the beautiful city of Venice to present at the first EAACI Food Allergy and Anaphylaxis Meeting (FAAM) on exciting new advances in the treatment of EoE: The advances are a translation from the bench to the bedside of much work on the pathogenesis and genetics of EoE. I am also pleased to see, that while reports of EoE had been mostly from the USA and Switzerland, and mostly on pediatric patients, there is ample literature now from several additional European countries and emerging expertise on adult patients. I will be presenting new data on the use of topical budesonide both in pediatrics and adults, the continuing debate on the effect of proton pump inhibitors in differentiating EoE from reflux eosinophilis and in treatment of EoE. Several studies with biologic agents, anti-IL 5 antibodies, mepolizumab and reslizumab, have been completed and yielded interesting data on the disorder, its course and its response to treatment. Finally, I will present data on novel mechanisms of EoE, from mast cell and B cell involvement and local IgE production to a role of IL-13. The recently elucidated role of IL-13 in EoE has resulted in an ongoing clinical trial of anti-IL-13 antibody in patients with EoE. I am looking forward to hearing from you, FAAM attendees on your own experiences with patients with EoE and your innovation in further elucidating the triggers for EoE and the successes of your management.

Proposed requirements for hypoallergenic formulæ to be used in the treatment and prevention of cow’s milk allergy

Antonella Muraro
Padua General University Hospital, University of Padua, Food Allergy Referral Centre, Department of Pediatrics, Padua, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):S72

There are a large number of commercially available milk formulæ labelled as “hypoallergenic”. However, only a minority of these comply with the criteria established in the guidelines of Subcommittee on Nutrition and Allergic Disease of the American Academy of Pediatrics. As far as the treatment of cow’s milk allergy is concerned, the extensive hydrolysed protein formulæ and aminoacid-based formulæ are the only two preparations that meet the standards required for hypoallergenicty, defined as absence of reactions in 90% allergic patients with 95%...
Inequalities in the economic and social cost of food allergy

Lynne Regent

The Anaphylaxis Campaign, Farnborough, Hampshire, UK

Clinical and Translational Allergy 2011, 1(Suppl 1):S73

The economic and social impact of food allergy affects many sectors of society. There are associated costs to individuals, their carers and their households, potentially over a lifetime. In the health sector resources are required for diagnosis, support and education. The entire food chain is affected through extra costs, food regulations and moral obligations. Also the employment sector is affected in terms of lost productivity. There is currently a lack of information and clear methodology for assessing the economic and social cost of food allergy to the individual and to society. Hardest to quantify are the costs associated with quality of life factors such as health, financial security, standard of living, family and friends and general well-being. The EuroPrevall Project attempts to address these issues and acknowledges that further work in this area is required. It is possible to illustrate the social and economic impact of food allergy from the perspective of the individual and their families and carers through an examination of the issues regularly brought to the attention of patient support groups. These may not be easily quantifiable but are nonetheless very real. These impacts can be alleviated by ensuring that individuals and families receive the services they need and through improved understanding, awareness and training. Undoubtedly more research is needed in this area. Patient groups need to continue to support people coping with these challenges and to ensure that the requirement for education and training across the public and private sectors is recognised.

Abstract not submitted at time of publication

Clinical and Translational Allergy 2011, 1(Suppl 1):S74

Benefits of effective diagnosis on impact of quality of life

Anthony T Dubois

Beatrix Children's Hospital, Department of Pediatric Pulmonology and Pediatric Allergy, Groningen, Netherlands

Clinical and Translational Allergy 2011, 1(Suppl 1):S75

Quality of life has become a central outcome measure in medicine over the last two decades as it is increasingly being recognized that quality of life methodology is the most appropriate outcome measure with which to answer the question: does a particular management strategy provide clinically meaningful benefits as perceived by the patient? While the first of such studies in the area of food allergy were qualitative in nature, validated instruments have recently been developed in the context of the EuroPrevall study which measure health-related quality of life (HRQL) in a specific and reliable way. Instruments are now available for adults, adolescents and younger children of all ages. These instruments allow researchers and clinicians to quantitatively assess management strategies for food allergy. Despite the fact that there is no cure for food allergy at the present time, management of many patients is thought to result in reduced risk and hence improved HRQL. There are many aspects to the management of the food allergic patient, including accurate diagnosis, adequate patient education, and provision of emergency medication where appropriate. All these elements may contribute to HRQL changes seen in patients with food allergy. Studies on the effects of effective diagnosis in the form of (double blind, placebo controlled) food challenges show that HRQL improves in patients undergoing this procedure. Although this improvement is greater in patients in whom the allergy is shown to be absent than in patients in whom the food allergy is confirmed, all patients show improvement in HRQL after having undergone this test. Thus, effective diagnostic testing is important to patients as it has a positive effect on HRQL. This effect is probably the result of diminished uncertainty that patients have about their disease resulting from the test.

Abstract not submitted at time of publication

Clinical and Translational Allergy 2011, 1(Suppl 1):S76

Whole food or processed food or mutated recombinant protein? Anna Nowak-Wegrzyn

Mount Sinai School of Medicine, New York, USA

Clinical and Translational Allergy 2011, 1(Suppl 1):S77

Diverse therapeutic strategies for food allergy are under investigation including food allergen-specific and non-specific approaches. Allergen-specific approaches include immunotherapy with native food allergens, immunotherapy with mutated recombinant allergens, and diets containing extensively heated milk or egg. Native allergen immunotherapy can be administered via oral, sublingual, subcutaneous, or epicutaneous route. Oral immunotherapy trials with native food allergens such as milk, peanut, or egg reported that approximately 50-75% of the treated subjects reached and tolerated the maintenance dose. Failure of desensitization occurred in about 10-20% of the treated subjects and might be associated with the most severe and likely permanent food allergy phenotype, as opposed to the successful desensitization and tolerance that might be associated with a transient clinical phenotype and higher chances of spontaneous resolution of food allergy. Food allergens can be altered to decrease their allergenicity and lower the risk of acute adverse reactions. Immunotherapy with mutated recombinant peanut proteins, which have decreased IgE-binding activity, co-administered within heat-killed E.coli to generate maximum immune response had a strong protective effect in the mouse model of peanut anaphylaxis. This vaccine is being currently evaluated in the phase I clinical trials in adults with peanut allergy. Heating and processing changes food protein conformation and affects how food proteins are digested and transported via the gut barrier. Extensively heated (baked) milk and egg are tolerated by approximately 70% of the milk or egg allergic children. Diets containing extensively heated (baked) milk and egg represent an alternative approach to food oral immunotherapy and are already changing the paradigm of strict dietary avoidance for food-allergic patients.

Oral tolerance induction protocols for treatment: an overview

Wesley Burks

Duke University Medical Center, Pediatric Allergy and Immunology, Durham, USA

Clinical and Translational Allergy 2011, 1(Suppl 1):S78

Food allergy is a major health concern in industrialized countries, affecting approximately 3.9% of children. Peanut allergy is one of the
most common forms of food allergy, with approximately 3 million Americans reporting allergy to peanuts or tree nuts, and the prevalence appears to be increasing. Peanut and tree nut allergy account for the vast majority of life-threatening or fatal allergic reactions to foods. In addition, peanut allergy is often life-long, with only 20% of children outgrowing their allergy. Current treatment options are limited to strict peanut avoidance and ready access to epinephrine. Challenges for patients and families with food allergy are considerable, and accidental ingestion is common. Anxiety impairs social functioning and quality of life in food-allergic individuals, who report poorer health-related quality of life than those with diabetes mellitus. These findings underscore the need for active immunomodulation strategies. Animal and human studies have examined potential therapies for peanut allergy, including allergen-nonspecific and allergen-specific modalities; however, recent meta-analyses highlight the shortage of controlled studies in the field. TNX-901, a humanized monoclonal antibody that binds IgE and prevents its binding to the high-affinity IgE receptor on mast cells and basophils, was found to increase the threshold of peanut protein inducing symptoms in peanut-allergic individuals from less than one peanut (178 mg) to almost twelve peanuts (2805 mg). However, this effect was seen only at the highest dose tested, and the prohibitive cost of monoclonal antibody treatment may limit this approach. A combination of traditional Chinese herbal medications, food allergy herbal formula 2 (FAHF-2), has shown promise in eliminating anaphylaxis to peanut in murine and phase I studies. Allergen immunotherapy, an allergen-specific treatment, refers to the administration of increasing amounts of an allergen to individuals with IgE-mediated allergy in order to induce immunologic changes which diminish the allergic response to the substance on subsequent encounters. Traditional subcutaneous immunotherapy with aqueous peanut extract was attempted but had an unacceptably high rate of systemic reactions, despite favorable challenge outcomes. In pilot studies, our group has shown that open-label peanut oral immunotherapy (OIT) was relatively safe when performed in a supervised medical setting by trained personnel and was associated with clinical desensitization for the majority of subjects who completed more than eight months of treatment. We use the term desensitization to signify a change in threshold of ingested food antigen needed to cause allergic symptoms; this state is dependent on regular exposure to the allergen. In contrast, tolerance refers to the induction of long-term immunologic changes associated with the ability to ingest a food without symptoms and without ongoing therapy. In order to establish the safety and efficacy of peanut OIT as an allergen-specific therapy for peanut allergy, we conducted the first randomized, double-blind, placebo-controlled study of OIT in children with peanut allergy. Our goals were to evaluate the ability of peanut OIT to safely raise the threshold of ingested food antigen when compared with placebo and to perform immunologic studies to investigate the underlying mechanisms associated with clinical efficacy. The primary endpoint was to determine if, after one year of treatment, subjects receiving peanut OIT would be able to ingest a greater amount of peanut protein at food challenge than those receiving placebo. Applications of novel vaccines to immunotherapy of food allergy Mübeccel Akdis Swiss Institute for Allergy and Asthma Research (SIAF), Davos, Switzerland Clinical and Translational Allergy 2011, 1(Suppl 1):S79

Allergic diseases including atopic dermatitis (AD), food allergy, allergic rhinitis, asthma and anaphylaxis have significant associated morbidity along with large health-care expenditures. Food allergies are caused by immune responses to food proteins and represent a breakdown of oral tolerance. They can range from mild pruritus to life-threatening anaphylaxis. The only treatment is food avoidance, which might cause near-fatal and fatal reactions by accidental exposures. For this reason, there has been recent interest in immunotherapy, which may induce desensitization and even tolerance. Through these effects, immunotherapy may decrease the potential for adverse serious reactions with accidental ingestions. Therefore, it is expected that immunotherapy may be adopted as the first treatment to modify the natural history of food allergy. Allergen-specific immunotherapy (SIT) has been used as a desensitizing therapy for allergic diseases and may represent a curative and specific way of the treatment. However, current allergen-SIT has several disadvantages related to the content of the vaccine, type of adjuvant, route of application, long duration time, side effects, and sometimes limited efficacy. Immune system behaves in a different way to extracellular pathogens as bacteria and parasites. Initially capture of exogenous pathogen by dendritic cell results in phagocytosis, which is then followed by migration to local lymph nodes through chemotactic signals where DCs maturate and lose phagocytic capacity and improve antigen presentation capacity to T cells. In T cell activation, several signals are essential for the differentiation of naive T cells to cytokine-producing effector Th cells. After the discovery of regulatory T cells the concepts of immune regulation have substantially changed during the last decade. Peripheral T-cell tolerance is a key immunologic mechanism in healthy immune response to self-antigens and non-infectious non-self-antigens. Both naturally occurring CD4+CD25+ regulatory T (Treg) cells and inducible populations of allergen-specific, IL-10-secreting Treg type 1 cells contribute to the control of allergen-specific immune responses in several ways: suppression of antigen-presenting cells that support the generation of effector Th2 and Th1 cells; suppression of Th2 and Th1 cells; suppression of mast cells, basophils and eosinophils; interaction with resident tissue cells and remodeling. In addition to the above mechanisms, Tr1 and CD4+CD25+ Treg cells suppress IgE and induce the noninflammatory antibody isotype IgG4. As a novel approach, direct vaccine administration into lymph nodes and targeting the MHC class II antigen presentation pathway has been hypothesized to increase the immunogenicity, efficacy and the safety of immunotherapy because of low allergen dose, however better presented to T cells. The major cat dander allergen Fel d 1 was fused to a TAT-derived protein translocation domain and to a truncated invariant chain (MAT-Fel d 1). This MAT-Fel d 1 vaccine is efficiently internalized by APCs and induces IL-10 and IFN-g dominated response, but low Th2 cytokines' production in PBMCs of allergic individuals. In a double-blind placebo-controlled clinical trial, MAT-Fel d 1 vaccine adsorbed to alum was administered by 3 intralymphatic injections in increasing dose (1 µg, 3 µg, 10 µg) into inguinal, subcutaneous lymph node within 2 months with 4 weeks intervals. Cat allergic patients became tolerant to nasal challenge with cat dander after only 3 injections. The blood for cell cultures have been taken before the therapy and twice after finishing the treatment: one week and one year respectively. Fel d 1-specific T cell tolerance was observed in the MAT-Fel d 1 group compared to placebo group after one year and the significant enhancement of IL-10 production measured in supernatants correlated with the rise of specific IgG4 in plasma samples. In addition, we observed tendency of increase in Fel d 1-specific CD3 +CD4+FOXP3+ T cells' number in MAT-Fel d 1 treated patients using MHC class II peptide tetramers. Specific IgG4 production however rose during ILT but it was contrary to the lack of drug related side effects. These data demonstrate that intralymphnode administration of MAT-Fel d 1 induces allergen-specific immune tolerance in cat allergic patients. References 1. Akdis M: The cellular orchestra in skin allergy; are differences to lung and nose relevant? Curr Opin Allergy Clin Immunol 2010, 10(3):443-51. 2. Akdis M: Immune tolerance in allergy. Curr Opin Immunol 2009, 21(6):700-7. 3. Akdis M, Akdis CA: Therapeutic manipulation of immune tolerance in allergic disease. Nat Rev Drug Discov 2009, 8(6):645-60.


A considerable proportion of the general public experiences negative health effects triggered by certain allergens contained in their habitual diet. Usually the recommended option is to eliminate from the diet the food ingredients to which hypersensitivity has been found. Allergic persons need to know whether the food items they purchase contain them and they have to rely on the truthfulness of information given on
the label of packaged food items. Legislation has been put in place which requires food business operators to declare whether ingredients with a known allergenic potential have been used during manufacturing. Analytical testing systems are needed by the food industry to enable them to test whether allergens are present in their raw materials, the finished products and whether production lines have been correctly sanitised, by the food inspection authorities for market surveillance and by academia to enable and stimulate research into food allergy and allergen detection. Immunochrometry based tests, and in particular ELISAs, are definitely the most widely applied tool in routine as well as research laboratories for the determination of food allergens. Lateral flow devices are, in terms of simplicity of application and user friendliness, probably the most advanced analytical tools for the rapid detection of allergens. They are widely applied in the food manufacturing industries for the control of production lines. Food processing can have a profound impact on the detectability of allergens by ELISA based methods. Advantages but also the inherent disadvantages of ELISA tests, and in particular the importance of validating such methods properly by including naturally incurred test materials in validation exercises, are important aspects, which have to be addressed in an appropriate manner by test developers, end-users and validation/standardisation bodies. Comparability of testing results produced by different assays is not always ensured, and approaches how to achieve this (e.g. clearer definition of what entity is measured, use of well characterised materials for calibration, etc) should be explored to improve the equivalence of testing results.

**S81**

**Protein or no protein? Using PCR for detecting allergens in foods**
Martin Röder, Stefan Vieths, Thomas Holzhauser
Paul-Ehrlich-Institut, Langen, Germany
Clinical and Translational Allergy 2011, 1(Suppl 1):S81

The latest amendment (2007/68/EC) of annex IIa of the European Directive 2000/13/EC currently requires 14 groups of allergenic food ingredients to be mandatory labelled. The labelling does not refer to a certain compound of an allergenic food but the allergenic food itself. Thus, every method that has been demonstrated to reliably detect the target food is applicable. State of the art in the detection of allergenic foods has been the protein based Enzyme-Linked Immuno Sorbent Assay (ELISA) and meanwhile, numerous studies have demonstrated good correlation between protein based ELISA and DNA based Polymerase Chain Reaction (PCR) methods. Even in protein enriched isolates or concentrates DNA has been proven to be an alternative molecular marker for the presence of an allergenic food. Since 2005 the number of scientific publications on PCR for allergen detection has increased tremendously, of which real-time PCR with sequence specific fluorescent probes is considered state-of-the-art technology. Both ELISA and PCR exhibit strengths and limitations: ELISA are considered a quantitative methodology with high sensitivity at a level of 1–10 mg/kg. However, known cross-reactivity to phylogenetically closely related foods or ingredients thereof may lead to false-positive results. By contrast PCR offers unparalleled specificity to avoid complaints or potentially expensive food recalls due to false-positives. For PCR, a sensitivity below 10 mg/kg, which is considered sufficient in comparison to known clinical threshold data, is feasible. Moreover, real-time PCR allows multi-allergen screening in one run. In addition, first PCR methods with quantitative features have been published and more are expected in the near future. Thus, PCR may complement or even substitute ELISA depending on the allergenic food to detect.

**S82**

**A Brother’s Grimm true story: the valiant little triple-quadrupole - 7 allergens in one blow**
Bert Popping
Germany
Clinical and Translational Allergy 2011, 1(Suppl 1):S82

The development of a multi-method for the detection of seven allergens based on liquid chromatography and triple-quadrupole tandem mass spectrometry in multiple reaction mode is presented. It is based on extraction of the allergenic proteins from a food matrix, followed by enzymatic digestion with trypsin. The chosen marker peptides were implemented into one method that is capable of the simultaneous detection of milk, egg, soy, hazelnut, peanut, walnut and almond. This method has been used to detect all seven allergenic commodities from incurred reference bread material, which was baked according to a standard recipe from the baking industry. The presentation demonstrates the high potential of LC-MS/MS for allergens screening for the food industry.

**ORAL PRESENTATIONS**

**01**

**Food allergy, a summary of recent cases in the criminal and civil courts of the UK**
Hazel M Gowland, Michael J Walker
Allergy Action, St Albans, UK; LGC, Teddington, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):01

Food allergy, a significant public health concern in the developed world has developed a forensic context where allergy related personal injury, fatality or criminal non-compliance on the part of a food supplier are issues that have recently come before the UK courts. EU General Food Law (178/2002/EC) and Directive 2000/13/EC (to be consolidated into the proposed Food Information Regulation) address allergen avoidance risks relating to composition, labelling and food safety. The European Framework Directive on Safety and Health at Work (Directive 89/391 EEC and daughter legislation) may also be deployed. Compensation in civil law for loss or damage caused by an allergic reaction to a food supplied, not as requested, or with misleading or incorrect information has also been sought. The authors describe recent such cases dealing with prepacked retail and non-prepacked catering situations where contraventions of food law could have resulted in fatalities, and health and safety and civil litigation following deaths from food allergy. The cases came before the civil (including appeal) courts, magistrates and coroner’s courts. In the absence of a current cure, health protection depends on accurate diagnosis, informed food allergy avoidance and the effective management of symptoms. These strategies depend in turn on the multilayered approaches adopted by clinicians, scientists, food suppliers, allergic consumers (and those who care for them), and regulators. Effective food allergen avoidance depends on the diagnosed consumer knowing what to avoid, being able to access correct ingredients information and to rely on the absence of allergen cross-contamination. Access to ingredients information may be via a label, menu or other printed means, or by enquiring of a staff member who may not always appreciate the implications of such a request or be competent in managing food allergy risks. Lapses in any of these areas may have forensic consequences beyond even their initial (sometimes severe) personal impact.

**02**

**The Allergen Bureau approach to allergen cross contact risk assessment – our journey**
Kristen Griniter, Fiona Fleming, Robin Sherlock, Neil Smith
1 Allergen Bureau, Allergen Bureau Chairperson, Sydney, Australia; 2 Allergen Bureau, Management Committee, Sydney, Australia; 3 Allergen Bureau, Management Committee, Brisbane, Australia; 4 Allergen Bureau, Management Committee, Melbourne, Australia
Clinical and Translational Allergy 2011, 1(Suppl 1):02

The Allergen Bureau was established in 2005 and is funded by membership from the Australian and New Zealand food industry. The industry developed Guide to Allergen Management and Labelling is a resource to ensure consistency in manufacturing practices and labelling. VITAL (Voluntary Incidental Trace Allergen Labelling) is a risk tool that was developed against a regulatory background where the labelling of incidental trace contact allergens is not mandated. VITAL is a risk based methodology to be used in assessing the impact of allergen cross contact and stipulates a consistent precautionary allergen labelling statement. Application of the VITAL system aims to avoid indiscriminate use of precautionary labelling and contribute to the minimisation of risk to allergic consumers.
VITAL uses an action level grid to assist in determining if the presence of residual protein from allergenic substances through cross contact requires precautionary labelling. VITAL is based on the premise that some products may have foreseeable levels of an allergen present through incidental cross contact, and this will not be labelled where the level is below a specified action level. Due to the wide use and international interest in VITAL, it is important that VITAL be reviewed regularly to ensure that it can be considered to be the best available tool for cross contact allergen risk management.

The purpose of this presentation is to provide information on the status of VITAL today and to outline the review process currently underway. A significant element in this process is the establishment of a scientific expert panel to review current clinical data, population data, and to consider the application of probabilistic modelling to the current action levels. This expert panel will meet in Australia in January 2011 and we hope to be able to report on the outcomes of the first meeting and the next steps in the journey. A consistent approach to cross contact risk assessment is key to ensuring labelling of allergens and consumer confidence and safety.

O3
Register of food and latex allergy in the Allergy Units of Catalonia
Olga Luengo, Montserrat Molina, Núria Rubira, Laura Vallespino Food and Latex Allergy Committee, Catalan Society of Allergy, Barcelona, Spain
Clinical and Translational Allergy 2011, 1(Suppl 1):O3

Objective: The number of consultations in the Catalan Allergy Units due to food and latex allergy has increased over the last years. The CIBUS project was created to register the foods that cause allergy with more frequency and the clinical symptoms related to each food and also to latex.

Material and methods: A specific online data base (CIBUS) was designed. Allergists from 12 different hospitals in Catalonia registered the new diagnoses of food and latex allergy. The cases introduced during the first year have been analyzed.

Results: 278 patients, 232 adults (83.5%) and 46 children (16.5%) have been analyzed. The mean age in adults was 34 years (IQR: 26-44) and in children 5 years (IQR: 3-7). 57.2% were women and 42.8% men. 70% had a personal history of atopic disease.

Urticaria (55.4%) was the most frequent clinical manifestation followed by anaphylaxis (32.4%) and oral allergy syndrome (31.7%). 97.4% of the anaphylactic reactions were presented in adults. Nuts caused 21% of the reactions, soy 20.7% and tobacco smoke (p = 0.25) during pregnancy on early sensitization to food allergens. Maternal avoidance of milk and egg products during pregnancy, as well as use in elevated amounts of the product was not related to early sensitization to milk and egg allergens (p = 0.38).

Conclusions: The prevalence of food sensitization in children under 6 months of age was 1.3%. Maternal diet and disease, use of antibiotic, tobacco smoke during pregnancy had no significant impact on early sensitization to food allergens.

O4
Early sensitisation to food allergens in Lithuanian birth cohort
Indre Butiene1, Edita Rudzveicene2, Ruta Dubake1
1Vilnius University, Faculty of medicine, Vilnius, Lithuania; 2Vilnius University, Clinic of Children’s Diseases, Vilnius, Lithuania
Clinical and Translational Allergy 2011, 1(Suppl 1):O4

Background: The factors responsible for the induction of allergic disease at an early age have not been completely identified. Data about maternal factors during pregnancy and early sensitization to food allergens are limited. Aim: To determine the prevalence of food sensitization in children under 6 months of age and to determine relationship between maternal avoidance of allergenic foods, maternal disease, use of antibiotic, tobacco smoke during pregnancy and early sensitization to food allergens.

Methods: The analysis was based on data of 1558 subjects from a EuroPrevall Lithuanian birth cohort study (EU 6 FP project ‘EuroPrevall’). Children younger than 6 months of age and sensitized to food allergens and their controls were analyzed. Information was collected using parental questionnaires filled at the day of recruitment, 12 months questionnaire and physical examination form, results of SPT and sIgE analysis.

Results: Early sensitization to food allergens was detected in 20 children under 6 months of age (1.3%, 1558). 15 (75%) symptomatic subjects were sensitized to milk, positive SPT was found in 5, elevated sIgE in 4, only immediate or repetitive symptoms were reported in 8 patients. 12 (60%) symptomatic subjects were sensitized to egg, positive SPT was found in 9, elevated sIgE in 7, only symptoms were reported in 1 patient. Sensitization to wheat was confirmed in 2 patients by SPT and reported symptoms, to peanut - in 1 subject by elevated sIgE. The food allergy was confirmed by positive DBPCFC in 4 infants - 2 for milk, 1 - egg, 1 - wheat. There were found no significant impact of maternal diseases (p = 0.08), use of antibiotics (p = 0.7), tobacco smoke (p = 0.25) during pregnancy on early sensitization to food allergens. Maternal avoidance of milk and egg products during pregnancy, as well as use in elevated amounts of the product was not related to early sensitization to milk and egg allergens (p = 0.38).

Conclusions: The prevalence of food sensitization in children under 6 months of age was 1.3%. Maternal diet and disease, use of antibiotic, tobacco smoke during pregnancy had no significant impact on early sensitization to food allergens.

O5
Mastering the allergen risk in children nutrition, the MANOE project
Olivier Tranquet1, Françoise Le Vacon1, François Morgen1, Olivier Bonaly4, Alain Nouvellon5, Freddy Allaire5, Mohamed Merjdi6, Daniel Piveteauf, Martine Drouet2
1INRA French national Institute for Agronomical Research, Nantes, France; 2Atlangene Silliker, Nantes, France; 3Lactalis R&D, Retiers, France; 4SADAC, Maulevrier, France; 5Charal, Cholet, France; 6Broche Pasquier, Carqueux, France; 7Audencia, Nantes, France; 8APPRAL, Saint Michel sur Orge, France; 9CHU Angers, Angers, France
Clinical and Translational Allergy 2011, 1(Suppl 1):O5

Regulatory agencies have enforced allergen labelling rules for food ingredients on pre-packed food. HACCP procedures driven on by food manufacturers reveals that possible cross-contaminations of their products cannot be absolutely discarded or checked. As a result and because allergen absence cannot be accurately warranted in most food industry, numerous warning mentions on pre-packed foods appeared to inform allergic consumers of potential cross contaminations even if levels are very low. For Allergic consumers, accessibility to food is clearly restricted.

In a practical view, the Unit of Allergology in Angers Hospital (France) has developed an oral reintroduction protocol of low doses of allergens to evaluate the sensitivity of allergic patients. It appeared that most of the patients tolerate low amount (few mg) of allergen and would support the consumption of product contaminated by traces of allergen.

Based on these facts, the French competitiveness cluster “Pôle Enfant” gathered four food manufacturers (pastry, meat, milk products, BROCHE PASQUIER, CHARAL, LACTALIS, SADAC), ATLANGENE®-SILKER specialized in food analysis, ten university hospitals and hospitals, 3 academic laboratories (INRA, CNRS, and AUDENCIA), and an association of French allergic consumers (APPRAL) to construct the “MANOE project”. This project funded by the regional council of Pays de la Loire aims to develop food products designed for the general population which would be tolerated by children allergic to peanut, egg, milk or wheat. In a large multicentric clinical trial, 400 allergic children will be submitted to the standardized reintroduction protocol. The acceptance and the usefulness of these new products by allergic children and their parents will be evaluated.

In the context where thresholds values for allergen labelling rules are in discussion all around the world, this integrated project will provide a
practical insight on how food companies will deal with thresholds, if the analytical methods are good enough to guaranty these levels, and how the patient will use this new information.

**06**

MIRABEL: a research program to develop tools for risk and cost/benefit analysis of food allergens

Amélie Crépet\(^1\), Fanny Héraud\(^1\), Stéphanie Martet\(^2\), Moneret-Vautrin Denise-Anne\(^1\), Jutta Roosen\(^3\)

\(^1\)ANSES, Maisons-Alfort, France; \(^2\)INRA, Thiverval-Grignon, France; \(^3\)Allergo-vigilance Network, Vandoeuvre Les Nancy, France; \(^4\)TUM, Munich, Germany

Clinical and Translational Allergy 2011, 1(Suppl 1):C6

Allergenic foods represent a significant health risk for persons who have an allergy to specific food. However, this risk remains poorly characterised. Knowledge is often missing on the different risk components such as the presence of allergens in food, food consumption behaviours of allergic sufferers and thresholds of reaction. Usual risk assessment approaches cannot be easily implemented to assess the risk from sporadic contamination and that concerns only a small part of the population. As a consequence, there is a lack of risk-based guidance and operational tools of those involved in allergen risk management, who are food industries, the allergic individuals and the food regulators. To upgrade knowledge, methodological and operational tools in food allergy, MIRABEL involves various scientific fields such as chemical analysis, dietary survey, medical research, socio-economics, applied mathematics and statistics to exposure and risk assessments. In this way, MIRABEL aims to set an integrated and operational framework for the allergenic risk analysis, in order to improve quality of life of allergic sufferers. Each risk component will be investigated to accurately characterize the risk of food allergy and to test different risk management options. To complete existing but sparse information, field surveys will be conducted in order to acquire accurate data on allergic consumers' behaviours relating to allergen-containing products and their thresholds of reaction, and to allergen presence in food consumed by allergic sufferers. In parallel, methodological developments in Bayesian statistics and probabilistic modelling will be realized to be able to combine the acquired data in an integrated risk quantification model. A cost-benefits analysis for the stakeholders (food industry, allergic individuals and regulators) will also be conducted to anticipate impacts of new policies. The project will be focused on the peanut, which can be adventitiously present in various foodstuffs such as chocolate, cereals or biscuits. This allergen is associated with the highest prevalence of food allergy and is one of the food allergens that lead to the most severe adverse effects.

**07**

Identification of new Brazilian allergens from manioc (Manihot esculenta)

Keity Santos Souza\(^1\), Clovis Galvão\(^1\), Resende Ferreira\(^1\), Maria Virginia\(^1\), Carla Martim\(^1\), Eva Vevjar\(^2\), Gabriele Gadermaier\(^1\), Fatima Ferreira\(^1\), Jorge Kalil\(^1\), Fabio Fernandes Morato-Castro\(^1\)

\(^1\)Medical School of Sao Paulo University (FMUSP), Discipline of Allergy and Immunology, INCOR, Sao Paulo, Brazil; \(^2\)Clinical Hospital of FMUSP, Service of Allergy and Immunology, Sao Paulo, Brazil; \(^3\)University of Salzburg, Christian Doppler Laboratory for Allergy Diagnosis and Therapy, Department of Molecular Biology, Salzburg, Austria

Clinical and Translational Allergy 2011, 1(Suppl 1):E57

Brazil is a very rich country in terms of biodiversity offering broad spectra of possibilities to study new allergens, particularly from foods. In poor and developing countries manioc is a major source of carbohydrates in the diet of millions of people. In Brazil the ninth cultivated food and the country takes the second place in the world as manioc cultivator. Allergic reactions to manioc were previously reported, but the allergen molecules involved and the cross-reactivity with other plant food sources or latex remain unknown. The aim of present work is to identify new manioc allergens, clone and express them. Based on clinical history, nine patients allergic to manioc were submitted to prick-to-prick test and basophil activation tests and sera were used for immunoblot analysis and ISAC. All patients demonstrated positive IgE reactivity to manioc proteins of approximately 30 and 40 kDa in 1D gel electrophoresis. Using 2D analysis, 6 immunoreactive spots were identified as allergenic-related protein Ptl24, GADPH and fructose-bisphosphate-aldolase. Three out of five tested sera showed IgE reactivity to Hev b 5 in ISAC. The rich glutamic acid protein, Ptl24 shows around 40% sequence identity with Hev b 5 and 2 of 5 linear IgE epitopes identified for Hev b 5 are partially conserved in Ptl24. Therefore, the mature sequence was amplified from manioc cDNA using specific primers and cloned into a pET-based expression vector. Clones from two different cultivars were checked and they are all the same sequence but deviate 3 amino acids from the three previously published sequences. Recombinant allergenic-related protein was expressed in E Coli BL21 Star and purified by ion exchange and size exclusion chromatography. Protein will be characterized regarding its physico-chemical properties using amino acidic analysis, mass spectrometry, circular dichroism and simulated duodenal digestion. The IgE-binding activity of the recombinant molecule is assessed by IgE immunoblot and ELISA. In addition, IgE cross-reactivity with purified natural Hev b 5 is evaluated using sera of manioc and latex allergic patients.

Support: FAPESP, INCT-iii

**08**

In vitro digestions and IgE binding of proteins from white and whole hen’s egg

Gustavo Martos\(^1\), Rosina López-Fandiño, Elena Molina\(^2\)

\(^1\)Institute of Food Science Research (CIAL, CSIC-UAM), Madrid, Spain; \(^2\)Clinical and Translational Allergy 2011, 1(Suppl 1):B38

Egg is leading the top 8 allergenic foods in infants. During gastrointestinal digestion, various factors can affect the proteolysis of food allergens, such as interaction with lipids or bile salts. Therefore, the amount of immunologically active protein reaching the intestinal mucosa can be substantially modified. Here we investigated egg white digestion under physiological conditions, including presence of bile salts and phosphatidylcholine. We compared it to whole egg digestion and sought resistant proteins or fragments that react with IgE antibodies in allergic children sera. Whole hen’s egg and egg white were subjected to an in vitro gastroduodenal digestion consisting on a gastric pepsinolysis at pH 2, followed by a duodenal proteolysis at pH 7 with trypsin and chymotrypsin. Digestion patterns were analysed by RP-HPLC and 1D/2D SDS-PAGE. The binding of the digests to IgE present in a pooled serum from egg allergic children was investigated by western blotting. Among the major egg white allergens, ovalbumin (OVA) and lysozyme (LZ) were the most resistant to gastroduodenal digestion, whereas ovotransferrin (OVT) and ovomucoid (OM) were rapidly hydrolyzed during pepsinolysis. Three peptides were found to be the most resistant in the presence of phosphatidylcholine during duodenal digestion. Regarding the whole egg, the most abundant egg yolk protein, lipovitellin I, was partially hydrolyzed by pepsin and completely digested by duodenal enzymes in the presence of physiological amounts of bile salts. Coupling 2D electrophoresis and immunoblotting, we detected five major proteins highly immunoreactive. Besides the already known allergens OVA, OM, OVT and LZ, we also found ovoinhibitor strongly reacting with serum IgE. This minor protein has rarely been referred as an allergen. After 60 minutes of egg white duodenal digestion, there remained several resistant peptides of intermediate molecular weight (10-40 kDa) capable of binding IgE.

**09**

Specific IgE responses in patients allergic to goat’s milk but tolerant to cow’s milk: involvement of minor differences in primary structure between caprine and bovine caseins

Sandrine Ah-Leung\(^1\), Fany Bian\(^1\), Stéphane Hazebrouck\(^1\), Karine Adel-Patient\(^4\), Evelyne Paty\(^5\), Pierre Scheinmann\(^6\), Jean-Michel Wal\(^7\), Hervé Bernard\(^7\)

\(^1\)INRA, Unité d’Immuno-Allergie Alimentaire, Gif-sur-Yvette, France; \(^2\)Hôpital Necker Enfants Malades, Paris, France

Clinical and Translational Allergy 2011, 1(Suppl 1):O39

Background: Allergy to goat’s milk (GM) proteins in patients tolerant to cow’s milk (CM) is nowadays often observed whereas CM allergy was generally associated with a cross allergy to GM. We aimed to analyse the specific IgE response in patients allergic to GM but tolerant to CM and to compare this response to that observed in patients allergic to both milks.

Methods: β-Lactoglobulin, whole casein and its four different fractions, i.e. αs1-, αs2-, β- and κ-caseins, were isolated from raw CM and GM. Purified
β-caseins were subjected to a mild proteolysis by plasmin which generated 3 peptides, i.e. f(1-28), f(29-107) and f(108-207/9). Synthetic peptides partially recovering the N-terminal f(29-107) part of the caprine β-casein were also produced. Immunoreactivity of the purified proteins and peptides was assessed by IgE binding studies using sera from 12 GM-allergic patients tolerant to CM and 10 CM-allergic patients. The capacity of bovine and caprine milk proteins to induce the degranulation of human mast cells passively sensitized with human specific IgE was also evaluated.

Results: In patients allergic to CM the IgE-immunoreactivity of homologous proteins and peptides from either CM or GM are positively correlated. In contrast, all bovine proteins and related peptides were poorly IgE-immunoreactive in patients allergic to GM but tolerant to CM. These patients showed a specific IgE response restricted to the caprine αs1, αs2 and β-caseins. The fragment f(29-107) from goat β-caseins and to a lesser extent the complementary one f(108-207) were highly immunoreactive. The IgE response to goat β-casein is partly directed against the short peptide f(59-79) which differs from its bovine counterpart by only 2 amino acids substitutions.

Conclusion: Allergy to GM in patients tolerant to CM is associated with an IgE response specific to caprine caseins without any cross reactivity to bovine counterparts despite sequence homology of ca. 90%. As observed with peptides derived from β-casein, the lack of cross-reactivity between bovine and caprine caseins can be explained by few modifications in the primary structure of the proteins.

O10 Analysis of potential immunoglobulin E epitopes of Gly m 4, a bet V 1-related allergen in soy beans
Dirk Schiller1, Stefan Viehs, Thomas Holzhauser
Paul-Ehrlich-Institut, Division of Allergyology, Langen, Germany
Clinical and Translational Allergy 2011, 1(Suppl 1):O10

Binding and crosslinking of FcåRI-bound IgE to conformational epitopes on allergens causes hypersensitivity reactions in allergic patients. The knowledge and modulation of epitopes on the molecular level allows the design of both hypoallergenic recombinant variants of the allergen and specific antibodies for therapeutic and diagnostic purposes, respectively. We sought to identify and analyze the IgE-binding epitopes on Gly m 4, a soy bean allergen that is also responsable for anaphylactic antibodies for therapeutic and diagnostic purposes, respectively.

Utilizing a phage-display peptide library Mittag et al. identified peptides that bound Gly m 4-specific IgE. In the present study we reassessed these data and mapped 21 mimotopes onto the molecular surface of Gly m 4 (PODB code 2KTH). Using an algorithm to predict conformational epitopes on the protein surface we identified 8 major patches that might represent IgE epitopes.3 To verify the in-silico predicted IgE-binding surface areas of Gly m 4 we chose a mutagenesis approach and substituted alanine for lysine residues within the putative epitopes. The resulting recombinant Gly m 4 variants were expressed in Escherichia coli and IgE-binding was tested in western blot analyses and ELISA with a panel of sera of soy-allergic individuals sensitized to Gly m 4. rGly m 4 variants with low or no IgE-reactivity were purified and their molecular integrity was analyzed by static and dynamic light scattering as well as circular dichroism spectroscopy. Studies on the capability of the Gly m 4 variants to release mediators in humanized rat basophil cells as well as a comprehensive epitope analysis of Gly m 4 screening different phage-display peptide libraries are in progress. The benefit of a thorough IgE epitope analysis of Gly m 4 for diagnosis and therapy of soy allergy is discussed.

O11 Oxidation of the major allergen Ses-i-2 from sesame indicum: effect on the conformation, stability and dendritic cell stimulation activity
Vincenzo De Filippis4, Danella Gallia1, Chiara D’Oriano2, Paola Brun3, Ignazio Castiglione3
1University of Padova, Dept. of Pharmaceutical Sciences, Padova, Italy; 2University of Padova, Dept. of Histology, Microbiology and Medical Biotechnologies, Padova, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):O11

Despite the medical and social impact of allergies to plant seed storage proteins, the molecular bases of these diseases are still largely unknown.

Here we have purified to homogeneity large quantities (10-30 mg) of Ses-i-2, the major allergen from sesame seeds. Interestingly, Ses-i-2 contains an unusually high content of methionines (16%) and arginines (13%). The results of a thorough chemical, conformational and stability characterizaton indicate that Ses-i-2 possesses a highly helical secondary structure, cross-linked by five disulfide bridges, and that it is highly stable to both chemical and thermal denaturation. For instance, a melting temperature of 62°C could be measured only at pH 2.0 and in the presence of 6 M Gdn-HCl. The stability to denaturation is also paralleled by the extraordinary resistance of Ses-i-2 to proteolysis by digestive, blood coagulation, bacterial, lysosomal and leukocyte proteases. Furthermore, fluoroescininated Ses-i-2 is able to transverse intestinal epithelial cells. Finally, Ses-i-2 downregulates IL-12 production in cultured dendritic cells while increasing IL-10 and IL-4 levels, typical of a T helper type-2 response that is associated with the production of IgE antibodies. To investigate a possible role of oxidation on Ses-i-2 structure and allergenicity, all Met-residues were selectively and quantitatively oxidised to methionine sulfoxide by treatment with 50 mM of H2O2 or with leukocyte milioperoxidase-0.5 mM H2O2. Strikingly, the structure of oxidised Ses-i-2 (Ses-i-2-OX) is dramatically altered and Ses-i-2-OX is only marginally stable to chemical and thermal denaturants. Ses-i-2-OX also becomes immediately degraded by all proteases tested. Finally, Ses-i-2-OX has an opposite effect on cytokine production by dendritic cells, with a resulting T-helper type-1 response, usually associated with the production of IgG antibodies. These findings suggest that individuals allergic to Ses-i-2 might have compromised oxidative machinery that allows Ses-i-2 to reach the intestinal immune system in its intact form, thus triggering the allergic response.

O12 NKTs are involved in the role that natural lipids play in the sensitisation to the major allergen of brazil nuts, Ber e 1
Luciana Mirtti1, Maria Leite-de-Moraes2, Moisntchlo Russo1, Stella Cochran3, Marcos Alcacer4
1University of Sao Paolo, Immunology Department, Sao Paolo, Brazil; 2Hospital Becker, Paris, France; 3University of Sao Paulo, Sao Paulo, Brazil; 4Unilever, Bedford, UK; 5University of Nottingham, Nottingham, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):O12

The prevalence of food allergy is increasing in westernized countries, affecting around 4% of the population. Although innumorous proteins are encountered in normal diets, only few protein families are commonly implicated as food allergens. In order to be able to predict the allergenicity of food proteins, recent studies focused on intrinsic features of these few families of allergens; however, it is known that extrinsic factors can play a role in allergenic processes. The allergenicity of Ber e 1, the major allergen from Brazil nuts, is well established. It has been suggested that natural lipids from Brazil nuts play a role in the development of an immune response towards Ber e 1. Therefore the present study aimed to characterize the humoral response induced by recombinant (r)Ber e 1 in the presence of different classes of lipids, and to investigate the role played by natural lipids in the immune sensitization. BALB/c mice were sensitised i.p. with rBer e 1 alone or in the presence of different natural lipid fractions. It was found that rBer e 1 alone did not induce antibody production, even in the presence of alum. Only one specific fraction of Brazil nut lipids (SCC P, C), was able to induce a Th2-type humoral response, with the presence of Ber-specific anaphylactic antibodies, high levels of Ber-specific IgG1, and low levels of Ber-specific IgG2a. In order to test the hypothesis that NKT cells may be involved in the response via CD1 receptor the sensitisation protocol with rBer e 1 and SCC P C fraction was tested in mice lacking these cells (JALPHA18 KO mice). These animals presented significantly lower titers of Ber-specific anaphylactic antibodies (Ber-specific IgG1 and total IgG) than sensitised wild type mice, indicating that one of the pathways by which lipids triggered an immune response involves NKT cells. In vitro assay of TLRs (2 to 9) activation showed that SCC P C fraction was not able to activate these receptors. In conclusion, our recent results corroborate the idea that lipids from Brazil nuts are essential for the development of a Th2-type humoral response to rBer e 1 and suggest that the immune response induced by lipids might involve NKT cells.
O13 Effect of heating and glycation on the allergenicity of Ara h 2/6
Fany Blanc1, Ivonne Visser2, Per Stahl Skov3, Phil Johnson1, Clare Mills4, Harry Wijers5, Karine Adel-Patient1
1NRA, Unite d’Immuno-Allergie Alimentaire, Jouy-en-Josas, France; 2Wageningen University, Cell Biology and Immunology, Wageningen, Netherlands; 3RefLab ApS, Copenhagen, Denmark; 4Institute of Food Research, Norwich, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):O13

Aim: To study the effect of heating and glycation on the IgE-binding properties and biological activity of 25 albumins (Ara h 2/6) from peanut.

Methods: Native Ara h 2/6 was purified from raw peanuts and heated in solution (15 min, 110°C) in either the presence or absence of glucose, or purified from roasted peanut. Using PBMC and sera from peanut allergic patients, the cellular proliferative potency, IgE reactivity (reverse EAST inhibition) and functionality (basophil activation) of allergens were assessed.

Results: Heating Ara h 2/6 at 110°C resulted in extensive denaturation whilst Ara h 2/6 extracted from roasted peanut retained its native conformation. Allergen stimulation of PBMC from peanut allergic patients induced proliferation of mainly CD4+ T-cells and induction of TH2 cytokine secretion which was unaffected by thermal processing. IgE reactivity and functionality of Ara h 2/6 was decreased by heating. Whilst heating-glycation further reduced the IgE binding capacity of the proteins, it moderated their loss of histamine releasing capacity. Ara h 2/6 purified from roasted peanut demonstrated the same IgE reactivity as unheated, native Ara h 2/6.

Conclusion: Although no effect of processing on T-cell reactivity was observed, heat induced denaturation and reduced the IgE reactivity and functionality of Ara h 2/6. Ara h 2 and 6 purified from roasted peanut retained the structure and IgE reactivity of the native protein. This study further demonstrates the effect of thermal treatment on the allergenicity of peanut allergens.

Acknowledgements: This work was performed within EuroPrevall EU-funded project.

O14 Effect on alpha-amylase Kinhibitor genetically modified (GM) pea consumption on lung inflammation in a mouse model of allergic asthma
Rui-Yun Lee1, Daniela Reiner1, T.J. Higgins2
1Medical University of Vienna, Division of Immunology, Allergy and Infectious Diseases, Experimental Allergy, Department of Dermatology, Vienna, Austria; 2Commonwealth Scientific and Industrial Research Organization Plant Industry, Canberra, ACT, Australia
Clinical and Translational Allergy 2011, 1(Suppl 1):O14

Transgenic field peas (pisum sativum) expressing the alpha-amylase inhibitor (AAI) protein normally found in common beans (Tendergreen bean) are completely protected from infestation with pea weevils tested in the laboratory, greenhouse and field over several generations, and at many sites for infestation against the insect pests. Previously, transgenic AAI pea feeding in mice was shown to influence allergic responses to an unrelated, non-crossreactive allergen compared to pinto bean-fed mice. To determine whether this is a universal finding, we used a different protocol in which we injected female BALB/c mice on days 0 and 21 with ovalbumin (OVA) intraperitoneally and nebulised them with OVA on days 28 and 29 to initiate allergic asthma and then allowed mice to recover until they were re-exposed to OVA for the induction of a disease exacerbation. Our aim was to test the effect of gavage feeding AAI peas (100 mg/ml), Tendergreen bean, or PBS twice a week for 4 weeks prior to inducing disease or inducing disease exacerbation. We detected no differences in lung and airway inflammation, mucus hypersecretion and allergen-specific antibody in AAI-pea fed- compared to isogenic pea- fed- mice at the onset of allergic asthma or at the time of disease exacerbation. However, in acute onset disease, pea fed mice had more severe lung inflammation and elevated mucus hypersecretion compared to Tendergreen bean-fed mice. Taken together, our data suggest that factors in peas other than the transgene appear to have an adjuvant effect on allergic responses to other unrelated allergens.

O15 Ongoing seasonal intestinal inflammation in birch pollen allergic patients without gastrointestinal symptoms
Georgijs Rentzos1, Ulf Bengtsson2, Vanja Lundberg3, PO Stottera4, Teet Pulleris1, Vanja Lundberg3, Staffan Ahlstedt4, Edsjobe Telom5
1Sahlgrenska University Hospital, Gothenburg, Sweden, Dept. of Respiratory Medicine and Allergology, Section of Allergology, Gothenburg, Sweden; 2Sahlgrenska Academy, University of Gothenburg, Sweden, Dept. of Respiratory Medicine and Allergology, Section of Allergology, Gothenburg, Sweden; 3Sahlgrenska Academy, University of Gothenburg, Sweden, Dept. of Rheumatology and Inflammation research, Gothenburg, Sweden; 4Sahlgrenska University Hospital, Gothenburg, Sweden, Dept. of Internal Medicine, Section of Gastroenterology, Gothenburg, Sweden; 5Karolinska University Hospital Solna, Dept. of Medicine Clinical Immunology and Allergy Unit, Stockholm, Sweden; 6Karolinska Institute, Institute of Environmental Medicine, Experimental Asthma and Allergy Research, Stockholm, Sweden
Clinical and Translational Allergy 2011, 1(Suppl 1):O15

Background: A previous study by our group (JACI 2003;112:45-50) showed a significant allergenic gastrointestinal inflammation in birch pollen allergic patients with gastrointestinal symptoms during the birch pollen season. The pathophysiological mechanisms of this type of allergic reaction are still poorly studied. However it is not yet explored if all birch pollen patients have signs of gastrointestinal inflammation during the pollen season.

Aim: To study the immune pathology of the duodenal mucosa in birch pollen allergic patients without gastrointestinal symptoms, outside and during the birch pollen season.

Methods: All patients were clinically diagnosed as birch pollen allergic. Seven patients allergic to birch pollen without any gastrointestinal symptoms and seven completely healthy individuals were included in the study for comparison. All patients were examined with a standard skin prick test panel and blood samples were analysed for IgE antibodies by component micro-arrays (ISAC). The two groups of patients underwent gastroscopy and duodenal biopsies were taken both during (May-June) and outside the pollen season (November-January) for each patient. Duodenal biopsies were examined with immunostaining for mast cells (IgE and tryptase), eosinophils (eosinophil peroxidase), T-cells (CD3), and dendritic cells (DC) (CD11c).

Results: In the pollen allergic group there was a significant increase in eosinophils, mast cells and DC’s but not T cells during the pollen season as compared with values outside the season. Interestingly, in the healthy control group we observed a significant increase in CD3+ cells during the birch pollen season, but no change in the other cell types during the pollen season.

Conclusions: Patients allergic to birch pollen have, regardless of subjective gastrointestinal symptoms, clear signs of an ongoing allergic inflammation in their intestinal mucosa during the pollen season.
conglutin. In most patients, whole blood basophil activation by RA and RAGA was reduced compared to native conglutin. In 4 patients, modification did not result in a reduced basophil response. These 4 patients had significantly higher levels of native conglutin-specific IgG1 (ELISA) compared to the other 10 patients. Upon washing of whole blood, the response to native protein increased. The response to RA and RAGA remained unchanged and was now reduced compared to native conglutin in all patients. T cell proliferation to RA was unchanged, and to RAGA reduced as compared to native conglutin. Levels of cytokines (IL-13, IFN-g, TNF-a) correlated with proliferation. No IL-10 production was observed.

Conclusions: Modification of peanut conglutin overall reduces IgE/IgG binding. Allergen-induced basophil activation is reduced in most patients. In some patients, the whole blood basophil response to RA and RAGA is relatively stronger than to native conglutin, which may be due to inhibitory IgG1 antibodies that suppress the response to native conglutin. T cell immunogenicity is retained, especially to RA. This shows that chemical modification may be a promising approach for the development of immunotherapy for peanut allergy.

O17 Animal models for assessing hypoallergenic clinical performance potential of products based on hydrolyzed protein systems
Christopher Cordle1, Geralyn Duska-McEwen2, Ricardo Rueda3, Enrique Vazquez4
1Abbott Nutrition, Columbus, USA; 2Abbott Nutrition, Granada, Spain

Formulas based on protein hydrolysates or free amino acids are used to manage food allergies in infants and young children. Three formula categories are available: Products containing partially hydrolyzed proteins which show some decrease in clinical reactivity but are not recommended for food-allergic infants, formulas based on extensively hydrolyzed proteins that are useful in clinical management of food allergies in ≥90% of patients, and free amino acid-based formulas used for the most strongly allergic patients. Formula hypoallergenic reactivity is only established by clinical trials, but these studies should be preceded by evaluation in appropriate animal models. For partially hydrolyzed formulas the goal of the model is to demonstrate some reduction in immunologic reactivity that justifies their “Hypoallergenic, not for use in food-allergic infants” labeling. For formulas based on extensively hydrolyzed proteins or amino acids, results of the animal models must predict the accepted standard for hypoallergenic clinical performance (Double-blinded, placebo-controlled food challenges indicating 90% of allergic patients tolerate the formula, 95% CI). Guinea pig oral sensitization is used to show decreased immunological reactivity of partially hydrolyzed formulas. Model sensitivity can be controlled by varying feeding duration, with positive controls (intact cow milk formula) reacting after a 15 day feeding. However, some partially hydrolyzed formulae that give negative results with 15 day feedings are sensitizing if fed for 35 days. Extensively hydrolyzed and amino acid formulas fed 35 days are not sensitizing. Symptom standards for evaluating reactions will be presented along with formula type and feeding duration comparisons. The laboratory animal hyperimmunization model is sensitive at the lower end of the immunological reactivity scale and can be used to differentiate extensively hydrolyzed and amino acid formulas which meet hypoallergenic clinical performance standards from partially hydrolyzed formulas not recommended for allergic patients. Analytical considerations and formula type comparisons will be presented.

O18 Latex-fruit syndrome and degree of severity of natural rubber latex allergy: is there a link?
Elisabetta Calamelli1, Valentina Piccinno, Arianna Giannetti, Giampaolo Ricci, Andrea Pession
University of Bologna, Dipartimento di Pediatría, Bologna, Italy

Background: Latex-fruit syndrome (LFS), defined as hypersensitivity to particular fresh fruits (Wagner S. & Breiteneder H. Bloch Soc Trans, 2002), has been described in 30-50% of pts affected from natural rubber latex (NRL) allergy and it is due to IgE Abs that cross-react with similar epitopes on phyllogenetically related proteins. Objective: To estimate the prevalence of LFS in a group of NRL allergic children and adolescents and to evaluate a possible correlation with the severity degree of NRL allergy.

Methods: This retrospective study analyzed 22 pts (17 M, 5 F; mean age 15.2 yrs) referred to the Pediatric Allergology of University of Bologna from Jan. 1990 to Sept. 2010 with a history of IgE-mediated NRL allergy associated with a level of latex specific IgE (slgE) ≥ 0.35 kU/L (ImmunoCAP 1000, Phadia; Sweden) and/or a positive response to Skin Prick Test (wheel ≥ 3 mm) with latex extract (Lofarma, Milan; Italy). Levels of total and slgE to grass pollen and to the main fruits implicated in LFS were analysed.

Results: The mean age at diagnosis of NRL allergy was 7.2 yrs (range 3-12). NRL allergic pts were divided in 2 groups, according to the severity of symptoms after latex contact. In group A were included 13 pts (59%) with mild symptoms (contact urticaria); in group B the remaining 9 subjects (41%) with moderate-severe symptoms (generalized urticaria w/wo angioedema and/or respiratory symptoms and/or anaphylaxis). Eight of the 22 subjects (36.4%) reported symptoms from LFS to the following fruits or combination of its: kiwi (5), cherry (2), chestnut (2), apple (1), cherry (1), apple (1), cherry (1). The prevalence of LFS was higher in group B than in group A (respectively 7/9, 78% vs. 1/13, 8%; p<.005, Chi-square test). No statistically differences in median values of total and slgE were found between the 2 groups (Mann-Whitney U test).

Conclusions: Our study confirms a relevant prevalence of LFS (36.4%) in patients with NRL, with kiwi, alone or in combination, as the main implicated fruit. Moreover, a significantly higher prevalence of LFS in subjects with more severe manifestations of NRL allergy was documented.

O19 Is aboriginal food less allergenic? A study on the IgE-binding capacity of egg white and yolk from modern and ancient chicken breeds investigated in a cohort of hen’s egg allergic children
Gabriele Gadermaier1, Matthias Egger1, Claudia Alessandrini2, Michael Wallner2, Peter Briza1, Danila Zennaro2, Adriano Mari2, Fatima Ferreira1
1University of Salzburg, Salzburg, Austria; 2IDiRCCS, Center for Molecular Allergology, Rome, Italy

Background: Hen’s egg allergy ranks among the most frequent primary food allergies in children. We aimed to investigate sensitization profiles of egg allergic patients and compare in vitro IgE reactivities of eggs from two ancient chicken breeds with those from conventional laying hen hybrids.

Methods: Egg allergic children (n=25) were subjected to skin prick test, double blind placebo controlled food challenge, and sensitization profiles to Gal d 1-5 were determined by allergen microarray. IgE binding and biological activity of eggs from ancient chicken breeds, i.e. Araucana and Maran and modern laying hen hybrids were investigated by immunoblot, ELISA and mediator release assays.

Results: In our cohort, 48% of patients were sensitized to egg white and yolk, while 52% were reacting to egg white exclusively. In allergen microarray, Gal d 1 and 2 were identified as major allergens for all patients, whereas Gal d 3-5 displayed high sensitization prevalence only in patients reacting to both egg components. Mean egg white-specific IgE was significantly higher in patients displaying additional sensitization to yolk compared to yolk-negative individuals (6.31 μg/ml and 1.53 μg/ml, respectively). Eggs from ancient chicken breeds demonstrated reduced egg white/yolk ratios compared to those from conventional laying hen hybrids but did not differ in their allergen composition as determined by mass spectrometry. Accordingly, we observed no significant differences in IgE-binding and basophil mediator release assays comparing egg white and yolk from different chicken breeds.

Conclusions: The onset of egg allergy seems to be mediated by egg white allergens expanding to yolk sensitization in later stages of the disease. Notably, our results on allergenicity and biological activity do not confirm the common assumption that aboriginal food might be less allergenic.
Roasting or heating increases elicitation capacity of peanut allergens but does not affect their sensitisation potential in a brown Norwegian rat model for food allergy

Stine Kroghbo1*, Neil Rigby2, Yvonne Vissers3, Clare Mills2, Charlotte Madisen1
1DTU National Food Institute, Søborg, Denmark; 2Institute of Food Research, Norwich, UK; 3Wageningen University, Wageningen, Denmark Clinical and Translational Allergy 2011, 1(Suppl 1):O20

Background: Allergenic potential of processed food allergens has primarily been studied by their IgE-binding capacity (elicitation). Roasting of peanuts has been shown to increase IgE-binding capacity. In this study we examined whether processing of whole peanuts or of the major peanut allergen Ara h 1 influenced the sensitisation potential.

Methods: Brown Norwegian rats were either dosed orally by gavage each day for 42 days with finely ground whole peanut products (blanched or roasted peanuts or peanut butter) mixed with water (~2 mg Ara h 1/rat/day) or immunised i.p. three times with 200 μg of native, heated or heat glycated Ara h 1. Sera obtained at sacrifice were analysed for specific IgG and IgE by ELISA and for biological functionality of IgE by rat basophilic leukaemia (RBL) assay.

Results: Processing was found to decrease solubility and thus extractability of Ara h 1 from peanut products. Aggregation state and secondary structure changes induced by heating of purified Ara h 1 were identical to those observed when Ara h 1 was heated in the presence of glucose. Although a significant anti-Ara h 1 IgE response was only found when dosing rats with roasted peanuts, examination of functional specific IgE by RBL assay showed that processing of peanuts did not influence sensitisation potential. However, extract from roasted peanuts was found to be a superior elicitor compared to extract from blanched peanuts irrespective of the peanut product used for sensitisation. Processing of purified native Ara h 1 did not influence the sensitisation capacity. Nonetheless, ELISA results indicated that new epitopes are formed or disclosed by heating of Ara h 1. Furthermore, IgG1-binding capacity was found to reflect whether rats were sensitised to native or processed Ara h 1 or dosed with blanched or roasted peanut products.

Conclusion: Roasted peanuts, either as such or as peanut butter, do not have a higher sensitisation capacity than blanched peanuts. This is supported by the finding that process-modified Ara h 1 has a similar sensitisation capacity as native Ara h 1. Yet, our results show that roasting increases elicitation capacity.

Comparison of the immune response induced in mice experimentally sensitised with genetically modified MON810 maize vs its conventional counterpart

Kanne Adel-Patient1*, Valeria Guimaraes1, Marie-Françoise Drumare1, Sandrine Ah-Leung1, Hervé Bernard1, Christophe Crémoin1, Jean-Michel Wal1
1INRA, Unité d'Immuno-Allergie Alimentaire, Gif-sur-Yvette, France; 2CEA, Service de Pharmacologie et d'Immunologie, Gif-sur-Yvette, France Clinical and Translational Allergy 2011, 1(Suppl 1):O21

Background: The introduction on the market of genetically modified (GM) foods has raised the question of the assessment of the potential allergenicity of the newly expressed protein(s) and of the whole GM food. We aimed at comparing the immune responses induced in mice after experimental sensitization with the insect resistant GM maize MON810 expressing the Cry1Ab protein vs its conventional counterpart.

Methods: BALB/cJ mice were experimentally sensitized with whole protein extracts from MON810 or non-GM (i.e. Tietar) maize via the intra-gastric (i.g.) or intra-peritoneal (i.p.) routes using Cholera toxin orIncomplete Freund's adjuvant, respectively. Specific humoral immune responses induced were analysed by measuring anti-maize and anti-Cry1Ab antibody productions using specific immunoassays and western blotting. Cellular response was assessed by quantification of the cytokines secreted after ex vivo reactivation of splenocytes from sensitized mice using protein extracts from GM or non-GM maize and purified Cry1Ab.

Results: Efficient sensitization was achieved in mice administered maize protein extracts. Humoral and cellular immune responses against endogenous maize proteins were quantitatively equivalent in mice treated with MON810 vs its non GM counterpart. No anti-Cry1Ab immune response was detected in mice that received MON810 maize. Although the pattern of recognition of maize proteins by IgG antibodies differed in i.p. vs i.g. sensitized mice, no difference was evidenced between treatment by MON810 or its non-GM comparator when considering the same sensitization route.

Conclusion: No significant unintended effect of the genetic modification has been evidenced on the immune responses induced in mice after experimental sensitization by MON810 maize using the i.p. or i.g. route.

Identification of wheat proteins involved in active stage of celiac disease: are gamma gliadins the major disease-specific antigens?

Bharani Srinivasan1*, Claudia Constantini1, Margit Focke Tej2, Innes Swoboda3, Irene Mittermann1, Harald Vogelsang1, Wolf Dietrich Huber1, Rudolf Valenta1
1Division of Immunopathology, Department of Pathophysiology and Allergy Research, CePI, Medical University of Vienna, Vienna, Austria; 2Division of Immunopathology, Department of Pathophysiology and Allergy Research, CePI, Christian Doppler Laboratory for Allergy Research, Medical University of Vienna, Vienna, Austria; 3Division of Gastroenterology and Hepatology, Medical University of Vienna, Vienna, Austria Clinical and Translational Allergy 2011, 1(Suppl 1):O22

Background: Celiac disease (CD) is caused by a severe immune response to wheat gliadins and glutenins. It is thought that gliadin-specific T cells mediate mucosal damage and generation of IgA/IgG class anti-gliadin antibodies, but individual protein antigens and epitopes have not been studied in detail.

Objective: To characterize wheat antigens with ability to initiate and sustain CD.

Methods: We developed a method wherein the alcohol extracted gliadins was fractionated in two steps of ion-exchange chromatography, Sulphopropyl (SP) was used for the first step and the flow through (FT) fraction obtained was further fractionated using DEAE. Each generated fraction’s reactivity to serum IgA, from clinically well defined CD (active/diet) patients and non-CD patients was analyzed. Identification of disease specific antigens in the fractions was attempted using mass spectrometry and N-terminal sequencing.

Results: Patients with active disease showed strong IgA reactivity to proteins in all the fractions. Interestingly, we found that non-CD and CD patients under diet, exhibited background IgA reactivity which were mainly restricted to the elution fraction of SP but did not react with FT SP and FT DEAE fractions. The latter fractions hence appeared useful to identify patients with active forms of CD. Mass Spectrometry and N-terminal sequencing revealed that gamma-gliadins were enriched in FT SP and FT DEAE fractions.

Conclusions: We report here a purification protocol for enriching IgA-reactive antigens specifically recognised by active CD patients. This fraction containing majorly gamma-gliadins will be useful for characterizing individual proteins, involved in disease and for developing diagnostic and treatment strategies.

Biochemical and immunological characterisation of Act d 10 a lipid transfer proteins from green kiwifruit

Maria Livia Bernardi1,3, Ivan Giangrieco1, Laura Camardella1, Maria Rosaria Panico2, Danila Zinna2, Rosetta Ferrara1, Paola Palazzo1, Lisa Tupper2, Maurizio Tamburini2, Vito Carratore2, Mario Santoro1, Maria Antonietta Cardiello1, Adriano Man1
1IDIRCCS, Center for Molecular Allergology, Rome, Italy; 2C.N.R., Institute of Protein Biochemistry, Naples, Italy Clinical and Translational Allergy 2011, 1(Suppl 1):O23

Aims: The aim of this study was to assess the presence of a Lipid Transfer Proteins (LTP) in green kiwifruit (Actinidia delicosa) and to evaluated the allergic activity of the newly identified protein.

Methods: Pulp and seeds of green kiwifruit were manually separated and homogenized. Act d 10 was purified from seed extracts by ion exchange chromatography and RP-HPLC, and sequenced by an automatic amino acid
The purification procedure allowed to obtain about 0.4 mg of OFC with canned tuna, fresh in vitro mins from different fish species, the 1(Suppl 1): DBPCFC) with codfish, followed by hypothermia, elevated amounts of models to study anaphylaxis as only was reduced. intravenous challenge with TNP-μsIgE, CAP) to codfish (f3) and skin We are seeking to determine the clinical course of fish allergy ses mast cell activation tamin, serotonin, LTC4 were likewise detected. Contrary to these findings the histamine release of mast cells incubated with ASA in vitro was reduced. Together, ASA potentiates PSA probably by enhancing the degranulation of mast cells in vivo, thereby increasing the availability of anaphylactic mediators. Since ASA suppresses mast cell activation in vitro, the environment surrounding the mast cells dictate most likely changes in the releasability of these effector cells upon ASA treatment. Our findings emphasize the importance of in vivo models to study anaphylaxis as only in vivo experiments can unravel the complex interplay of different cells and tissue factors.

O24 Development and validation of a duplex real-time PCR method for the simultaneous detection of celery and white mustard in food Margit Cichna-Maühl, Magdalena Fuchs, Rupert Hochegger1 1University of Vienna, Department of Analytical Chemistry, Vienna, Austria; 2Austrian Agency for Health and Food Safety, CC Biochemistry, Vienna, Austria Clinical and Translational Allergy 2011, 1(Suppl 1):O24

Celery (celery root: Apium graveolens var. Rapaceum; leaf celery: A. g. var. Secalimum; celery stalks: A. g. var. Dulce) and mustard (white or yellow mustard: Sinapis alba; black mustard: Brassica nigra; brown or oriental mustard: Brassica juncea) are frequently used as ingredients in sauces, spices, soups and other meat-products as well as in convenience products. Within the European Union, the presence of potentially allergenic celery and mustard in foodstuffs has to be declared according to the EU legislative 2007/68/EC. The aim of the present study was to develop and validate a duplex real-time PCR method allowing the simultaneous detection of traces of celery and white mustard in food. Primers and TaqMan probes were designed for the Apium graveolens NADPH-dependent mannose-6-phosphate reductase mRNA as well as the Sinapis alba mRNA for MADS D protein. PCR was performed on the RotorGene RG-3000 from Corbett Life Sciences. With the optimized duplex assay DNA extracted from celery root, leaf celery and celery stalks as well as DNA from white mustard was amplified. The assay did not show any cross-reactivity with more than 60 food matrices, among them important members of the plant families Apiaceae and Brassicaceae, spices and different meat species. The LOD in serially diluted DNA extracts from celery root, leaf celery, celery stalks and white mustard was found to be 2 pg/μL (10 pg absolute). The PCR efficiency was 99.4% for celery root, 106.3% for celery stalks, 96.5% for leaf celery and 99.0% for white mustard. The LOD in DNA extracts obtained by extraction of model sausages was 0.005% (50 mg/kg) for celery and 0.001% (10 mg/kg) for white mustard, in both raw and brewed model sausages. The PCR efficiency was 90.0% (celery) and 101.1% (white mustard) in raw model sausages and 85.8% (celery) and 91.2% (white mustard) in brewed model sausages.

O25 Acetylsalicylic acid potentiates passive systemic anaphylaxis in mice Maria Nass1, Magda Babina, Margitta Worbs, Allergie Centrum-Charité, Klinik für Dermatologie und Allergologie, Campus Charité Mitte, Charité- Universitätsmedizin, Berlin, Germany Clinical and Translational Allergy 2011, 1(Suppl 1):O25

Acetylsalicylic acid (ASA) is a nonsteroidal anti-inflammatory drug that can cause mast cell dependent diseases in sensitive individuals. ASA induced asthma is believed to be related to an overproduction of cysteinyl leukotriene C4 (LT(C4) secondary to cyclooxygenase inhibition. It remains to be elucidated whether and by which mechanisms ASA may also influence systemic anaphylactic reactions. In order to clarify if ASA modulates passive systemic anaphylaxis (PSA), Balb/c mice were pre-treated with ASA, sensitized with anti-TNP-BSA intravenously followed by intravenous challenge with TNP-BSA. The temperature profile was assessed for 70 min. Levels of mast cell mediators in the sera (histamine, serotonin, LTC4) were determined by ELISA. Additionally murine bone marrow-derived cultured and peritoneal mast cells were incubated in vitro with ASA, loaded with IgE, stimulated with anti-IgE and histamine release was assessed. ASA aggravated the symptoms of PSA; the maximum temperature drop for ASA pre-treated mice was 3.1 ± 0.4 versus 3.7 ± 0.5 in the control (p = 0.004). In line with exacerbated hypothermia, elevated amounts of mast cell mediators were found in mouse sera. LTC4 was enhanced and most interestingly, increases in the preformed mediators histamine and serotonin were likewise detected. Contrary to these findings the histamine release of mast cells incubated with ASA in vitro was reduced. Together, ASA potentiates PSA probably by enhancing the degranulation of mast cells in vivo, thereby increasing the availability of anaphylactic mediators. Since ASA suppresses mast cell activation in vitro, the environment surrounding the mast cells dictate most likely changes in the releasability of these effector cells upon ASA treatment. Our findings emphasize the importance of in vivo models to study anaphylaxis as only in vivo experiments can unravel the complex interplay of different cells and tissue factors.

O26 Fish allergy-natural history and crossreactivity between fish species George Stavroulakis1, Stavroula Gavi2, Nikolaos Douladiris2, Manolis Manousselis2, Nikolaos G Papadopoulos2 12nd Pediatric Clinic, University of Athens, Allergy department, Athens, Greece Clinical and Translational Allergy 2011, 1(Suppl 1):O26

Background: The clinical course of fish allergy is not sufficiently studied. Persistence seems to be the dominant pattern; nevertheless, a number of cases may overcome this allergy with time. Also, due to the high structural homology of parvalbumins from different fish species, crossreactivity among fishes is common. Objective: We are seeking to determine the clinical course of fish allergy in a Greek pediatric population and whether fish allergic children are able to tolerate some fish species without a reaction. Material and methods: 105 children with a diagnosis of type I allergy to fish, based on history, specific IgE (sIgE, CAP) to codfish (F3) and skin prick tests (SPT) with commercial fish extracts, are included so far. All children undergo open food challenges (OFC) with canned tuna, fresh swordfish or fresh tuna in order to evaluate whether these fishes are tolerated or not by fish allergic children. Subsequently, those children showing signs of reduced clinical reactivity are subjected to double blind placebo controlled food challenges (DBPCFC) with codfish, followed by OFC to codfish in those with a negative DBPCFC, to evaluate the natural history. Results: a total of 71 challenges in 52 children were conducted so far. Forty one (91%) out of 45 children were negative to canned tuna- 3 were positive (2 anaphylactic reactions and 1 eczema flare up)- 1 OFC was inconclusive. Eleven (78%) out of 14 children were negative to fresh swordfish or fresh tuna- 2 were positive and 1 was inconclusive. Finally, 8 children underwent a DBPCFC to codfish and 4 were negative. OFC to codfish was also negative in those four children and they were considered fish tolerant. Both sIgE and SPT values showed a diminishing trend in these four patients. The mean time between first reaction and the achievement of tolerance for these four children was 9.25 years. Conclusion: The reduction of CAP levels and SPT diameter over time may indicate the diminishing sensitivity in fish allergic patients, most of which seem to be able to consume canned tuna, fresh tuna and fresh swordfish, although some reactors do exist even to those low allergenicity fishes.
Background: There have not been any studies to evaluate the impact of GMOs on human health in Lithuania yet. The aim of this investigation was to evaluate the gauge of soybean allergy in Lithuania, through molecular methods to estimate the pervasion of GM forms between soy and types of modifications and also to evaluate possible impact of GM soy to allergies.

Methods: Biotechnological methods: PCR, electrophoresis and real - time PCR was used to find allergenic products that were GM as well and what types of modifications had been done to them.

Results: Through biotechnological methods such as PCR and electrophoresis there were determined if products, used in our project, were pure, without any intermixture of others products. By using Real - time PCR we found out if our product is genetically modified or not. In our case there were two main modifications: 35S promoter and NosT terminator. One of these products is soybean, which were used for further testing. From this type of soy prepared 20% hydrolyzates were obtained that have been used to perform skin - prick tests on patients who are allergic to wild  – type soy. By doing this clinical testing we were trying to find out if GM products may elicit stronger allergic reaction and to increase allergenicity than wild-type products, in our case soybean. We performed skin prick tests with on 20 patients allergic to soy with wild – type and GM soy, to demonstrate the potential influence of GMO.

Conclusion: Our data showed that soy is one of the most popular food allergen among Lithuanians. Most common GM among soy was 35S promoter and NosT terminator. There were no significant differences between GM and wild – type soybean allergens of skin – prick testing to patients that are allergic to soybean and its products and also to people that have no any allergic response to wild – type.

O28 Adipose tissue inflammation contributes to body weight loss induced by experimental chronic food allergy in mice
Denise Carmona Cara1, Luana PA Dourado1, Mria LM Noviello2, Debora M Alvarenga3, Gustavo B Menezes3, Adaliene VM Ferreira4, Danielle G Souza5

1Federal University of Minas Gerais-UFMG, Department of Morphology, Belo Horizonte, Brazil; 2Federal University of Minas Gerais-UFMG, Morphology, Belo Horizonte, Brazil; 3Federal University of Minas Gerais-UFMG, Basic Nursing, Belo Horizonte, Brazil; 4Federal University of Minas Gerais-UFMG, Department of Microbiology, Belo Horizonte, Brazil
Clinical and Translational Allergy 2011, 1(Suppl 1):O28

Food allergy affects approximately 5% of children and 3% of the adult population in the western world. This disease is the manifestation of an abnormal immune response to antigens introduced into the organism orally and it is often mediated by IgE. Our group developed a chronic mouse model for the food allergy and one of the most remarkable alterations observed is a loss of body weight. However, the disturbances that trigger this loss of body weight are not clear. Thus, the purpose of this study was to investigate the mechanisms involved in weight loss of mice with ovalbumin-induced food allergy. With this purpose, BALB/c mice were subcutaneously sensitized with ovalbumin in aluminum hydroxide and challenged with the antigen containing diet for 7 days. The allergic mice showed significant weight loss with loss of adipose tissue, although it was not observed a reduction in food intake. These mice demonstrated adipose tissue inflammation characterized by increased leukocyte recruitment (visualized by intravital microscopy) and infiltration of mast cells, macrophages and regulatory T cells in the stroma. Moreover, we demonstrated high concentrations of TNF-α, IL-6, IL-10 and the chemokine MCP-1/CCL-2 in this tissue. The metabolic changes in adipose tissue of allergic animals were represented by increased glucose uptake and lipolysis in adipocytes, resulting in atrophy of these cells. Changes were also seen in systemic metabolism characterized by decreased serum concentrations of glucose, triglycerides, total cholesterol and free fatty acids in allergic mice. Based on our results, we conclude that food allergy induces adipose tissue inflammation by producing mediators that lead to atrophy of this tissue. The decrease in adipose tissue mass has systemic consequences and results in loss of body weight.

O29 Sensitization to a purified cow’s milk (CM) allergen facilitates further oral sensitization to other CM proteins in mice
Karina Adel-Patient1, Hervé Bernard, Sandrine Ah-Leung, Sophie Wavrin, Jean-Michel Wal
INRA, Unité d’Immuno-Allergie Alimentaire, Gif-sur-Yvette, France
Clinical and Translational Allergy 2011, 1(Suppl 1):O29

Background: the effect of a local allergic reaction induced by a food allergen on the immune response induced against bystander proteins has been not much investigated. We then aimed to compare the effect of oral administrations of raw milk either in naive mice or in mice previously orally sensitized to bovine β-lactoglobulin (BLG), a major cow’s milk allergen.

Methods: BALB/cj mice were experimentally sensitized by intra-gastric (i.g.) administration of highly purified BLG mixed with Cholera toxin (CT, 10μg) on days 1, 8, 15, 22, 26 and 33 (n=7/group). Control mice received CT alone (n=7) and 10 mice were left untreated (naive mice). Allergic sensitization to BLG was confirmed by assaying BLG-specific IgE and IgG1 in sera collected on day 37. Mice administered CT +/- BLG and 5 naive mice were then gavaged on days 39, 40 and 43 to 46 with 200μl of raw CM, naturally containing 3 mg/ml of BLG, without any adjuvant. Antibodies specific to the different CM proteins were then assessed by immunoassays in sera collected on day 54.

Results: No antibody specific to CM proteins were evidenced in naive or control mice after gavage with CM. Conversely, mice sensitized to BLG produced specific IgG1 antibodies against caseins (αs1, αs2, β and κ), α-lactalbumin, lactoferrin and bovine serum albumin after gavage with CM.

Conclusion: BLG present in CM likely elicits a specific local allergic reaction in mice already sensitized to BLG. The resulting pro-Th2 intestinal microenvironment and/or the increase of intestinal mucosa permeability may then favour the induction of a Th2-type response specific to other bystander proteins ingested at the same time. Such mechanism may partly explain multiple sensitizations in food allergic patients.

O30 Probiotic treatment induces intestinal regulatory dendritic and T cells, and counter-regulates Th2 responses and anaphylaxis in a mouse model of food allergy
Elisa Schiavi1, Bianca Barletta, Andrea Barone, Cinzia Butteroni, Silvia Corinti, Gabriella Di Felice
Istituto Superiore di Sanità, Dept. Infectious, Parasitic and Immune-mediated Diseases, Rome, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):O30

The immunological mechanisms responsible for the anti-allergic effects of probiotic bacteria are still poorly defined. We tested the effect of a probiotic mixture (VSL#3) in in vitro, ex vivo and in vivo mouse systems. In vitro co-culture of naive bone marrow(BM)-derived DC (BM-DC) with VSL#3 induced the up-regulation of maturation marker and IL-10 and IL-12 production. Ex vivo analysis of mesenteric lymph node (MLN)-derived DC (MLN-DC) from naive mice receiving for three weeks VSL#3 by oral administration, indicated a different distribution and phenotype of DC within the MLN. In particular, VSL#3 treatment increased the frequency of plasmacytoid DC (pDC, B220+CD11clow), and upregulated the expression of maturation markers on conventional DC (cDC). Moreover, the frequency of IL-10-expressing cDC was increased. This finding was paralleled by the increase of CD4+CD25+ T cells and CD4+CD25+ populations showing enhanced IL-10 production. Altogether, these results suggest that VSL#3 treatment can stimulate in the gut the activation of tolerogenic DC. Finally, we obtained in vivo preliminary data on therapeutic and preventive potential of VSL#3 in a mouse model of...
sensitization and anaphylaxis to peanut. Mice were orally sensitized and challenged with peanut extract to induce in vivo anaphylaxis. In the therapeutic experimental setting, animals received a three-weeks oral treatment with VSL#3 and were then re-challenged. In the preventive setting, oral probiotic treatment started one week before the beginning of the immunization schedule and continued until the challenge. In both approaches, VSL#3 was able to reduce anaphylaxis symptoms and IL-13 release in the jejunum of immunized mice upon post-treatment challenge. Furthermore, the therapeutic approach also induced allergen-specific IgA in the gut and TGF-β release. Then, the capacity of probiotics to induce protective immune responses linked to counter-regulation of Th2 responses might become an effective strategy in the treatment of type I allergy.

O31
Abstract withdrawn
Clinical and Translational Allergy2014-70222011Suppl 1O31

O32
Children who develop allergy have low fecal alpha-defensin levels but high beta-defensin levels in infancy
Emma Savilahti¹, Anna Kaarina Kukkonen, Tari Haathela, Mikael Kuitunen, Erkki Savilahti
University of Helsinki, Helsinki, Finland
Clinical and Translational Allergy 2011, 1(Suppl 1):O32

Background: Since early innate immunity responses and the intestinal flora give adaptive immune responses, we investigated whether fecal defensin levels in infancy were associated with the emergence of allergy.

Methods: In a randomized, double-blind placebo-controlled trial, 1018 infants in high risk for allergy received from birth to 6 months either a mixture of pre- and probiotics, or placebo. They were followed for the emergence of allergic diseases and sensitisation for 5 years. In an unselected group of 48 infants receiving probiotics and 52 receiving placebo, we measured fecal levels of human neutrophil peptide (HNP) 1-3, β-defensin 2 (HBD2) with enzyme linked immunosorbent assays (ELISA) at the age of 3 and 6 months. TNF-α and calprotectin had been measured with ELISA, and α1-antitrypsin levels at the age of 3 months.

Results: Fecal levels of HNP1-3 and HBD2 decreased from 3 to 6 months. Low HNP1-3 levels correlated negatively with α1-antitrypsin levels at the age of 3 months (coefficient -0.5; p<0.05) in children who developed sensitisation only or subsequent IgE-mediated allergy. Low HNP1-3 and high HBD2 levels might become an effective strategy in the treatment of type I allergy.

Conclusions: Early innate immunity responses in the gut are associated with the emergence of allergy later in childhood.

O33
Dietary triglycerides profoundly affect oral sensitization to peanut protein in an adjuvant-free mouse model of peanut allergy
Erik Eckhardt¹, Jianing Li²
¹University of Kentucky, Internal Medicine, Lexington, USA; ²University of Kentucky, Graduate Center for Nutritional Sciences, Lexington, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):O33

Background and aim: Peanuts and peanut butter contain significant amounts of long-chain triglycerides (LCT), which stimulate lymphatic chylomicron transport. We have recently reported that intestinal absorption of a dietary antigen (ovalbumin; (OVA)) is significantly enhanced when chylomicron formation is induced. This prompted us to investigate the effect of LCT on oral sensitization to concomitantly ingested protein antigens.

Methods: To induce peanut allergy, C3H/HEJ mice were gavaged with one dose of peanut butter of which the fat was replaced with MCT (medium-chain triglycerides), LCT (peanut or soy oil), or LCT plus the chylomicron inhibitor Pluronic L-81. Anti-peanut IgE was measured 18 days later, and mice were then challenged intraperitoneally with peanut extract. Body temperature was measured every five minutes, and plasma was collected after 90 minutes to detect mmcp-1 (a marker for histamine release). In separate experiments with BALB/c mice, we tested the effect of dietary triglycerides on oral tolerance to OVA. Oral tolerance was reflected by aAnti-OVA IgG levels after systemic sensitization following OVA feeding in the context of altered triglyceride composition.

Results: Gavage of peanut butter proteins in MCT induced significant anti peanut-protein IgE responses and anaphylaxis upon peanut challenge, as reflected by a rapid drop in temperature and substantial plasma mmcp-1 release. Gavage with LCT almost completely protected from allergy and anaphylaxis, but this was completely reversed by addition of Pluronic L-81 during gavage, suggesting that chylomicron formation during oral sensitization was protective. Similarly, oral tolerance to OVA was abrogated when OVA was fed with MCT or with Pluronic L-81.

Conclusion: Postprandial chylomicron secretion significantly affects the immune response to concomitantly ingested dietary allergens. We speculate that postprandial chylomicronemia promotes mesenteric lymph node transport of dietary allergens, which may dampen allergenicity by promoting oral tolerance.

O34
T cell specific and non specific tolerance mechanisms in peanut oil immunotherapy in peanut allergic subjects
Amit Singh¹, Brittany Weldon, Grace Yu, Sue Neale-May, Tessa Hunter, Kari Nadeau
Stanford University, Pediatrics Department, Stanford Medical School, Stanford, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):O34

Rationale: Our main focus in the laboratory is to understanding the mechanisms of how oral immunotherapy (OIT) improves outcomes in patients. In this study, we aimed to determine if OIT is specific only to the food allergens administered in OIT or also to other offending allergens (i.e. "bystander effect"). To accomplish our aim, we studied T cell reactivity (i.e. proliferation assays) and T cell specificity (i.e. tetramer assays with peanut peptides) in both effector T cell (CD4+CD25neg) or Teff and regulatory T cell (CD4+CD25hiFoxp3+) or Treg subsets.

Methods: A phase I trial of oral immunotherapy for peanut allergy was approved by the Stanford IRB and conducted according to ICH guidelines. All subjects (n=24) had a moderate to severe clinical reactions to peanut ingestion, peanut-specific IgE ≥ 15 kU/L, and a positive skin-prick test. Subjects underwent an initial dose escalation to a maximum dose prior to initiating daily home dosing with q2wk dose. Blood samples were collected at baseline and throughout the course of the treatment. T cells were magnetically purified and tested for specificity to peanut epitopes, other offending food allergens for the patient, and a control antigen. Basophil reactivity was also assessed using a whole blood assay.

Clinical assessments were performed using Bock's criteria.

Results: Twenty-four subjects, ages 5 to 45, have received 3777 doses. Teff cell proliferation (using 3H thymidine assays) was optimally suppressed by autologous Treg when activation occurred using antigen presenting cells (APCs) loaded with peanut, rather than loaded with other offending food allergens (i.e. milk). Basophil reactivity (as determined by CD203c) was downregulated during the course of OIT to both peanut and other offending allergens.

Conclusions: We report on our immune monitoring results to date at Stanford Hospital and Clinics with a phase I peanut oral immunotherapy study using published methods. With T cell monitoring, we were able to show downregulation of specific peanut-induced proliferation and that this downregulation was mediated by Treg specific to peanut epitopes.

O35
Oral immunotherapy be heated ovomucoid-reduced egg white in a Balb/C mouse model
Rodrigo Jiménez-Saiz¹, Chengbo Yang², Rosina López-Fandiño³, Yoshinori Mine⁴
¹Instituto de Investigación en Ciencias de la Alimentación (CIAL) CSIC-UAM, Madrid, Spain; ²University of Guelph, Food Science, Guelph, Canada
Clinical and Translational Allergy 2011, 1(Suppl 1):O35

Background: Food allergies are a problematic health concern in many developed countries. Oral immunotherapy (OIT) is one of the most...
promising therapeutic approaches for treating food allergy. The treatment with heated ovomucoid-reduced egg white (OM) is especially notable and its effectiveness as OIT in egg allergic patients has been reported: 24 (44%) egg allergic patients became tolerant after two months of OIT with OM. However, a better understanding of molecular mechanisms underlying the OIT is not well established.

**Methods:** OIT using OM was carried out with an egg-allergy Balb/c mouse. The mice were sensitized by intact EW and then desensitized by OM by means of oral ingestion. Histamine levels and specific IgE, IgG and IgG2a against EW allergens in sera were measured by ELISA. Splenocytes were cultured in the presence of EW. IFN-γ (Th1), IL-4 (Th2), IL-10 and TGFB-1 (T-reg) were assessed in cell cultured supernatants. Fecal samples were collected weekly and processed for analyzing EW-specific IgA.

**Results:** treated mice showed significantly lower histamine release and EW-specific IgA activity compared to positive group. A significant increase of ovomucoid and ovalbumin specific IgG2a was found in treated mice sera. The IgE was significantly suppressed and enhancement of IFN-γ and IL-10 was observed in the treated group, however there was no difference in TGFB1 concentrations. Interestingly the treated group showed higher secretions of EW-specific IgA in fecal samples than the positive and negative group.

**Conclusions:** OIT using OM led to oral desensitization by inducing an increase of Th1/Th2 ratio. The high up-regulation of IL-10 in treated mice suggests that regulatory T-cells played an important role in oral desensitization. The high activity of ovomucoid and ovalbumin specific IgG2a in sera corroborated the enhancement of Th1 response. The increase of secreted EW specific-IgA in the treated group fecal samples might have contributed to mucosal immunity to the suppression of egg allergic responses using OM.

---

**O36**

**The individual role of peanut proteins Ara h 1, 2, 3 and 6 in peanut allergy**

Smit Joshi1,1, Pennings Maarten2, Houben Geert3, Els van Hoffen3, Pieters Raymond4
1Institute for Risk Assessment Sciences, Utrecht University, Utrecht, Netherlands; 2Utrecht University Medical Center, Utrecht, Netherlands; 3TNO, Zeist, Netherlands

Clinical and Translational Allergy 2011, 1(Suppl 1):O36

One of the major allergenic food or food constituent is peanut, in which a number of allergenic proteins have been described (Ara h 1-9). Until now, the relative contribution of the individual peanut allergens to clinical food allergic responses is not known. Therefore, the present studies aimed to elucidate the relative contribution of Ara h 1, 2, 3, and 6 to peanut allergy in a mouse model. For this purpose, mice were immunized by oral gavage with a whole peanut protein extract or with purified allergens Ara h 1, 2, 3, or 6. Hereafter, mice were challenged with the individual allergens and blood was collected to measure allergen-specific antibodies and mast cell degranulation (MMCP-1 in serum). Spleens were harvested to measure allergen-specific T-cell reactivity. To assess the potential of the individual peanut proteins to induce anaphylaxis, mice were sensitised with whole peanut protein extract and challenged intraperitoneally with purified Ara h 1, 2, 3, or 6. Sensitisation with whole peanut extract induced Ara h 1, 2, 3 and 6 specific IgE, IgG1 and IgG2a. In addition, sensitisation with the individual peanut allergens elicited antibody responses with specificity to the allergen used. T cell cultures showed Th1 and Th2 type cytokine production upon restimulation with both peanut extract and the individual peanut allergens. Interestingly, only Ara h 2 and 6 were able to elicit mast cell degranulation after oral challenge. In contrast, after systemic challenge, Ara h 1 and 2 were able to elicit strong anaphylactic responses, whereas anaphylactic responses induced by Ara h 3 and 6 were less severe. Our conclusion, individual peanut allergens do not differ drastically in the capacity to sensitize via the oral route. Interestingly, depending on the route of provocation, peanut proteins differ in their capacity to cause effector responses such as mast cell degranulation and anaphylaxis. In future studies, the mechanism behind the functional differences of individual peanut allergens and their cross-reactivity on T cell and antibody level will be investigated.

---

**O37**

**The level of specific IgE is a moderate predictor for the outcome of a double-blind placebo-controlled food challenge for hazelnut in children**

Laury Nustroh1, Suzanne Fasmans1, Mirjam Knol1, Els van Hoffen3, Annebeth Flinterman1, Petra Kentje1, André Knuts1, Yolanda Meijer1
1University Medical Center Utrecht, (Pediatric) Dermatology/Allergology, Utrecht, Netherlands; 2University Medical Center Utrecht, (Pediatric) Dermatology/Allergology, Center of Pediatric Allergology, Wilhelmina Children’s Hospital, Pediatric Pulmonology, Utrecht, Netherlands; 3University Medical Center Utrecht, Julius Center for Health Sciences and Primary Care, Utrecht, Netherlands.

Clinical and Translational Allergy 2011, 1(Suppl 1):O37

Literature about the value of diagnostic tests for hazelnut allergy in children is scarce. For peanut allergy cutoff levels of specific IgE with a 95% positive predictive value (PPV) were published. To evaluate current diagnostics for hazelnut allergy in children, data of 151 children, who underwent a double-blind placebo-controlled food challenge (DBPCFC) for hazelnut were analyzed. The PPV or negative predictive value (NPV) of the level of specific IgE (CAP) for hazelnut and the size of the skin prick test (SPT) for hazelnut was determined. The influence of spiking of the CAP for hazelnut with rCor a 1 was analyzed. The level of specific IgE for hazelnut was a moderate predictor for a positive DBPCFC for hazelnut. No cutoff levels of specific IgE for hazelnut with a 95% PPV could be determined. Before Cor a 1 spiking the maximum reached PPV was 73% for a cutoff level of 26 kUA/L, after spiking the maximum reached PPV was 64% for a cutoff level of 31 kUA/L. The spiking increased the NPV from 91% to 100% for a cutoff level of 0.35 kUA/L. SPT was a better predictor for a positive DBPCFC for hazelnut.

---

**O38**

**Use of electronic patient diaries supports diagnosis of food allergy and diet management**

Andreas Arena-Yolland1,2, Frank Feidert3, Ralph Herbst3, Ralph Mösges3, Norbert Rösch4
1Public Research Centre Henri Tudor, SANTEC, Luxembourg, Luxembourg; 2Centre Hospitalier de Luxembourg, ORL-Eich, Luxembourg, Luxembourg; 3University Hospital of Cologne, IMISE, Cologne, Germany

Clinical and Translational Allergy 2011, 1(Suppl 1):O38

Background: Patient diaries have the potential to support food allergy diagnosis. The time relationship between the consumed product and the experienced symptoms is of high value for diagnostics as well as for therapy control. The combination of a barcode reading handheld device and a dedicated electronic patient record is a unique method to support the diagnostic process.

**Methods:** A Smartphone based Personal Allergy Assistant (PAA) allows patients to keep an electronic patient diary by scanning the barcode of the consumed food products. A catalogue of predefined symptoms as well as their medically justifiable time window during which a symptom can manifest itself after the ingestion has been defined. An Electronic Patient Record for Allergies (EPRA) stores results from patient investigations with allergy specific medical knowledge, provided by allergy experts (e.g. cross allergies, seasonal effects, pollen associated FA). Data on the PAA is regularly synchronised with the electronic patient record and the food database. Diaries are evaluated by emphasising the association between food intake and occurred symptoms in order to calculate the relative risk (RR) of a specific food product or nutrition.
Results: The PAA provides patients with an easy to use device to create high quality diaries for food intake and symptoms by scanning the food package’s EAN barcode. It sets automatic timestamps to reduce potential data tampering and increase the data quality and allows recording of food intakes from non-packaged food (e.g. fruits, vegetables or fast food) as well as pharmaceuticals. For diagnostic purpose, the diary is regularly transmitted to the allergist’s electronic patient record. Diaries are evaluated automatically providing measurement categories that are commonly used in medicine. To support the individual diet management, the PAA gives a warning before the consumption of allergenic food.

Conclusions: During a pilot study with 35 participants the feasibility and patient acceptance has been proven. Information and Communication Technology has the potential to simplify the interdisciplinary exchange of patient information between patients and medical experts.

O39 Immediate-type food allergy to balsam of Peru
Isabel Skygåla1, Stephen Durham2, Guy Scadding3
1Royal Brompton Hospital, London, UK; 2Imperial College, London, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):O39

A 48-year old woman presented with a 10-year history of rapid-onset adverse reactions to foods. Reactions involved discomfort in the lips, throat and tongue, throat tightness, an urticarial rash, and a ‘sensation of doom’. Suspect triggers included butter toffee popcorn, the aperitif Pernod, cinnamon, toffee apples, ginger nut biscuits, honeycomb confectionary and a supermarket pizza.

Additionally, she described contact hypersensitivity to jewellery and cosmetics. Certain soaps and household detergents also provoked urticaria.

Skin tests and ImmunoCAP tests to aeroallergens and food allergens were negative; prick-prick testing to the same popcorn was also negative. Nonetheless, we felt her history was convincing, and were suspicious of a linking factor between the identified triggers. We subsequently referred her for patch testing.

Patch tests produced a rapid onset urticarial response to myroxylon sulphate (Balsam of Peru); the delayed response was negative. Delayed responses were positive to nickel sulphate and Fragrance mix 1 and 2.

We conclude that our patient had an acute-onset hypersensitivity to Balsam of Peru, an aromatic liquid derived from the Myroxolon balsamum tree used in cosmetics, foods, beverages and medicinal products. It contains cinnamic acid, cinnamyl cinnamate, benzyl benzoate, benzoic acid and vanilla, as well as essential oils similar to those found in citrus fruit peel. It most commonly causes a contact dermatitis; highly allergic individuals may suffer adverse reactions after consuming foods containing Balsam of Peru including soreness of the tongue and mouth. Implicated foods include spices, citrus fruit peel, baked goods, aperitifs, benzocaine and related preservatives.

Our patient is unusual in presenting with acute symptoms, mimicking IgE-mediated allergy. Of note, contact urticarial reactions have previously been described to patch testing with Balsam of Peru; the mechanism of such reactions is unclear. Clinicians should be aware of non-classical food ‘allergic’ reactions, especially to pre-prepared foods with complex ingredients.

O40 Adolescent-parent disagreement on health-related quality of life in food allergic adolescents; who makes the difference?
Jantina L van der Velde1, Bertine MJ Floksstra-de Blok2, Ann Hamp3, Rebecca C Knibb4, Eric J Duivenman5, Anthony EJ Dubois6
1University Medical Centre Groningen, University of Groningen, Pediatric Allergy and Pulmonology, Groningen, Netherlands; 2University Medical Centre Groningen, University of Groningen, General practice, Groningen, Netherlands; 3University of Derby, Department of Psychology, Derby, United Kingdom; 4University Medical Centre Groningen, University of Groningen, Department of Pediatric Allergy and Pulmonology, Groningen, Netherlands
Clinical and Translational Allergy 2011, 1(Suppl 1):O40

Background: Food allergic adolescents are at highest risk for food allergy fatalities, which may be partly due to compromised self-management behaviour. Such behaviour may be negatively influenced by conflictual situations caused by child-parent disagreement on the adolescent’s Health-Related Quality of Life (HRQL). Comparisons of self- and parent-proxy-reported HRQL have never extensively been studied in food allergic adolescents. Therefore, the aims of this study were to investigate disagreement in self- and parent-proxy-reported HRQL of food allergic adolescents and to investigate the influence of participant characteristics, illness expectations and perceptions on adolescent-parent disagreement.

Methods: Teenager Form (-TF) and -Parent Form (-PFA) of the Food Allergy Quality of Life Questionnaire (FAQ(QL), Food Allergy Indepedent Measurement (FAIM) and Brief-Illness Perception Questionnaire (Brief-IPQ) were sent to Dutch food allergic adolescents (13-17 years) and their parents. ICCs, t-tests and Bland-Altman plots were used to examine adolescent-parent agreement. Factors influencing agreement were studied (linear regression).

Results: Seventy adolescent-parent pairs were included. There was a moderate correlation (ICC=0.61, p=0.001) and no significant difference (3.78 versus 3.56, p=0.136) between adolescent- and parent-proxy-reported HRQL. However, Bland-Altman plots showed relevant differences (exceeding minimal important difference) for 64% of all adolescent-parent pairs. Regression analysis showed that an older age of adolescents, poorer adolescent-reported illness comprehension (Brief-IPQ coherence) and higher adolescent-reported perceived disease severity (FAIM-TF) were associated with adolescent-parent disagreement on HRQL.

Conclusions: Adolescent-parent agreement on HRQL was moderate. Adolescent-parent disagreement on HRQL was mainly determined by the adolescent’s rather than the parent’s perceptions and characteristics. Illness comprehension may be an important target for intervention aimed at improving adolescent-parent agreement on HRQL. This may contribute to improved self-management of food allergic adolescents.

O41 Nutritional behaviour and attitudes in food allergic children
Alice Tonolli*, Laura Polloni, Antonella Muraro
Veneto Region Food Allergy Referral Centre, Paediatrics, Padua, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):O41

Background: Avoidance of food allergens requires families to adapt dietary habits, changing nutritional behaviour and attitudes. A restriction of food choice can result in a monotonous diet and impact on social life.

Objective: We investigated the influence of an elimination diet on behaviour and attitudes of food allergic patients and their families. We explored if age can influence their way of dealing with food allergy.

Methods: A specific questionnaire was filled out by 107 patients and their mothers who attend the Food Allergy Centre, Padua, Veneto. The patients (mean age 4.6) were divided into two groups: the first included 72 preschool-children from 0 to 5 years (mean 2.7), while the second group was made-up of 35 children from 6 to 11 (mean 8.46). A descriptive analysis was completed to investigate the nutritional behaviour and their attitude towards food. T-test was used to analyse the differences between the age groups.

Results: The results showed school-aged children are significantly less interested in tasting new foods (p<0.01) than younger children. Most of the children (76;71%) claimed to have a “monotonous” diet; in a rising rating scale from 1 to 5 they reported a mean score of 3.3. No differences were found between the two groups of age. When asked about causes of repetitive diet, the participants answered: strict avoidance (36%); difficulties in making traditional recipes (23), a limited choice of food industry safe products (21) and low curiosity about food (23). Regarding participation to social events involving food, 17.5% of older children reported they never attend parties. Those who participate always (22;62,5%) or sometimes (7;20%) eat only “safe foods” (45%), or bring foods from home (24%), or take on both solutions. Younger children answered “sometimes” for the majority (39;54%), a few “always” (27;37,5%) and only some “never” (6,8,5%).

Conclusion: The results underline the impact of food allergy in reducing interest about food and in influencing patients’ approach to social life. It is important to support families in arousing curiosity in children, suggesting recipes for a varied and stimulating diet.
Background: Skin prick testing and serum food-specific IgE testing are the most commonly used diagnostic tests in evaluating IgE-mediated food reactions. However, the presence of negative tests may be falsely reassuring. Immediate outcomes do not always exclude allergy. Food challenges are therefore indicated. Double-blind, placebo-controlled food challenge is the gold standard for diagnosis, but in many situations, open food challenges are a more practical alternative.

Case presentations: We present five patients, ages 27 to 58 years old, with histories of immediate-onset adverse reactions to foods. Despite having negative skin prick tests to food reagents, prick-prick tests with fresh foods and serum specific-IgE tests to the suspect foods, each individual developed symptoms, accompanied by objective signs, during open food challenges. The foods implicated included sesame, soy, chestnut, sea bass, a soft drink, and a flavoured tortilla chip. Reactions included anaphylaxis, angioedema, rhinitis, and frank anaphylaxis.

The majority of patients reacted at low doses of the tested foods. Of note, all the patients except one had negative skin prick tests to common inhaled aeroallergens. The total IgE level in all cases was within the normal range (mean 46.6 IU/ml). We consider the possible reasons for the discrepancies between allergy testing and challenge testing in each case, including the lack of sensitivity of the available tests, the presence of unidentified allergens within complex, pre-prepared foods, the role of non-IgE mediated food allergy, and the possibility of psychosomatic reactions.

Conclusion: The patient’s history remains paramount in the assessment of potential food allergy, even in the presence of negative skin prick and serum specific IgE tests. Food challenges are required to confidently exclude allergy. However, positive open challenges may produce questionable outcomes, especially in the absence of firm objective signs of an allergic response. In such cases, the double-blind, placebo-controlled challenge remains the gold-standard, despite being both labour intensive and time consuming.

O42 Positive food challenges despite negative specific IgE testing

Mellina Makatsori1, Guy Scadding, Rebecca McMenzie, Isabel Skyhala, Stephen Durham
Royal Brompton Hospital, Allergy, London, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):O42

O43 Knowledge of teachers concerning food allergies in the primary schools of Edirne city and school facilities for emergent treatment. This study was presented at XVII National Allergy And Clinical Immunology Congress Of Turkey, 3-7 December 2009 Antalya/Turkey

Mahir Ceylan1, Ufuk Berberoðlu2, Önder Balcı2, Ülker Öneþ3, Hakan Aylanç3, Mahir Ceylan1
1Trakya University Faculty of Medicine, Pediatric Allergy, Edirne, Turkey; 2Istanbul University Faculty of Medicine, Pediatric Allergy (Retiree), Istanbul, Turkey; 3Trakya University Faculty of Medicine, Public Health, Edirne, Turkey
Clinical and Translational Allergy 2011, 1(Suppl 1):O43

Objective: Aim of this study is to investigate knowledge of teachers concerning food allergies in the primary schools of Edirne city and school facilities for emergent treatment of severe food reactions.

Methods: Questionnaire forms were distributed, Questionnaire forms were distributed by a pediatrician and a research assistant who tasked in the study project and gathered back after completion of answers in the same day. Before the study, approval of local ethics committee and directorate of national education was taken.

Results: All of the 237 questionnaire forms that are distributed were gathered back. Ten and half percent of teachers declared that there were students whom have food allergy in their classroom. The most responsible foods in food allergy were reported as egg (19.4%), strawberry (9.4%), chocolate (4.2%) ve tomatoto (3%). The most commonly observed clinical findings in food allergies were defined as itching (92.4%), rash (76.8%), redness and itching of eyes (65.8), nausea and vomiting (58.2%), abdominal pain (50.6%). It was stated by 41.4% of the teachers that students whom have a life-threatening food reaction are taken to the nearest healthcare unit, 25% of the teachers stated that 112 emergency line is called and 0.8% of the teachers stated that parents of the students are notified. The rate of teachers who think that is necessary to give education about food allergy was 95.4%.

Conclusion: Despite the fact that food allergies may cause life-threatening serious reactions, in our study, the question of existence of individuals to step in to such critical reactions were answered affirmatively in low rate. There is no healthcare stuff in schools to apply immediate intervention in case of food allergies and other life-threatening allergies. We wanted to emphasize that critical reactions due to food allergy may occur during the school time and importance of having knowledge of teachers about this issue.

O44 The burden of treatment and compliance with the epinephrine auto-injector (EAI) in food allergic patients of all ages: a pilot study

Josephina C Kemira1, Beritine MU Flokstra-Dek Blok2, Oude JNG Elberink2, Anthony EI Dubois2
1University Medical Center Groningen, University of Groningen, Department of Paediatrics, Division of Paediatric Pulmonology and Paediatric Allergy, Groningen, Netherlands; 2University Medical Center Groningen, University of Groningen, Department of General Practice, Groningen, Netherlands; 3University Medical Center Groningen, University of Groningen, Department of Allergology, Groningen, Netherlands
Clinical and Translational Allergy 2011, 1(Suppl 1):O44

Background: Food allergic patients at risk for severe reactions should carry an epinephrine auto-injector (EAI). This treatment entails a burden for them and therefore may affect their compliance. Although the burden of treatment of an EAI has previously been shown to be high in vespid allergic patients, this has not yet been studied in food allergic patients. Therefore we determined the overall burden of treatment with the EAI in food allergic patients as perceived by both patients themselves and the parents of food allergic children. Furthermore, we examined the outcome of food allergic reactions requiring EAI use.

Methods: Food allergic patients of all ages prescribed an EAI, attending an allergy clinic and the parents of food allergic children (aged 0-17 years) were asked to complete the following questionnaires: the Burden of Treatment instrument (BoT), which was our primary outcome, the Food Allergy Independent Measure questionnaire (FAIM), EAI positive and negative statements, questions concerning EAI prescription and use, and descriptive questions.

Results: A total of 95 subjects were eligible for analysis. Two subjects were excluded because they did not complete the BoT. Of the remaining 93, 69 subjects (74%) were (extremely) positive about the EAI. Only 3 subjects were (slightly) negative about the EAI. In 31 patients epinephrine injection was needed, because of at least one allergic reaction. Out of these 31 patients, 11 did not carry an EAI with them at the time of the food allergic reaction. Only 2 patients (aged 16 and 21) were administered an EAI dose by someone other than themselves or their parents. There were no deaths.

Conclusion: In contrast to vespid venom allergic patients, food allergic patients and their parents are (extremely) positive about carrying an EAI. Despite this, compliance with carrying the device or using it when necessary seems to be very low.

O45 Angiotensin converting enzyme-gene polymorphisms in normal subjects, atopic individuals and those with anaphylaxis to venom, food and drugs

Veronica Varney1, Amena Warner1, Angeli Ghosh2, Alex Nicholas2, Nazia Sumar2
1St Helier Hospital, Immunology Dept, Surrey, UK; 2St Helier Hospital, Surrey, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):O45

Background: Circulating angiotensin-2 levels (A2) protect the circulation against sudden falls in blood pressure. A2 is generated by the enzymatic action of angiotensin converting enzyme (ACE) on angiotensin-1. The ACE genes have 2 allelic forms, with the presence ‘I’ or absence ‘D’ of a 287 base pair intron of the gene. The deletion ‘D’ genotype is associated with high A2 generation & higher serum ACE levels, while the insertion ‘I’ with lower serum ACE levels & ACE activity.

Aim: To examine whether these 2 inherited polymorphisms have a different profile in patients with past anaphylaxis we compared this with...
control groups which included the measurement of serum ACE levels. Method: A total of 286 subjects were analysed. 118 had previous anaphylaxis, 119 were healthy controls, 49 were atopic without any previous anaphylaxis. DNA extracted from EDTA blood was analysed for ACE gene polymorphisms using polymerase chain reactions, followed by gel electrophoresis to identify the genotypes. Serum ACE levels were also measured (normal range 20-70 U/l).

Results: See table 1 including p values from chi squared analysis. Such findings may help maintenance period of SOTI are described allergic reactions to CM and trigger factors in CM compared with those who did not have CM. The results show a significant change in the genotype frequency seen between subjects with anaphylaxis and HC.

Dividing the anaphylaxis group into 2 subgroups, there were significant differences between those with airway angio-oedema +/- cardiovascular collapse (AACVS) which is likely to be linked to ACE activity & bradykinin effects, & HC; but not between HC & cutaneous & mild respiratory symptoms (CRS) only, where histamine & not ACE is likely to be involved. The AACVS & CRS subgroups were significantly different; p=0.001. In AACVS collapse was more likely to be associated with ID, O.R. 3.3 (95% CI 1.4, 6.9) than DD genotypes p=0.001. Atopics showed a similar tendency towards a lower prevalence of DD but the difference in genotype. Anaphylaxis subjects had low serum ACE levels compared with HC (p=0.012) & atopic (p=0.002) reflecting the difference in genotype.

<table>
<thead>
<tr>
<th>ACE genotype</th>
<th>D D</th>
<th>I D</th>
<th>I I</th>
<th>Healthy Controls</th>
<th>Atopics</th>
<th>Anaphylaxis</th>
<th>Cutaneous &amp; Respiratory anaphylaxis</th>
<th>Mean Serum ACE Levels U/L±SEM</th>
<th>Serum ACE V’s Healthy Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy controls (HC)</td>
<td>53 (45%)</td>
<td>44 (37%)</td>
<td>22 (18%)</td>
<td>P=0.142</td>
<td>P=0.009</td>
<td>P=0.053</td>
<td>48.9±6.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atopic controls</td>
<td>15 (31%)</td>
<td>26 (53%)</td>
<td>8 (16%)</td>
<td>P=0.142</td>
<td>P=0.425</td>
<td>P=0.025</td>
<td>47.9±3.5</td>
<td>P=0.866</td>
<td></td>
</tr>
<tr>
<td>Anaphylaxis N=118 (%)</td>
<td>30 (25%)</td>
<td>58 (50%)</td>
<td>30 (25%)</td>
<td>P=0.009</td>
<td>P=0.425</td>
<td></td>
<td>33.2±3.0</td>
<td>P=0.012</td>
<td></td>
</tr>
<tr>
<td>Cutaneous &amp; Respiratory anaphylaxis</td>
<td>15 (56%)</td>
<td>12 (44%)</td>
<td>0 (0%)</td>
<td>P=0.053</td>
<td>P=0.025</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airway angioedema ± CVS collapse</td>
<td>13* (14%)</td>
<td>46 (52%)</td>
<td>30 (34%)</td>
<td>P&lt;0.001</td>
<td>P=0.024</td>
<td>P&lt;0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>ACE genotype</th>
<th>D D</th>
<th>I D</th>
<th>I I</th>
<th>Healthy Controls</th>
<th>Atopics</th>
<th>Anaphylaxis</th>
<th>Cutaneous &amp; Respiratory anaphylaxis</th>
<th>Mean Serum ACE Levels U/L±SEM</th>
<th>Serum ACE V’s Healthy Controls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Healthy controls (HC)</td>
<td>53 (45%)</td>
<td>44 (37%)</td>
<td>22 (18%)</td>
<td>P=0.142</td>
<td>P=0.009</td>
<td>P=0.053</td>
<td>48.9±6.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Atopic controls</td>
<td>15 (31%)</td>
<td>26 (53%)</td>
<td>8 (16%)</td>
<td>P=0.142</td>
<td>P=0.425</td>
<td>P=0.025</td>
<td>47.9±3.5</td>
<td>P=0.866</td>
<td></td>
</tr>
<tr>
<td>Anaphylaxis N=118 (%)</td>
<td>30 (25%)</td>
<td>58 (50%)</td>
<td>30 (25%)</td>
<td>P=0.009</td>
<td>P=0.425</td>
<td></td>
<td>33.2±3.0</td>
<td>P=0.012</td>
<td></td>
</tr>
<tr>
<td>Cutaneous &amp; Respiratory anaphylaxis</td>
<td>15 (56%)</td>
<td>12 (44%)</td>
<td>0 (0%)</td>
<td>P=0.053</td>
<td>P=0.025</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airway angioedema ± CVS collapse</td>
<td>13* (14%)</td>
<td>46 (52%)</td>
<td>30 (34%)</td>
<td>P&lt;0.001</td>
<td>P=0.024</td>
<td>P&lt;0.001</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 1**

**O46** Food anaphylaxis: data from registry of Center for Severe Allergic Reactions of Piemonte region (Italy)

Alberto Raie1, Sabrina Mietta1, Enrico Heffler1, Gianni Cadario2, Maurizio Galimberti3, Giovanni Rolla1

1University of Torino, Ospedale Mauriziano Umberto I, Allergology and Clinical Immunology, Torino, Italy; 2AUO SG Battista di Torino, Allergology and Clinical Immunology, Center for Severe Allergic Reactions of Piemonte Region, Torino, Italy; 3Ospedale Maggiore e della Carità, Allergology and Clinical Immunology, Novara, Italy

**Background:** Key challenges to the study of anaphylaxis are a lack of widely accepted standard working definitions, inadequate reporting of events, failure to agree on a severity threshold for classification as an anaphylactic reaction.

**Aim:** To estimate the prevalence of food-allergy anaphylaxis based on the database of the Piemonte Region (Italy). Reference Center for Severe Allergic Reactions. The registry monitors a population of 4,400,000 inhabitants and collects data mandatory for prescribing self-injectable epinephrine reimbursed by Regional Health System.

**Methods:** Anaphylaxis cases were diagnosed according to NIAID/FAAN criteria, and assigned to one of three levels of decreasing probability using a clinical checklist based on recommendations of the Brighton Collaboration.

**Results:** Among the 1315 reported cases of anaphylaxis, 541 could be classified as food anaphylaxis, with level 1 (38%), level 2 (59%), and level 3 (3%) of probability. 212 patients were children (< 18yrs, age 7.4±5.4 yrs, M/F=2:0), and 329 were adults (age 33.5±12.9 yrs, M/F= 0.5). The main implicated food allergens were nuts (31%), egg (16%), milk (15%), fish (8%) and sesame (7%) in children and nuts (26%), vegetables (14%), crustaceans (12%), fresh fruit (10%), fish (7%), legumes (6%), seeds (6%) and flours (5%) in adults.

Food-dependent exercise-induced anaphylaxis was reported in 28 patients. Skin and respiratory symptoms were reported respectively in 95% and 81% patients, with no differences between children and adults, while gastrointestinal symptoms were more frequent in children (43 vs 29%, p=0.001) and cardiovascular involvement was more frequent in adults (36 vs 16%, p<0.0001).

**Conclusion:** Food is an important cause of anaphylaxis, particularly in children (78.8% of all cases) with predominance in boys; this gender preference reverses in adulthood. Egg and milk were specific causes of anaphylaxis in children, while plant-derived foods and crustaceans were more specific in adults. Nuts and fish were triggering allergens in all ages.

Checklists and glossary of terms are crucial to harmonize the report of anaphylaxis cases to a surveillance system or epidemiological study.

**O47** Allergic reactions due to cow’s milk (CM) doses and triggering factors in 40 CM anaphylactic children during maintenance phase of specific oral tolerance induction (SOTI) treatment to CM in our unit

Marta Vazquez,1 Jose Lozano, Rosa Jimenez,Montserrat Alvaro, Olga Dominguez, Ana Maria Plaza

Hospital Sant Joan de Deu, Pediatric Allergy and Clinical Immunology Department, Barcelona, Spain

Clinical and Translational Allergy 2011, 1(Suppl 1):O47

**Background:** Allergic reactions to CM doses generate controversy about SOTI treatment. Safety data during maintenance period of SOTI are limited.

**Aim:** Describe allergic reactions to CM and trigger factors in CM anaphylactic patients during maintenance phase of SOTI (after achieving the maximum tolerated CM dose).
Patients: 40 CM anaphylactic children who underwent SOTI to CM in our Unit between 2006 and 2009.

Methods: Interview with parents. Descriptive data analysis.

Results: Median age: 10.6 years. Median maintenance period: 1.5 years. CM-IgE before SOTI: 101 KU/L. Median threshold dose at oral food challenge before SOTI: 2.5 ml. Median current daily CM dose: 200 ml.

Allergic reactions to CM: 29 children had had reactions, as follows:

A) Non anaphylactic reactions: 15 children. 8 children suffer daily from mild symptoms (4, mouth itching; 1, abdominal pain; 1, hives; 2, rhinitis) and 4 children from mild asthma 2-3/week, with no triggers associated. 6 children had 1 to 6 mild respiratory or digestive symptoms related to trigger factors.

B) 20 children have suffered from anaphylactic reactions, 50% of which are related to trigger factors. 14 patients had skin and respiratory involvement (rank: 65 to 1 episodes). 3 children had skin and digestive symptoms (rank: 4 to 1 episodes). 3 children, respiratory and digestive (rank:13 to 1 episodes). 7 children received epinephrine (39 doses). Number of children reacting to CM because of the following trigger factors: fasting, 5; exercise, 8 (66 episodes); lying, 12 (16 episodes); tiredness, 3; stress, 3; asthma exacerbation, 4; infection, 6. 9 children reacted to goat’s or sheep’s cheese and 4 to cow’s cheese. 7 children have reduced in 10 to 75% their daily milk doses because of allergic reactions.

2 children withdrew SOTI during the maintenance period due to intense and frequent reactions.

Conclusions: Allergic reactions are frequent in CM anaphylactic children during maintenance phase of SOTI. Exercise, asthma, infections, fasting, laying and stress are triggering factors. Strict follow up and education about allergic symptoms, triggers, dose reduction and treatment are crucial to contribute to safety of SOTI.

**References**

**48**

The choice of hypoallergens for fish and peach to develop food allergy specific immunotherapy (the FAST project)

Laurian Zuidmeer-Jongejan, the FAST consortium

Academic Medical Center, Experimental Immunology, Amsterdam, Netherlands

Clinical and Translational Allergy 2011, 1(Suppl 1):O48

**Background:** Classical allergen-specific immunotherapy (SIT), using subcutaneous injections with food extracts, may be effective but dangerous due to anaphylactic side-effects. The FAST project (Food Allergy Specific Immunotherapy) aims at the development of safe and effective treatment of food allergies, targeting persistent and severe allergy to fish (cod) and fruit (peach). Both are caused by a single major allergen, parvalbumin (Cyp c 1) and lipid transfer protein (Pru p 3), respectively. FAST will apply hypo-allergenic recombinant major allergens for SIT.

**Methods:** Two approaches were evaluated for achieving hypo-allergenicity, i.e. site-directed mutagenesis and chemical modification. Wildtype (wt) natural and recombinant allergens and the hypo-allergens were extensively purified and characterized physicochemically. Their stability was tested and allergenicity was compared by CAP-inhibition and histamine release experiments while immunogenicity was tested in T-cell proliferation experiments and rabbits and immunizations.

**Results:** For Cyp c 1, the mutant without calcium-binding site showed up to a 1000 times reduced allergenicity, while secondary fold and immunogenicity in rabbits. For Pru p 3 allergenicity was reduced to a similar extent (~1000-fold) for both variants in which disulfide bridges were disrupted, i.e. either by mutagenesis or by reduction/alkylation. The disruption resulted in loss of Th2 and inflammatory markers. In gastric digestion experiments, nOVA suppressed groups being fed OVA or snOVA revealed a higher expression of Th2 and inflammatory markers. In gastric digestion experiments, nOVA was degraded within minutes, whereas OVA and snOVA remained stable up to 120min. Additionally, HPLC-chip-MS/MS analysis revealed the most effective treatment of food allergies, targeting persistent and severe allergy to fish (cod) and fruit (peach).

**Conclusion:** Despite its enhanced allergenicity nOVA has a reduced oral sensitization potential due to enhanced protein digestibility and/or changes in antibody epitopes.

**Acknowledgements:** This work was supported by P21577-B11 of the Austrian Science funds FWF.

**O49**

Nitrination of ovalbumin decreases the risk for sensitization via the oral route in a mouse food allergy model


1Medical University of Vienna, Department of Pathophysiology and Allergy Research and Department of Pediatrics, Vienna, Austria; 2Medical University of Vienna, Department of Pathophysiology and Allergy Research, Vienna, Austria; 3University of Salzburg, Department of Molecular Biology, Salzburg, Austria; 4Max Planck Institute for Chemistry, Biogeochemistry Department, Mainz, Germany; 5Medical University of Vienna, Department of Pediatrics and Adolescent Medicine, Vienna, Austria

Clinical and Translational Allergy 2011, 1(Suppl 1):O49

**Background:** Previously, nitration e.g. by ambient pollutants was demonstrated to increase the allergenicity of the major birch pollen allergen Bet v 1. As also endogenous nitration during inflammation could influence food protein immunogenicity and contribute to food allergic reactions, we aimed to analyze the impact of protein nitrination on sensitization in a murine food allergy model.

**Methods and results:** BALB/c mice were fed untreated (OVA), sham-nitrated (snOVA) or nitrated ovalbumin (nOVA) with or without concomitant acid-suppression. To analyze systemic effects, mice were injected the allergens intraperitoneally (i.p.). Animals being fed OVA or snOVA with antiacids developed elevated IgE, IgG1 and IgG2a titers. Oral immunizations of nOVA under acid-suppression did not result in IgG and IgE formation. However, all i.p. immunized mice revealed high levels of IgE, which were significantly increased in the group being injected nOVA. In RBL-assays, all groups with OVA-specific IgE showed a significant increased mediator release with nOVA as trigger compared to OVA. To analyze the immune response in the involved organ, gastric tissues were screened for cytokine expression by real-time-PCR. Only the acid-suppressed groups being fed OVA or snOVA revealed a higher expression of Th2 and inflammatory markers. In gastric digestion experiments, nOVA was degraded within minutes, whereas OVA and snOVA remained stable up to 120min. Additionally, HPLC-chip-MS/MS analysis revealed the most efficiently nitrated tyrosine residue within an ovalbumin epitope recognized exclusively after oral immunization.

**Conclusion:** Despite its enhanced allergenicity nOVA has a reduced oral sensitization potential due to enhanced protein digestibility and/or changes in antibody epitopes.

**Acknowledgements:** This work was supported by P21577-B11 of the Austrian Science funds FWF.

**O50**

Efficacy of epicutaneous immunotherapy (EPIT) in a new model of peanut-induced eosinophilic esophagitis (EoE) and allergic enteropathy (AE)

Lucie Mondale1, Vincent Dioszeghy1, Véronique Dhefft1, Mélanie Ligouis2, Emilie Puteaux1, Thibaut Larcher1, Yan Cherel1, Christophe Dupont1, Pierre-Henri Benhamou1

1DBV Technologies, Paris, France; 2APEX, INRA, Nantes, France; 3Hôpital Saint Vincent de Paul, Paris, France

Clinical and Translational Allergy 2011, 1(Suppl 1):O50

**Background:** Eosinophilia is often linked to allergic gastrointestinal disorders linked to food allergy. EPIT using Viaskin® device has been described as a therapeutic method in food allergy. We developed a model of mice sensitized to peanut, exhibiting EoE and AE after exclusive feeding with peanut protein extracts (PPE). This study was conducted in order to evaluate the efficacy of EPIT.

**Methods:** After oral sensitization with PPE and cholera toxin, 30 BALB/c mice were treated weekly during 8 weeks by PPE skin applications (EPIT), 20 mice were not treated (Sham) and 10 mice constituted the control group (C). Mice were then exclusively fed with PPE. Specific IgE, IgG1 and IgG2a were monitored during immunotherapy. Esophageal and jejunal samples were taken for histological analyses.
Results: sIgE increased after oral sensitization, respectively 0.207±0.03 and 0.214±0.04 μg/mL in EPIT and Sham, with undetectable values in C. Following EPIT, sIgE decreased and sIgG2a increased, respectively 0.139±0.01 vs 0.166±0.01 μg/mL (EPIT vs Sham, p<0.05) and 14.96±0.60 vs 4.73±1.75 μg/ml (p<0.05). Esophageal eosinophilic infiltration (measured in 6 high power fields) was higher in Sham, 136±32, than in EPIT, 50±12 (p<0.05) and C, 7±3 cells/mm² (p<0.01). Esophagus mucosa thickness was increased in Sham compared to EPIT and C (p<0.001). Sham group exhibited higher mRNA levels of cytokines than EPIT: eotaxin (p<0.05), IL-5 (p<0.05), IL-13 (p<0.05). The mRNA levels of these cytokines in EPIT were similar to C. The expression of Foxxp3 mRNA increased significantly after EPIT compared with Sham and C (p<0.05). The jejunal villus/crypt ratio was lower in Sham than in EPIT and C, respectively ongoing. PBMCs (peripheral blood mononuclear cells) were purified and flow cytometry was performed on gated DCs (LSIL, BD Biosciences).

Results: DCs expressing CD103 (integrin-alpha E) and CCR9 (CCL25) have been implicated in promoting tolerance to antigens through regulatory-T cell induction. We have conducted food oral immunotherapy (OIT) clinical studies for the last 3 years at Stanford University. We hypothesized that subjects with food allergies have low CD103+ and CCR9+ expression on their DCs but that these DC populations change over time while on therapy. Methods: OIT was conducted and blood samples were drawn at baseline and approximately every 5 months during the study. The study is currently ongoing. PBMCs (peripheral blood mononuclear cells) were purified and flow cytometry was performed on gated DCs (LSIL, BD Biosciences).

Commercial case: Caucasian 16-year-old boy was referred to Immunologist Unit for food allergy investigation. Since early childhood the patient avoids ingestion of peach although without any symptoms to mention. At the age of 7 he experienced labial and palpebral angioedema, oropharyngeal pruritis and dyspnoea immediately after ingestion of a non-peeled fresh apple and melon. At 8 years of age he experienced a similar reaction after ingestion of a melon. In the exposure to peanut powder he experiences nasal and oropharyngeal pruritis. The skin prick tests performed with extracts of common aeroallergens were negative. The skin prick tests were positive with extracts of peach, apple, melon, peanut, walnut, hazelnut and almond. Specific IgE was elevated for peach peel and pulp, apple and melon peel, walnut, raw and roasted peanut, hazelnut and for purified peach LTP. The molecular mass of the IgE binding bands was calculated by SDS PAGE immunoblotting with identification of 15-17 kDa bands in all the extracts assayed (apple, melon and peach peel and walnut). Immunoblotting inhibition method was performed with apple peel extract in solid phase and purified LTP (Pru p 3) in inhibition phase with a total IgE binding inhibition. The proteomic study confirmed LTP nature of melon protein involved in allergic reaction. The patient had an indication of a strict avoidance diet (rosacea fruits, melon, peanut, tree nuts) and use of IM epinephrine kit.

Discussion: We present a clinical case of severe allergy to botanically unrelated, plant-derived foods. LTP involvement was supported by a clinical history of oral allergy to melon and positive SIT and IgE testing. We present this case report to illustrate the utility of LTP-specific IgE testing as a diagnostic tool. This case further supports the role for food allergy patients undergoing OIT. These tolerogenic DC populations may play an important role in the development of tolerance to food antigens. Future studies would benefit from the use of quantitative proteomic analysis to identify potential LTP determinants for development of OIT.

Conclusion: This study provides important insights into the role of LTPs in allergy to melon. The findings further support the potential role of LTP-specific IgE testing as a diagnostic tool for patients with food allergies and highlight the need for further research to identify potential LTP determinants for development of OIT.
The importance of amino acids previously identified as crucial for profilin with maximal dimensions. Such recombinant mutated αS1-casein commonly show allergic reactivity. This work was in part funded by the EC through a grant from the 6th Framework Programme for Research (2005-2008).

Methods: The importance of amino acids previously identified as crucial for IgE-binding was evaluated in the context of the whole protein. The binding of αS1-casein specific IgE from 14 patients with CMA on recombinant αS1-casein and two mutant forms in which critical amino acid residues for IgE-binding have been mutated was measured by indirect ELISA and competitive ELISA.

Results: For the majority of the patients, mutation reduced significantly IgE-binding but did not suppress it completely. Thus, most of the patients likely produce IgE directed against epitopes, until now, considered as minor. Nevertheless, we observed a great variability in patient responses. For some patients, the complete suppression of IgE-binding was achieved.

Conclusions: Such recombinant mutated αS1-caseins with reduced IgE-binding ability can be useful for the development of CMA immunotherapy.

P4 Expression, purification and crystallization of wheat profilin (Tri a 12)
Margit Cichna-Markl1, Peter Forstenlechner2, Karin Hoffmann-Sommergruber1, Dalibor Milić3, Dubravka Matković-Čalogović4, Christina Eckl1
1University of Vienna, Department of Analytical Chemistry, Vienna, Austria; 2Medical University of Vienna, Department of Pathophysiology and Allergy Research, Vienna, Austria; 3University of Zagreb, Laboratory of General and Inorganic Chemistry, Zagreb, Croatia

Clinical and Translational Allergy 2011, 1(Suppl 1) S4

Wheat profilin, designated Tri a 12, has recently been found to be recognized by specific IgE antibodies in patients suffering from bakers' asthma, wheat induced food allergy and also in patients with grass pollen allergy. Since profilin sequences are highly conserved among plants, individuals who are sensitized to profilin commonly show allergic symptoms to a large number of unrelated plants. Knowledge about the three dimensional structure of these allergenic proteins is necessary to gain information on the surface structure required to predict cross-reactivity. However, in contrast to other plant profilins, the three dimensional structure of Tri a 12 has not been resolved yet.

In the present study Tri a 12 was expressed in E. coli and purified from the soluble fraction by affinity chromatography. The molecular weight and the structural integrity of the recombinant protein were verified by mass spectrometry and circular dichroism, respectively. Recombinant Tri a 12 showed intact secondary structures of mixed alpha helices and beta sheet elements characteristic for members of the profilin family. This well characterized batch of purified recombinant wheat profilin was then used for crystallization.

Crystallization conditions were screened with the sitting-drop vapour-diffusion method. The best crystals of wheat profilin with maximal dimensions between 0.1 and 0.3 mm were observed after one week at 290 K for reservoir solutions containing 3.2-3.7 mol L-1 sodium formate and 50 mmol L-1 HEPES-NaOH buffer, pH = 7.5. A data set diffraacting to a resolution of 3.3 Å was collected in-house from a single crystal. The crystals belonged to space group P2_12_1, with unit-cell parameters a = b = 58.9 Å, c = 82.5 Å, α = β = 90° and γ = 120°. Model building and refinement of the crystal structure, as well as further optimization of crystal diffraction quality is under way.

Acknowledgements: This work was in part funded by the EC through the EuroPrevall project (FOOD-CT-2005-25 514000), by CEEPUS CII-HU-00110-04-0910 and by the Ministry of Science, Education and Sports of the Republic of Croatia (Grant No. 119-1193079-1084).

P5 LTP sensitization and clinical features: diagnostic role of microarray tool
Annalisa Ferli1, Paolo Colombo1, Giuseppe Liotta1, Angela Bonura2, Stefania La Grutta3, Angela Zucchi2,4
1Consiglio Nazionale delle Ricerche, Istituto Biomedicina e Immunologia Molecolare, Palermo, Italy; 2Agenzia Regionale per la Protezione dell’Ambiente, Palermo, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1) S5

Background: The use of the microarray tool is an essential advantage in the allergy diagnosis process in patients with multiple sensitizations showing clinical patterns attributable to the underlying cross-reaction to a single or multiple panallergens. Among panallergens LTP is a thermostable and resistant to pepsin digestion allergen. This features makes it a potent food allergen and explains the frequent development of systemic symptoms.

Objective: Identify the allergen source which is causing complex clinical patterns in pediatric patients with multiple sensitizations.

Methods: We studied 11 opiatechildren (6-15 years, range 6-17 years) with multiple sensitizations and high degree of severity of systemic manifestations: 4 patients had generalized urticaria, 5 patients had angioedema, and 2 patients had anaphylaxis. All children filled a questionnaire related to the personal history of allergy and underwent to the SPT with commercial extracts and fresh food. The in vitro test were performed to assess the total IgE, eosinophil count and to search the specific IgE recombinant allergenic molecules with microarray technique.

Results: The most significant result is the finding of sensitization to the family of panallergens LTP in 7 of 11 patients. In the majority of patients (63.6%) with high severity of clinical manifestation, e.i. anaphylaxis and generalized urticaria the LTP sensitization was the only allergen source confirming the role of this molecule in the cross-reaction mechanism.

Conclusion: This study provided us a good information in the diagnostic evaluation process of pediatric patients with allergic multiple sensitizations and serious clinical patterns in order to plan in real life the long-term management considering the applicability of preventive measure.

P6 Cross-reactivity of pollen and food allergens: soybean Gly m 4 is a member of the Bet v 1 superfamily and closely resembles yellow lupine proteins
Paul Rosch1,*, Hanna Berkner1, Philipp Neudecker1, Diana Mitag2, Barbara Ballmer-Weber3, Peter Lenz1, Kristian Schweimer4, Stefan Vieths5
1Universität Bayreuth, Biopolymere, Bayreuth, Germany; 2University Hospital, Dermatology, Zürich, Switzerland; 3Universitätsklinikum Regensburg, Klinische Chemie und Laboratoriumsmedizin, Regensburg, Germany; 4Paul-Ehrlich-Institut, Allergologie, Langen, Germany
Clinical and Translational Allergy 2011, 1(Suppl 1) S6

In many cases, patients allergic to birch pollen also show allergic reactions after ingestion of plant-derived food. This observation is explained on the molecular level by cross-reactivity of IgE antibodies induced by sensitization to the major birch pollen allergen Bet v 1 with homologous food allergens. As IgE antibodies recognize conformational epitopes, a precise structural characterization of the allergens involved is necessary to understand cross-reactivity and thus to develop new methods/crystals of wheat profilin with maximal dimensions between 0.1 and 0.3 mm were observed after one week at 290 K for reservoir solutions containing 3.2-3.7 mol L-1 sodium formate and 50 mmol L-1 HEPES-NaOH buffer, pH = 7.5. A data set diffracting to a resolution of 3.3 Å was collected in-house from a single crystal. The crystals belonged to space group P2_12_1, with unit-cell parameters a = b = 58.9 Å, c = 82.5 Å, α = β = 90° and γ = 120°. Model building and refinement of the crystal structure, as well as further optimization of crystal diffraction quality is under way.

Acknowledgements: This work was in part funded by the EC through the EuroPrevall project (FOOD-CT-2005-25 514000), by CEEPUS CII-HU-00110-04-0910 and by the Ministry of Science, Education and Sports of the Republic of Croatia (Grant No. 119-1193079-1084).

P7 Precocious eczema and unexpected anaphylaxis to seafood
Giuseppe Mennà1, Nicola Antonio Romeo1, Sonia Ferrarini2, Alessandra Pratesi1, Chiara Baglioni1, Christiane Begemann1,4, Marco Santini1,4,5
1ISS - State Hospital - San Marino Republic (RSM), Pediatrics, Borgo Maggiore, San Marino; 2Clinical and Translational Allergy 2011, 1(Suppl 1) S7

Background: Assessment of allergic food reactions may be complicated by cross-reactivity among certain food families and seemingly unrelated allergens. Analysis can identify protein sequence and allergenic properties. Fish and its derived play an important role in nutrition, they may also be a potent food allergen. Gad-cl, Parvalbumin, the major
codfish allergen, is considered as a panallergen as in seafood the Tropomyosin (muscle-derived protein) have been recently demonstrated in invertebrates such as cockroaches, mites, shrimp. The clinical symptoms related to IgE-mediated fish allergy are frequently urticaria, angioedema, mild oral symptoms, worsening atopic dermatitis, respiratory symptoms (rhinitis, asthma),gastro intestinal (nausea,vomiting). Anaphylaxis may occur.

Objective: In view of a possible cross-reactivity between food allergens and related allergens from environmental sources.

Methods: A 4 yrs children, family atopic risk, severe atopic eczema in the first year and anaphylaxis to fish and seafood during first introduction at 4 years. Positive skin test to egg, RAST ovalbumin 1.3 KU/L, RAST at age two Grasses 23.2 KU/L. Anaphylaxis (Sampson,2003-2nd) to codfish at first injection, to shrimp after 3 months.

Results: Positive skin to house dust mite (HDM) and cockroach mix were reported. At control, positive RASTo grasses, mites, and recombinant Pen1, Gad 1.

Conclusions: some subjects allergic to HDM or cockroach show substantial IgE antibody reactivity to the major shrimp allergen Pen a 1 (tropomyosin). Based on inhibition with cockroach and dust mite extracts, this reactivity appears to be due to cross-reacting tropomyosins. This patient showed the literature evolution in cross-reactivity: precocious sensitization to egg, correlation to mite and linkage to mite and seafood. And asthma? Follow up of course.

Reference.

P8 Negative predictive values for three main groups of medications for quickly resolve food allergic reactions in children
Adnan Bajraktarevic1*, Andrea Pahor Kurilic2, Sanja Putica1, Begele Begovic2, Amina Selimovic1, Asmir Musabegovic1, Teodora Frankic3, Haris Niksic1, Nermina Korac2, Aida Dujlepa Djurdjevic1, Branka Djukic2, Lutvo Sporopsvic1
1Public Health Institution of Canton Sarajevo, Pediatrics Department, Sarajevo, Bosnia and Herzegovina; 2Clinical Medical Center Sarajevo, Clinical Pharmacology, Sarajevo, Bosnia and Herzegovina; 3Pediatrics Clinic Sarajevo, Department for allergology and pulmonology, Sarajevo, Bosnia and Herzegovina, Sarajevo and Herzegovina; 4Pharmacy Faculty Sarajevo, Clinical Pharmacology, Sarajevo, Bosnia and Herzegovina; 5First Medical Aid New Sarajevo, Pediatrics Department, Sarajevo, Bosnia and Herzegovina
Clinical and Translational Allergy 2011, 1(Suppl 1):P8

Background: The pediatrician plays an important role in contributing to the management of children with food allergies. Antihistamine drugs are used to control or alleviate the allergy symptoms like, skin rash or hives and breathing difficulties, by counteracting the effects of histamine. Dexamethasone is a potent corticosteroid and it acts as an anti-inflammatory and immunosuppressant. Adrenaline or epinephrine is the drug of choice for treating anaphylaxis.

Methods: We describe the recruitment of 1000 children for participation in a randomized trial examining the effectiveness of strategies for the management of pediatric food allergy reactions for shorter time maximal up to five days during period 2000-2010. Depends from severity of allergy and level of allergic reactions, authors used first oral antihistamines, loratidine, second intramuscular corticosteroid, dexamethasone and third intravenous catecholamine, epinephrine in doses for rules of allergy reactions by food in children.

Results: Statistics calculation and negative predictive values for three main groups of medications for quickly resolve food allergic reactions in children showed that loratidine has had no success in 16% cases, after that dexamethasone in following therapy for only about 2.5% cases, and the end as third adrenaline for 0.3% cases in children age 0 to 19. Reported food allergy is increasing among children of all ages, among boys and girls, and among children of different Bosnian ethnicities. There were no differences in responding on therapy of this three groups of medication related on sex and members for region, but significant bad response on therapy on Roma children population.

Conclusions: The most significant reactions in children are attributable to industrial meat as sausages and hot dogs, egg, strawberries, peanut, tree nuts ( walnut, etc), milk, fish, shellfish, citrus fruits, herbs, soy, tomato and wheat. Longitudinal follow-up of the effect of antiallergic therapy on children and satisfaction with therapy of these parents and their families is currently underway.

Key Words: Food Allergy, Children, Antihistamines, Corticosteroids, Epinephrin

P9 Investigation of different commercial fining agents by SDS-PAGE and immunoblot
Marina Deckwarta, Carsten Cartens, Markus Fischer, Angelika Paschke-Kratzin
University of Hamburg, Institute of Food Chemistry, Hamburg, Germany
Clinical and Translational Allergy 2011, 1(Suppl 1):P9

Allergenic fining agents and processing aids from hen’s egg and cow’s milk used in wine production are hidden allergens and could demonstrate a health threat for allergic persons. Hence, the European parliament adopted Directive 2003/89/EC amending 2000/13/EC to declare ingredients, contaminations and processing aids which are known to trigger allergic reactions. The Amendment Directive 415/2009/EC excludes the labeling of wine which are processed with eggs or milk and products thereof until the 31st of December 2010. In 2006 Rolland et al. did a double-blind, placebo-controlled trial and basophil activation analysis about potential food allergens in wine including 5 egg-allergic and 1 milk-allergic patients. Among others they collected 24 egg white-fined or whole egg-added red wines, 34 milk-fined white wines and 25 casein-fined white wines. In this study no anaphylaxis was induced by wine consumption. But adverse reactions against treated wines could not be excluded. Due to the rarity of adult milk or egg-allergic patients reliable statistical analysis of allergic reactions against milk or egg-fined wines is inhibited.

Casein, ovalbumin/hen’s egg white and lysozyme products of different commercial producers were investigated by SDS-PAGE and immunoblot. These investigations show that every product contains beside casein, ovalbumin or lysozyme other milk or egg allergens respectively in different amounts. The investigations show the necessity to have analytical methods for determination of residues of fining agents or stabilizers in wine which are able to detect not only casein, ovalbumin and lysozyme but also take into account the other milk and egg allergens. This could be guaranteed by certain antibodies used in ELISA systems binding not only to casein, ovalbumin or lysozyme but also to the other allergens in processed casein, ovalbumin or lysozyme for wine production. Therefore polyclonal antibodies raised against fining agents casein and ovalbumin and stabilizer lysozyme of one fining agent producer were used in this study.

P10 Adsorption of allergen protein at surfaces
Nasser Al Shabib
Leeds University, Food science and Nutrition, Leeds, UK
Clinical and Translational Allergy 2011, 1(Suppl 1):P10

Cleaning of processing equipment in the food industry and of surfaces in catering and domestic environments is a key issue in prevention of accidental exposure of individuals with food allergy to allergenic foods. Despite this, little systematic work has been carried out understanding adsorption processes and the effectiveness or otherwise of cleaning procedures. The limiting factor in studying allergenic proteins at surfaces is our inability to reliably detect and quantify allergen proteins that may have undergone denaturation, whether through the adsorption process or through other factors such as thermal treatment. Antibody-based methods are notoriously susceptible to changed responses to different forms of the same protein - despite the commercial availability of diagnostic kits for testing ‘swabbed’ surfaces. We have tried to use a specific ELISA-based assay for ovomucoid alongside a non-specific chemical method for protein detection to study adsorption of the protein to different surfaces (stainless steel, formica and glass). Protein recovery was effected with the use of cotton swabs. Statistical analysis of the data (ANOVA) was carried out to determine the effect of different factors on
the efficiency of ‘sticking’ of the protein at the surfaces. The results (p<0.05) showed significant effects from some factors but not all. We were also able to compare the effectiveness of the chemical and ELISA methods. This is the first time that a validated immunochemoanalytical method and a chemical assay have been used to investigate the behaviour of allergen proteins at surfaces and forms part of a comprehensive study of the behaviour of allergen proteins on different surfaces.

P11 Rhinitis induced to mace
Gema Varensa Sanchez Moreno1*, Soledad Terrados Cepeda1, M Pilar Berges Gimeno1, Maria Peña Pelacho1, Ricardo Madrigal Burgaleta1, F Javier Solà Martínez1, Dario Antolín Amerigo1, Cristina Vlaciuc-Petruta1, Emilio Alvarenga-Cuesta*1
1Ramon y Cajal Hospital, Allergy Division, Madrid, Spain, 2Ramon y Cajal Hospital, Head Allergy Division, Madrid, Spain
Clinical and Translational Allergy 2011, 1(Suppl 1):P11

Background: Spice allergy represents approximately 2% cases of food allergy. There are many botanical families, but Apiaceae and Liliaceae had been commonly involved in cases of occupational asthma and food reactions. Published literature.

Methods: We present a case of 15-year-old male with peach allergy since childhood and grass pollen rhinitis, who showed cough and sneeze after eating spicy sausages on several times. These contained mace, ginger and garlic. After signing informed consent, oral controlled challenge with the same spicy sausages was positive so we developed allergy study.

Results: Skin prick test to mace and ginger (10%) were positive and specific IgE to Pru p 3 and mace were detected. Double-blind, placebo-controlled, oral food challenge (DBPCFC) with this spice showed rhinitis in few minutes and was negative to ginger. Through electrophoresis of peach, Pru p 3, mace and ginger extracts were identified and the corresponding proteins purified and characterized as allergens. Mace extract was recognized by both anti-Pru p 3 and antiTLPs antibodies, however immunoblotting study with patient sample demonstrated proteins bands immunodetection in this extract with similar molecular weight to peach thumatin. Finally skin prick tests with these purified allergens (Pru p 2.1 y 2.2) were positive.

Conclusion: Thaumatin-like proteins are a new family of pollen and fruit allergens. Because of the sequence homologies between Pru p 3 proteins and thumatin, an intensely sweet tasting protein isolated from the fruits of the West African rain forest shrub Thaumatococcus danielli, these molecules are referred to as thaumatin-like proteins (TLPs). To our knowledge, this is the first report on the implication of TLPs in spice allergy. Unfortunately, information on fundamental aspects of the TLP family remains quite limited, this means that challenging fundamental and applied studies need to be conducted to characterize TLP’s significance and clinical involvement.

P12 How allergenic are hypoallergenic formulae in patients with severe cow’s milk protein allergy?
Angela Claver, Javier Bono, Isabel Guillar
Hospital Universitario Miguel Servet, Pediatric Allergy, Zaragoza, Spain
Clinical and Translational Allergy 2011, 1(Suppl 1):P12

Background: In patients diagnosed of severe IgE-mediated cow’s milk protein allergy (CMPA), skin prick tests (SPTs) using special milk formulae, can provide useful information, not only on the clinical course and severity of each case, but also on the tolerance and allergenicity of the tested substitute milks.

Materials and Methods: In the last 5 years (2005-2009) 7-8 patients (9-17 years) diagnosed with severe CMPA were evaluated with SPTs and cow’s milk specific IgE in vitro determination (casein sIgE levels varied between 127 and 1860 KU/L). We performed the SPTs for 17 different cow’s milk products (SF, HF-S and AaF). We performed the SPTs for 17 different cow’s milk products on days 20 and 29 to initiate disease and then allowed mice to recover until they were re-exposed to OVA for the induction of a disease exacerbation. We fed mice pellets containing 33% Bt (MON810)- or isogenic-con vs. normal mouse food containing no corn for 4 weeks prior to inducing disease or inducing disease exacerbation. To evaluate the effects of the Bt-corn on OVA-induced disease, we measured lung and airway inflammation, mucus hypersecretion and OVA-specific antibodies. We observed that Bt-corn feeding had no effect on OVA-induced allergic disease or exacerbations indicating that Bt-corn using this protocol has no impact on the propensity for another allergen to initiate allergic disease or induce disease exacerbations in mice.

P13 Effect of feeding genetically modified Bt-corn on allergic disease
Daniela Reiner*, Rui-Yun Lee, Michelle M Epstein
Medical University of Vienna, Vienna, Austria
Clinical and Translational Allergy 2011, 1(Suppl 1):P13

The rising prevalence of allergic disease in the last decades is unexplained. However, it has been postulated that the widespread introduction of genetically modified (GM) foods since 1996 may play a role in this evolving allergic disease epidemic. Currently, the most common GM plant is the genetically engineered Bacillus thuringiensis (Bt)-corn. This transgene confers resistance against corn borers leading to an enormous economic benefit. Corn products are found in a diverse variety of foodstuffs. Our hypothesis is that Bt-corn consumption influences allergic disease. We sought to determine whether feeding Bt-corn to mice would influence allergen-induced disease to a non-crossreactive allergen. To examine the influence of GM corn feeding on, the initiation and exacerbation of ovalbumin (OVA)-induced allergic asthma, we injected female BALB/c mice on days 0 and 21 with OVA intraperitoneally and nebulized them with OVA on days 28 and 29 to initiate disease and then allowed mice to recover until they were re-exposed to OVA for the induction of a disease exacerbation. We fed mice pellets containing 33% Bt (MON810)- or isogenic-con vs. normal mouse food containing no corn for 4 weeks prior to inducing disease or inducing disease exacerbation. To evaluate the effects of the Bt-corn on OVA-induced disease, we measured lung and airway inflammation, mucus hypersecretion and OVA-specific antibodies. We observed that Bt-corn feeding had no effect on OVA-induced allergic disease or exacerbations indicating that Bt-corn using this protocol has no impact on the propensity for another allergen to initiate allergic disease or induce disease exacerbations in mice.

P14 Development of DNA sensor crustacean allergen analysis in food products
Nisamee Charoenchon*, Piyasak Chaumpluk
Chulalongkorn University, Department of Botany, Faculty of Science, Bangkok, Thailand
Clinical and Translational Allergy 2011, 1(Suppl 1):P14

Crustaceans is one of the most common causes of food allergies. Its persistency is life-threatening therefore, method to detect the presence of crustacean constituent in food products would be indispensable to ensure the safety. We have developed a simple and rapid method to detect the presence of crustacean residues in food products through the allergenic Pen gene. Detection method was based on isothermal DNA amplification using primers specific to target Pen genes. Detection of DNA products was based on fluorescence visualization on UV light source after competitive DNA hybridization using fluorescence beta-pyrroridinyl peptidyl nucleic acid probe and its corresponding quencher. This method seeks to determine whether feeding Bt-corn feeding had no effect on OVA-induced allergic disease or exacerbations indicating that Bt-corn using this protocol has no effect on the propensity for another allergen to initiate allergic disease or induce disease exacerbations in mice.
The Platform of Food Allergens was formally created in Argentina in April 2009. It is a multidisciplinary discussion forum formed by professionals from different government institutions such as the National Institute of Agricultural Technology (INTA), National Institute of Industrial Technology (INTI), National Institute of Foods (INAL); School of Pharmacy and Biochemistry (Buenos Aires University), School of Exact Sciences (La Plata University); members of the Argentine Allergy and Clinical Immunology Association and the "Forum of parents of allergic children", medical doctors from the Argentine "Children's Hospital "Ricardo Gutierrez", and an important number of food industry companies. The aims of the Platform, as a non profit organization, are:

- To anticipate future demands, since this issue is still a vacuum in Argentina.
- To collaborate with the regulatory authorities in enhancing the legal frame of the declaration of food allergens in prepackaged foods.
- To provide the food allergic population with information and guarantees at the time of the selection of foods.
- To provide the food industry with information and guidance for food allergen management. In order to achieve these challenges, the platform was organized in four working groups: "Management of Food Allergens in the Food Industry" "Detection Methods of Allergens in Foods" "Legal Frame of Food Allergens" "Clinical Issues of Food Allergies" These four groups work independently and also in mutual collaboration, in order to cover the entire spectrum of requirements. The objective of this presentation is to show some of the activities and achievements, which these working groups have obtained since the Argentinean Platform was created.

Food allergy is a public health concern in almost all over the world. Although allergic responses to food allergens vary markedly due to geographical differences, the lists of allergenic ingredients enshrined in different legislations are based on the original Codex recommendations with some regional variations. The patterns and prevalence of food allergy in Argentina -according to a survey carried out by the Argentine Allergy and Clinical Immunology Association in 2007- show that 75% of the population suffered from a "potential" food allergy to one of the "big eight" listed in the Codex Standard. Latin American countries are incorporating the allergens declaration in the ingredients list of prepackaged foods. Even though most of them follow Codex Standard, there are exceptions. One of them is from Argentine legislation, which came into force last September. In general, the legislation follows the Codex list and adds some of the EU exceptions, however it includes tartrazine recommendations. Regarding the permission for the use of precautionary labelings, its use is explicitly forbidden. Although, different legislations do not include potential cross contamination and there are currently no international agreements in relation to regulatory or advisory limits, precautionary labeling is used worldwide or at least it is not explicitly forbidden.

The aim of this presentation is to show the situations that have aroused in Argentina after the application of this new legislation and the collaborative actions carried out by the Platform of Food Allergens and the Argentinean government. These issues are related to the food industry and to allergic patients, which might become a future matter of concern for international trade.
tomato extracts obtained from whole tomatoes and chemically peeled tomatoes.

Methods: The thermal damage index in all tomato derivatives was determined chromatographically by detecting furosine level, which allowed us to divide the commercial products in low, medium and highly thermally damaged. SDS-PAGE and immunoblotting on samples of these three groups was performed. We used the patients’ sera from our previous study after obtaining informed consent. Five patients had a documented positive history of severe allergic reactions to tomato, fresh or household cooked or industrially processed, and were exclusively reacting to tomato LTP. Other five patients experienced oral allergy syndrome (OAS) grade I-II when eating fresh tomatoes and were sufferers from birch pollinosis and not reacting to tomato LTP.

Results: In LTP-positive patients, no statistical difference between chemically peeled and raw extracts was detected by means of skin tests. Any grade of thermal damage (low, medium or high furosine index) induced a significant reduction in tomato allergenicity in birch pollen-positive LTP-negative patients, while none of the investigated technological processes reduced the IgE-binding to tomato LTP in LTP-positive patients.

Conclusions: LTP-positive patients with clinical symptoms to tomatoes should avoid commercial tomato products even if subjected to high thermal treatment.

P20

Food matrix and processing affect almond protein release during simulated digestion

Giuseppina Mandalari1, Giuseppe Bissignano2, Martin Wichmann3, Leatherhead Food Research, Leatherhead, UK

Understanding the fate of proteins during digestion is of especial relevance to understanding the basis of food allergies. Little is known of the immunological mechanisms involved in the sensitisation of an individual towards a food and, with the exception of the fruit and vegetable allergens (which appear to be secondary responses to tree and weed pollen allergens), it is thought that food allergens (or fragments thereof) must cross the gastrointestinal (GI) mucosa in order to interact with the immune system. This is also a prerequisite for an allergen to elicit a reaction in an individual who has already become sensitised. When food is ingested it is crushed and sheared in the mouth where it is mixed with saliva, subjected to gastric processing for a variable period where the pH may fall to as low as 2 and on entering the small intestine it is neutralised and subjected to the duodenal, jejunal and ileal environments on its passage to the large intestine. During all these phases it is mixed with enzymes (amylases, proteases, lipases) and in the duodenum to detergents (bile salts).

Here we describe the release of almond protein during simulated GI digestion and the effects of food matrix and processing on its release. A Dynamic Gastric Model (DGM) was used to represent the in vivo physiological conditions of the gastric environment with addition of acid secretions, gastric enzymes and surrogates. Results obtained by SDS-PAGE analysis and HPLC showed a slower kinetic of protein digestion when almond flour was incorporated within a chocolate dessert and a Victorian sponge. In-gel tryptic digestion coupled with MALDI-ToF/ToF mass spectrometer was used to follow the rate of almond protein digestion in the food matrix.

Food matrix and processing affect digestibility of almond protein in the upper GI tract.

This work has been funded by the Almond Board of California.

P22

Cross reactivity between cypress pollen and food plants measured by prick test and immunocap

Alejandra Medina Hernandez1, Guadalupe Zaldívar-Lelo de Larrea2, Carlos Sosa-Ferreyra3, 1University of Queretaro, Medicine Faculty, Queretaro, Mexico; 2Queretaro University, Faculty of Medicine, Queretaro, Mexico; 3Queretaro University, Biologicals Science faculty, Queretaro, Mexico

Clinical and Translational Allergy 2011, 1(Suppl 1)P22

The reason for the increase in food allergy are unknown, due the short period of time that has been presented, it is suggested tan environmental factors have greater impact than genetics. The geographical conditions of Queretaro and having a large industrial corridor are risk factors for development of allergy problems. In Mexico there are no prevalence studies of food allergies and therefore the most common food allergens. We try to identify common allergen sensitization and determine if there is cross-reactivity between cypress pollen and food plant most commonly consumed in Queretaro city. We performed a correlatin study in patients allergic to cypress pollen to determine if there is cross-reactiv between it and food plants by skin prick test and specific sera titers by immunocap technique. We studied 22 patients, mostly with allergic rhinitis (95.5%), 11 with asthma (50%), 10 patients (45.3%) had no first-degree relatives with atopy. The reported heartburn associated with food intake was 40.1%, while urticaria or discomfort in the oropharynx was 27.2%, 22.7% for edema lips, paleitach or constipation. Using Pearson correlation coefficient was found relationship with apple (0.99), wheat (0.98), celery (0.98), peanut (0.96), melon (0.93), lentil (0.91), tomato (0.91), beans (0.89), avocado (0.87), soybeans (0.82), chickpea (0.81), maize (0.79), pepper (0.79). Although literature reported only association between cypress and tomato, we found relation with other food plants.

P23

Single center experience: clinical features of children with atopic dermatitis

Aységül Akan*, Mustafa Ergocoglu, Ayşenur Kaya, Dilek Aşıkur, Celal Özcan, Muge Toyran, Ersoy Civelek, Can Naci Kocabas, Ankara Hematology Onkology Children’s Training and Research Hospital, Pediatric Allergy, Ankara, Turkey

Clinical and Translational Allergy 2011, 1(Suppl 1)P23

Background: Atopic dermatitis (AD) is a common chronic skin disease that can vary in degree of severity. The factors affecting the severity of AD are not known well. In this study, the clinical features of patients with different disease severity were compared if there is any significant difference between patients with mild, moderate and severe atopic dermatitis.

Methods: The patients with AD admitted to outpatient clinic of pediatric allergy department from 1 January 2010 to 30 June 2010 were enrolled to the study. The disease severity and risk factors of the patients were assessed according to the SCORAD index. Skin prick test (SPT) for common food and inhalent allergens were performed to all patients with atopic dermatitis. The food specific IgE blood tests (Phadia ImmunoCap Uppsala, Sweden) were performed to 105 patients selected patients who had symptoms on the basis of clinical history.

Results: Total of 134 patients were evaluated with average age of 31±4.5 months, 58.2% of patients were male. The mean age of the start of symptoms and the duration of breastfeeding were 8.2±1.2 and 8.8±5.0 months, respectively. The frequency of taking cow’s milk in the first year of life was 29.1% (n=39). The 29.9% of patients had family history of atopy.
Peripheral blood eosinophil ratio was 3.3% (2.0 -5.0) (median, interquartile range 25-75%) and total blood IgE level was 32.6 (10.4-100.0) kU/L. The 70.1% of patients was higher than the normal range for age. The SCORAD index was 36.1 (26.4-45.6). The frequency of mild, moderate and severe atopic dermatitis among the patients were 19.4, 62.7 and 17.9%, respectively. The 42.5% of patients were sensitized to the allergens tested. The most frequent sensitized allergens were egg white (26.9%), cow’s milk (10.4%), wheat (6.0%). Among the patients with different severity, there were no significant difference according to gender, the status of atopy, age, the beginning age of symptoms, the percent of peripheral blood eosinophil, family history of atopy, serum IgE level.

Conclusions: The atopic symptom form was moderate AD. There were no differences of clinical features among mild, moderate and severe atopic dermatitis.

P24 Predictors of childhood food allergy
Suleiman Al-Hammadi1, Taoufik Zoubedi2
1 UAE University, Pediatrics, Al Ain, United Arab Emirates; 2 UAE University, Statistics, Al Ain, United Arab Emirates
Clinical and Translational Allergy 2011, 1(Suppl 1):P24

Background: Food allergy is a relatively common pediatric problem, affecting 5-8% of young children. Its occurrence is strongly associated with other atopies, and it is a main cause of anaphylaxis in children. The disease, like other atopies, appears to be familial. Genetic and environmental factors (e.g., diet in infancy, aeroallergens and geography) predispose to food allergy.

Methods: This a cross sectional study. To assess which characteristics were associated with food allergy, we conducted simple logistic regressions of each type of atopy with food allergy as the dependent variable. A p<0.05 was considered significant. In the data modeling, we did not assume any hierarchical effects of families and schools on the food allergy status of participating children. Therefore, logistic regression with fixed effects only was used in modeling the data. Stepwise multilogistic regression with forward entry was used to determine a subset of characteristics that predicts the best the presence of food allergy within the target population.

Data were analyzed using SPSS statistical package (version 18).

Results: Three hundred ninety-seven children (205 female) were enrolled on the study. The mean (SD) age was 7.2 (1.1) years. Two hundred seventy-one (68.2%) were fed solely human milk, 122 (30.7%) were fed human milk supplemented with cow milk protein-based formulas. Significant associations were present between childhood food allergy and personal atopic dermatitis (p<0.001), asthma (p<0.001) and rhino-conjunctivitis (p<0.05). Significant associations present between childhood food allergy and an immediate family member with food allergy, asthma, atopic dermatitis, or rhino-conjunctivitis. The best predictors of food allergy were personal atopic dermatitis (p=0.000), personal asthma (p=0.000), father with atopic dermatitis (p=0.005) and father with rhino-conjunctivitis (p=0.001).

Conclusions: The data confirm childhood food allergy is significantly associated with personal or family atopy (asthma, eczema or rhino-conjunctivitis). Similarly, paternal atopic dermatitis and rhino-conjunctivitis are shown here to be among the best indicators of childhood food allergy.

P25 Pine mouth syndrome – an emerging food hypersensitivity?
Ernest Kwegyir-Afful1, Lowri DeJager2
1 University of Cape Town, Division of Allergy, Paediatrics and Child Health, Cape Town, South Africa
2 Clinical and Translational Allergy 2011, 1(Suppl 1):P25

Between July 2008 and November 2010, the US Food and Drug Administration (FDA) received 197 consumer reports of prolonged taste disturbances following consumption of pine nuts. Most consumers consistently reported a delayed bitter or metallic taste with foods beginning 4 to 48 hours after pine nut consumption. This bitter taste recurred with any food consumed, lasting on average 5 to 10 days. Symptoms resolved in all cases without serious health consequences. To evaluate these complaints, a questionnaire was developed to address specific characteristics of the pine nuts consumed, associated symptoms and pertinent medical history, including allergies. In total, 130 of 197 consumers answered the questionnaire. All complainedants were adults and 73.1% were female. The majority of the pine nuts were imported from Asia (China, 68.2%) and consumed in a raw state (75.2%). All consumers reported no rancid or foul taste with the pine nuts. Analysis of 15 different complaint samples found no evidence of pesticides or related contaminants; however, measurable concentrations of hexanal (0.2 - 4.1 mg/kg) – an indicator of lipid oxidation - were found. The majority of consumers were non-smokers and 30.8% reported one or more allergies: seasonal (20%), food (6.9%), drug (3.8%) and food intolerances (2.3%). Only 15.7% of consumers reported additional symptoms, such as tingling in the mouth, hives and/or gastrointestinal complaints, suggestive of a possible food allergy or intolerance. Except for a few cases in which oral allergy-like symptoms were noted in individuals with seasonal or tree nut allergies, there was no association between symptoms and an allergic condition. No other relevant medical information to explain the taste disturbances was found. The reported complaints are consistent with a previously described condition called pine mouth syndrome. Although the mechanism remains unknown, pine mouth syndrome should be recognized as an emerging food hypersensitivity in patients presenting with atypical oral complaints to pine nuts.

P26 Eosinophilic oesophagitis in Cape Town, South Africa
Michael Levin1, Cassim Motala2
1 University of Cape Town, Division of Allergy, Paediatrics and Child Health, Cape Town, South Africa
2 Clinical and Translational Allergy 2011, 1(Suppl 1):P26

Eosinophilic oesophagitis has been described in patients from all ethnic backgrounds in studies originating in all continents apart from Africa. A cohort of 8 patients (3 boys, 5 girls) identified at Red Cross Hospital during 2009-2010 is described. Average age 7 years (1yr 11 months to 15 years 10 months). Ethnicity 2 caucasian, 5 mixed, 1 Black African. Age of onset: mean 3 years, median 1 year 4 months. Age of diagnosis mean 6years 3 months, median 3 years 9 months. Time to diagnosis: mean 3 years 3 months, median 6 months, IQ range 5 months to 6 years. Presenting symptoms in order of prevalence are reflux (7/8), long time to eat (6/8), difficult swallowing (6/8), growth failure (5/8), food refusal (5/8) and painful swallowing (4/8). Associated atopic diseases comprised immediate food allergy (6/8), eczema (6/8), rhinitis (6/8), asthma (3/8) and urticaria (2/8). Total of 26 biopsy specimens, mean 3.25 per patient. Only 4/8 confirmed peak eosinophil count >15/hpf, 7/8 had minor features present. Food skin prick tests 152 (19 per patient). Positive skin tests >1mm 57 (13 per patient). The most commonly identified foods are peas, wheat, egg, egg white, banana and egg yolk. Skin tests >=3mm 32 (7 per patient). Most commonly identified foods by SPT >=3mm are egg yolk, egg white, peas, soya, rye, rice, carrot and green beans. Patch tests 167 (21 per patient). 30 positive, average of 4.3 per patient. Most commonly identified foods are beef, peanut, lamb, chicken, soy and ham. All commenced on initiation of short course of oral steroids. All put on targeted elimination diet. All had clinical improvement. 3 controlled and acceptable symptoms, 2 some symptoms and difficulties, 2 very symptomatic with poor control, 1 defaulted.

P27 Food allergy in patients with confirmed celiac disease
Hadi Peyman1, Mohammad Rez Hafezi Ahmadi2, Monireh Yaghoubi1, Ezatollah Mahmodi1, Ali Delipsheh3
1 Iam University of Medical Sciences, Iam, Islamic Republic of Iran; 2 Iam University of Medical Sciences, Clinical Pathology, Iam, Islamic Republic of Iran; 3 Iam University of Medical Sciences, Clinical Epidemiology, Iam, Islamic Republic of Iran
Clinical and Translational Allergy 2011, 1(Suppl 1):P27

Background: Celiac disease is mediated by the immune system response to ingested gliadin component of gluten present in wheat. Therefore patients with celiac disease have basically sensitive immune systems which can
hypotheses for the differences between studies. These differences may include differences in the study population, methodology, and inclusion criteria.

Methods: A retrospective analysis was performed on medical records of patients referred to our allergy clinic between 2000 and 2010. The patients were classified into two groups based on the presence of allergy to sesame, and the results were compared using statistical analysis.

Results: A total of 100 patients were included in the study, with 50 patients in each group. The prevalence of allergy to sesame was 40% (20 patients) in group 1 and 20% (10 patients) in group 2.

Conclusion: The prevalence of allergy to sesame is higher in children from Bosnia and Herzegovina than in children from Romania. Further studies are needed to investigate the potential factors associated with this difference.

Key Words: Allergy, Children, Peanut, Incidence, Prevalence.
soya bean. There was no correlation between total IgE and the presence of sIgE for foods. The presence of sIgE did not correlate with clinical symptoms of the patients. High level for sIgE to at least one food were present only in 1% of the pts (4 pts).

Discussion: This is the first evaluation of sIgE to food in Romania in selected patients (either with urticaria either with a known respiratory allergy). The presence of sIgE to foods is not equal with food allergy, its presence is needed. The low incidence of sIgE to food in our area might be an explanation for the rare cases of real food allergy.

Conclusion: The level of sIgE for food is low in our population.

P31
Late resolution of cow’s milk and egg allergy: experience at a third level centre
Francesca Barbón, Francesca Lazzarotto, Alice Toniolo, Antonella Muraro
Food Allergy Centre, Padua University Hospital, Dept of Pediatrics, Padova, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):P31

Background: Cow’s milk allergy affects about 2-3% of general population; the prevalence of egg allergy is 1-2% among childhood. According to the literature the development of tolerance for cow’s milk and egg allergy is reached in early childhood, in the majority of case. In addiction it is reported that over six years of age there is a significant decrease in the resolution rate both for cow’s milk and egg allergy.

Objective: The aim of this study is to define the rate of allergy resolution over time in a selected population of cow’s milk and egg-allergic patients.

Methods: We conducted a retrospective study on 110 patients, 42 with cow’s milk and 68 with egg allergy, which attend the Food Allergy Centre, Padua, Veneto. All the patients studied were between 5 and 15 years and they had not yet developed tolerance to egg or milk. The lack of tolerance was confirmed by an oral food challenge (OFC). A descriptive analysis was conducted on the collected data.

Result: The development of tolerance was reached in 66.7% (28) patients with cow’s milk allergy, in particular 57.1% (16) from 6 to 7 years old, 17.8% (5) from 8 to 9 years old, 7.2% (2) from 10 to 11 years old, 14.3% (4) from 12 to 13 and 3.6% (1) from 14 to 15. The total percentage of patients who achieved tolerance to egg was 67.6%. The distribution among the different groups of age is as follow: 58.7% (27) from 6 to 7 years old, 13.1% (6) from 8 to 9 years old, 15.2% (7) from 10 to 11 years old, 6.5% (3) from 12 to 13 and 6.5% (3) from 14 to 15.

Conclusion: Our data show that achieving of tolerance is still possible for both cow’s milk and egg at ages older than six years. The rates of resolution for both cow’s milk and egg allergy between different rising age groups are similar. In spite of several limitations for a non homogeneous and non proportional distribution of patients between the different ages, the results underline the importance of monitoring the older children with OFC during years at, at least, yearly intervals as some of these children can still outgrow their food allergy.

P32
Natural history of cow’s milk allergy in Mediterranean area of Turkey
Gulbin Karakoc’, Derya Atintas, Mustafa Yilmaz, Seval Kendirli, Dilek Doganel Cukurova University Faculty of Medicine, Pediatric Allergy and Immunology, Adana, Turkey
Clinical and Translational Allergy 2011, 1(Suppl 1):P32

Background and Objective: Cow’s milk allergy (CMA) is the most common food allergy in with most outgrowing by age 3 years. In this study we aimed to define the natural course of CMA and identify the factors that predict outcome.

Patients and method: Ninety one children with the diagnosis of CMA that were to follow up in Cukurova University, Pediatric Allergy-Immunology Department enrolled to the study. The diagnosis of CMA was made on the basis of a history of symptoms associated with exposure to milk, a positive food challenge, and positive skin prick test and/or specific IgE. Symptoms and clinical findings, cross-reactivity with other proteins, prognosis and risk factors for the persistence were evaluated.

Results: There were 35 girls and 56 boys with the mean age of 26.4±19.8 months. Respiratory symptoms were the most common symptoms and seen in 52.7% of the patients, followed by skin symptoms (46.1%). Gastro intestinal symptoms were observed in 10% of the children and anaphylaxis in 3.3%. Cross-reactivity to goat milk, soya milk and beef were 94%, 46% and 76%, respectively. Rates of resolution were 32.3% by age 1 year and 76% by age 3 years. Among the 23 patients with persistent CMA, 20 patients had asthma (86.9%). Inhalant allergen sensitivity developed in 18 of overall patients (19.7%). Coexistence of egg allergy, specific IgE level more than 3.5 kU/L and age onset of the symptoms before than 6 months were determined as significant predictors of outcome.

Conclusion: In this study, we observed that, 76% of the children became tolerant to cow’s milk by age 3 years. Early age of onset, high specific IgE levels and coexistence of egg allergy were found to be risk factors for the persistence. These children should be followed up for development of asthma and inhalant allergen hypersensitivity.

P33
Prevalence of fruit (kiwi) allergy in health worker with latex hypersensitivity
Sayyed Hesamedin Nabavizadeh1*, Shiva Yazdanpanah2
1Yasouj University of Medicine, Allergy, Yasouj, Islamic Republic of Iran; 2Vali Asr Health Center, Health Center, Shiraz, Islamic Republic of Iran
Clinical and Translational Allergy 2011, 1(Suppl 1):P33

Allergic reaction to natural rubber latex have increased during past 10 years especially among health worker and patients with high exposure to latex allergen. Latex allergy is associated with clinical or serological cross reactivity to plant derived allergen especially tropical fruit for example avocado bananas chestnut kiwi papaya potato and peaches. In this study on health worker among 580 participants 104 (17.9%) who were positive to latex skin prick test. Of 464 patients with negative skin prick test to latex are have 12 patients with positive skin prick test to kiwi and in 197 patients with positive skin prick test to latex 7 patients had positive skin prick test to kiwi (p<0.05). In this study difference of sensitivity to banana and potato in both groups were not significant according to this study kiwi hypersensitivity is important problem among health worker with sensitivity to latex.

Key words: latex Allergy – kiwi – skin prick test

P34
Multiple primary food allergy in pediatric patients seen in a tertiary referral center
Liliane De Swert1*, Jasmine Leus2, Marc Raes3, Dominique Bullerd4
1University Hospital Gasthuisberg, Pediatrics, Belgium; 2University Hospital Gasthuisberg, Leuven, Belgium; 4University Hospital Gasthuisberg, Leuven, Belgium
Clinical and Translational Allergy 2011, 1(Suppl 1):P34

Background: Multiple food allergy is increasing. Objective: To find out the frequency of multiple primary food allergy (MPFA) in our patient population; the causal foods and their number per patient; age at diagnosis of food allergy; symptoms; frequency of environmental allergy occurring in those patients.

Methods: MPFA was defined as primary allergy simultaneously occurring to at least 3 unrelated foods. Allergy to a specific food was considered proven based on at least one of the following: a clear cut clinical history; elimination and reintroduction; a specific IgE level or skin prick test size ≥ the 95% positive predictive value (defined for cow’s milk, egg, peanut, wheat, potato); a positive provocation test. Primary allergy to the given food was documented by the involvement of class 1 allergens and/or the timing of food allergy development. Files of all patients visiting our tertiary Pediatric Allergy Center between September 2008 and August 2009 were studied retrospectively.

Results: Out of 715 patients 65 subjects (40 boys/25 girls) were found to have MPFA (9%). Age at enrollment ranged from 6 to 192 months (median 5.8 months); age at first diagnosis ranged from 1 to 192 months (median 11 months; mean 18.5 months). The causal allergens were egg (60/65), cow’s milk (57/65), potato (22/65), peanut (21/65), tree nuts (18/ 65), fish (15/65), soy (14/65), wheat (10/65), banana (6/65) and kiwi (5/65). In 32/65 subjects more than 3 different foods were involved.
The symptoms were: atopic dermatitis, guttate manifestations, urticaria, angioedema, respiratory manifestations, anaphylaxis and failure to thrive in 92%, 61%, 45%, 41%, 35% 28% and 21% respectively. Thirty out of 32 subjects having reached the age of 6 years (93%) also suffered from respiratory allergy.

Conclusion: Up to 10% of children visiting a tertiary allergy center might present with MPFA, needing specialized dietary advice.

P35

Adverse reactions to food in patients with mastocytosis
Valentina Pucino1, Domitria Magliacane, Angelica Petraroli, Massimo Triggiani
Division of Clinical Immunology and Allergy, University of Naples Federico II, Naples, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):P35

Background: Mastocytosis is a disease characterized by abnormal growth and accumulation of mast cells (MC) in different tissues. The disease can be classified as cutaneous (CM), when MC infiltrate is limited to the skin, and systemic mastocytosis (SM) when MC proliferate in other organs such as the bone marrow, gastrointestinal tract, lung, liver, spleen or lymph-nodes. Clinical symptoms of CM and SM are related to the release of MC-derived mediators and/or to tissue infiltration by MC. The increased number of MC in various organs, including the gastrointestinal tract, raises the question whether patients with mastocytosis may have a high frequency of adverse reaction to food (ARF).

Methods: We studied 126 patients (mean age 33 years; range 1-80 years) with mastocytosis, of which 34 (27%) were <18 years old and 92 (73%) were > 18 years old. Mastocytosis was diagnosed according to WHO criteria (Valent et al. Leuk. Res. 25:603-25, 2001). Medical history of adverse reactions to food was obtained from all patients. Those who reported suspected reactions were further evaluated by skin prick test and serum specific IgE assay.

Results: A positive history for ARF was detected in 12/34 (34%) patients < 18 years old and in 5/92 (5%) patients > 18 years old. Clinical manifestations of ARF were urticaria/angioedema (13 patients), asthma (2 patient) and anaphylaxis (2 patients). Elevating food included peanuts (5 patients), nuts (3 patients), eggs (1 patient), tomatos (2 patients), peaches (2 patients) or shellfish (4 patients). A positive skin prick test and/or elevated levels of serum specific IgE for relevant food allergens were found only in 5 patients (4 < 18 years old).

Conclusions: These results indicate that ARF are more frequent in pediatric than in adult patients with mastocytosis. The prevalence of ARF in adults with mastocytosis is not significantly different from that in the general population. Most of the adverse reactions to food in patients with mastocytosis are not associated with positive skin prick test or elevated serum specific IgE. These results suggest that mechanisms other than IgE-mediated may be involved in ARF in patients with mastocytosis.

P36

Seafood allergy in children
Paul Turner1, Ian Ng1, Andrew Kemp1, Dianne Campbell1
1Children’s Hospital at Westmead, Allergy & Immunology, Westmead, NSW, Australia; 2University of Sydney Medical School, Discipline of Paediatrics, Sydney, NSW, Australia
Clinical and Translational Allergy 2011, 1(Suppl 1):P36

Background: Both food allergy and seafood (fish, mollusc and crustacean) consumption have increased considerably over the past 40 years. There is limited published data on the epidemiology of seafood allergy in children.

Methods: Using a retrospective chart review, we collected data on children presenting to our Tertiary Allergy Service with an allergic reaction to seafood between 2006 and 2009. Families were then contacted by postal questionnaire to assess the impact of the allergy on everyday life.

Results: 2999 children were seen during this period with a range of allergic problems, including food allergy. 167 (5.6%) had experienced a definite clinical reaction to seafood (103 male, 62%); 94% had evidence of co-existent atopic disease. The most common seafood implicated were: Prawn (26%), Unspecified white fish (10%), Tuna (8%), Salmon (8%); In 14%, the exact type of fish could not be recalled by the parent or identified by the physician. 21% had experienced anaphylaxis to seafood. Over 50% of crustacean-allergic children could tolerate fish. However, cross-sensitization was very common in fish-allergic children, with one third reporting clinical reactions to at least two species of fish; 59% were sensitized to crustacean while 22% had clinical allergy to crustacean. 16% developed symptoms to fish vapours. In children with allergy to tuna and/or salmon, at least 21% were able to tolerate the fish in a tinned form.

Conclusion: This study demonstrates that seafood is a common and important cause of food allergy in Australian children, and highlights the high rate of anaphylaxis in this population.

P37

Oral tolerance and functional Treg cells are induced in BALB/c mice after gavage with bovine β-lactoglobulin (BLG)
Karine Adel-Patien1, Hervé Bernard, Sophie Wavrin, Sandrine Ah-Leung, Jean-Michel Wal
INRA, Unité d’Immuno-Allergie Alimentaire, Gif-sur-Yvette, France
Clinical and Translational Allergy 2011, 1(Suppl 1):P37

Background: Food allergy is considered as resulting from an impaired development of oral tolerance, or a breakdown in existing oral tolerance. We then aimed to study oral tolerance to a major cow’s milk allergen, BLG, which could prevent further systemic allergic sensitization and elicitation. Methods involved were investigated.

Methods: BALB/cJ mice were gavaged with PBS (control mice) or with 2 mg of purified BLG on days 1, 2, 3, 8, 9 and 10. All mice were then sensitized by i.p. administration of 5 μg of BLG in alum on day 14. Mice sensitization was assessed by quantitative measurement of BLG-specific IgE and IgG1 antibodies on individual serum samples collected on day 36. After a boost administration of BLG/alum, elicitation of the allergic reaction was induced by intra-nasal administration of BLG. Bronchoalveolar lavage fluids (BAL) were collected 24h later and their cellular composition was analysed using simultaneous labelling with anti-CD3, anti-B220, anti-CD45R, anti-CD11c and anti-CCR3 or with anti-CD4 and anti-Foxp3 antibodies. In parallel, Th1/Th2/Th17 cytokines were assayed on centrifuged BAL.

Results: Both allergic sensitization and elicitation were efficiently induced in control mice, as demonstrated by the high levels of anti-BLG IgE and IgG1 antibodies in sera, and IL-4, IL-5, GM-CSF and eotaxin release and eosinophil influx in BAL. Conversely, BLG-specific IgE and IgG1 antibody productions, as well as cytokine secretion and eosinophil recruitment in BAL, were totally inhibited in mice gavaged with BLG before sensitization. Interestingly, a high percentage of Foxp3+ cells within CD4+ cell population and a negative correlation between the number of eosinophils and the percentage of Foxp3+ cells were evidenced in BAL of mice gavaged with BLG.

Conclusion: Both inhibition of the allergic sensitization and active suppression of effector cells by Foxp3+ cells at the challenging site may contribute to the efficient systemic tolerance in BALB/c mice after gavage with BLG.

P38

Processes of hypoallergenic crops at agricultural biotechnology
Sebnem Kavakli
Ege University Graduate School of Natural and Applied Sciences, Biotechnology, Izmir, Turkey
Clinical and Translational Allergy 2011, 1(Suppl 1):P38

Background: Food allergies are a major health concern in industrialized countries. Reduction of allergens in foods, either by food processing or genetic engineering are strategies to minimize the risk of adverse reactions for food allergic patients. Biotechnological approaches can use for the reduction of allergens in plant foods. Because food allergens can be life threatening, a
variety of strategies to abrogate or minimize allergic episodes are currently under study. Hypoallergenic crops can use at food allergies. On the other hand, no hypoallergenic crops are commercially available. Some crops, such as rice, tomato, apple and in legume ones, several allergens have been targeted to reduction, including Lyc e 1, Lyc e 3, Mal d 1, cysteine protease, Ara h 2.

There are two different process for obtain hypoallergenic crops. In the first, germplasm lines are screened for the absence or reduced content of specific allergenic proteins. In the second, genetic transformation is used to silence nature genes encoding allergenic proteins. Germplasm screening can be applicable at protein and DNA levels. At protein level, protein screens have been performed using specific allergen or stained gels that evaluate the overall protein profile of varieties of interest. At DNA level of germplasm screening; the amplification of the gene of interest from a pool of template DNAs that could carry natural mutations, and the main objective has been to identify cultivars carrying natural hypoallergenic variants of known allergens. Genetic transformation have been developed using RNA interference (RNAi). It is a post transcriptional gene silencing (PTGS) technique. PTGS is induced by sence transgene that can suppress expression of the transgene as well as the endogenous homologous genes, hence the name cosuppression. This study aims to explain the processes which use for producing hypoallergenic crops and to give examples of applications about the subject.

**P39**

**Milk protein IgG and IgA: the association with milk-induced gastrointestinal symptoms in adults**

**Marina Petroviæ**

Clinical Center Kragujevac, Pulmonary, Kragujevac, Serbia

**Clinical and Translational Allergy** 2011, 1(Suppl 1):P39

**Background:** To study the association between serum levels of milk protein IgG and IgA antibodies and milk-related gastrointestinal symptoms in adults.

**Methods:** Milk protein IgG and IgA antibodies were determined in serum samples of 270 subjects. Subjects were randomly selected from a total of 1560 adults undergoing laboratory investigations in primary care. All 270 participants had completed a questionnaire on abdominal symptoms and dairy consumption while waiting for the laboratory visit. The questionnaire covered the nature and frequency of gastrointestinal problems, the provoking food items, family history and allergies. The levels of specific milk protein IgG and IgA were measured by using the ELISA technique. The association of the milk protein-specific antibody level was studied in relation to the milk-related gastrointestinal symptoms and dairy consumption.

**Results:** Subjects drinking milk (n=45) had higher levels of milk protein IgG in their sera than non-milk drinkers (n=125, P=0.001). Subjects with gastrointestinal problems related to milk drinking consumed less milk but had higher milk protein IgG levels than those with no milk-related gastrointestinal symptoms (P=0.03). Among the symptomatic subjects, those reporting dyspeptic symptoms had lower milk protein IgG levels than non-dyspeptics (P=0.05). However, dyspepsia was not associated with milk drinking (P=0.59). The association of high milk protein IgG levels with constipation was close to the level of statistical significance. Diarrhea had no association with milk protein IgG level (P=0.5). With regard to minor symptoms, flatulence and bloating (P=0.92), were not associated with milk protein IgG level. Milk protein IgG levels did not show any association with milk drinking or abdominal symptoms. The levels of milk protein IgA and IgG declined as the age of the subjects increased (P=0.001).

**Conclusion:** Milk protein IgG but not milk IgA seems to be associated with self-reported milk-induced gastrointestinal symptoms.

**P40**

**Management of cow’s milk protein allergy in primary care**

Dinkar Bakshi 1, Ian Pollock 2

1 Homerton University Hospital, London, UK; 2 Chase Farm Hospital, Paediatrics, London, UK

**Clinical and Translational Allergy** 2011, 1(Suppl 1):P40

**Background:** The incidence of Cow’s Milk Protein Allergy (CMPA) is increasing in the United Kingdom. However, many practitioners in primary care are unsure about its diagnosis and management. There is usually a lag period of a few months, between the first presentation of children with CMPA to their General Practitioner (GP), and referral to an Allergist. Enfield area comprises a middle-class, and relatively affluent population of London.

**Aim:** To identify the factors that influence CMPA primary care management and referral practice, in Enfield area in London.

**Methods:** A web-based questionnaire was completed by 46 General Practitioners in Enfield area, in January, 2010.

**Results:** 87% of the respondents felt that children with suspected CMPA should be seen by an Allergist within 4 weeks from the date of referral. 54.3% of the GP’s said that they referred children to a Paediatric Allergist, after a trial of extensively hydrolysed or aminoacid formula milk. The most popular milk substitutes in primary care in Enfield are Nutramigen (60.9%), Soya milk (52.2%), Neocate (47.8%) and Peptijunior (17.4%). 82.6% GPs said they prescribe Epipen (Adrenaline autoinjector) for life threatening allergic symptoms. With regards to referral to a Paediatric Dietitian, 34.8% GPs said they refer less than 25% cases of CMPA, whereas 43.5% GPs refer over 75% children with CMPA. GPs got information about management of CMPA primarily from Paediatricians (71.7%), while a significant number also accessed journals (52.2%) and the internet (50.0%).

**Conclusion:** The management of CMPA in primary care in Enfield is not consistent, and dependent upon the individual GPs. We have initiated the formulation and dissemination of a local guideline, to enable practitioners in primary care to refer children with suspected CMPA to the Allergy clinic.

**P41**

**INDANA - International Network for Diet And Nutrition in Allergy**

**Carina Venter 1, Berber Vlieg-Boerstra 2, Isabel Skyllas 3**

1 University of Portsmouth, Portsmouth, UK; 2 University Medical Centre, Amsterdam, Netherlands; 3 The Royal Brompton Hospital, London, UK

**Clinical and Translational Allergy** 2011, 1(Suppl 1):P41

**Background:** The International Network for Diet and Nutrition in Allergy (INDANA) was established in 2009 by a group of dietitians/food scientists specialising in food allergies and intolerances.

**Aim:** The aim of this organisation is to bring together food allergy professionals to bridge the gap in science between food hypersensitivity, immunology, nutrition and food science to improve the nutritional management of those living with food allergies and intolerances.

**Steering group and champions:** The steering group consist of 17 members with representation from the USA, United Kingdom, Europe, Australia, New Zealand and South Africa. INDANA has four prominent international champions, namely Prof. Susan Prescott (Australia), Prof. D. Alexson (UK), Prof. Steve Taylor (USA) and Prof Hugh Sampson (USA), who are supporting INDANA activities in the wider community of international allergy practice.

**Affiliations:** The group is currently affiliated to the EAACI and is working towards collaborative multi-professional activities such as education, audit and research. Further affiliations with other well known associations in the allergy field are also explored. INDANA also aims to unify practices and develop evidence-based guidelines and protocols for the diagnosis and nutritional management of patients who suffer from food hypersensitivity.

**Activities:** In 2010, members of INDANA presented at the American Academy of Allergy, Asthma and Immunology (AAAAI) meeting in New Orleans as well as the EAACI meeting in London. Two members of INDANA are presenting at the Food Allergy and Anaphylaxis Meeting (EAACI) in Venice 2011.

**Future developments:** INDANA members will be presenting at the AAAAI meeting in 2011 addressing Nutritional Considerations in Food Allergy and the EAACI meeting in June 2011 in a session entitled Dietary management of food allergy; addressing cultural differences. INDANA hopes to increase their current membership numbers over the next few years and are actively developing conference and educational programs for 2012.

**Membership:** Membership is open to any health care professional with a relevant first degree working in the field of food allergy (http://www.indana-allergynetwork.org).
P42
Attitudes and practices of primary care physicians in Ankara about food allergy and anaphylaxis
Aysegul Akalan1, Essay Cinikeli1, Mustafa Ergocoglu1, Celal Ozcan1, Dilek Azkur1, Muge Toyran1, Yasemin Gokce2, Tali Ozdemir2, Sedat Guler2, Can Naci Kocabas1
1Ankara Hematology Oncology Children's Training and Research Hospital, Pediatric Allergy, Ankara, Turkey; 2Local Health Managers' Office of Ankara, Ankara, Turkey
Clinical and Translational Allergy 2011, 1(Suppl 1):P42
Background: Because of the rise in the frequency, food allergies (FA) and consequently anaphylaxis (A) are becoming public health problems. The consciousness about prevention, diagnosis and therapy has to be improved, especially among primary care physicians (PCP).
Methods: The survey including questions and case examples about FA and A was given to PCP during 2 meetings held by Local Health Managers' Office of Ankara.
Results: Median of the age of the participants and duration of their practice were 42.4±6.5 and 17.0±6.4 years. The 72.4% of participants pointed out that lower than 5% of their pediatric patients had food allergies. The 35.6% of the participants thought that FA could be completely cured with therapy, the 36.9% stated that they didn’t refer the patients suspected for FA. The 73.4% defined asthma as a significant risk factor of A for the patients with FA. Egg white was the most common food allergen (85.8%) defined by PCP and teh second common food allergen was cow’s milk (67.5%). The 43.3% of the participants had ever given a prescription of epinephrine ointjector, 93% of them defined they knew poorly about the use of epinephrine ointjector. The 50% of PCP defined epinephrine as the first drug in a case with anaphylaxis, 60% of this group pointed out to give subcutaneously. Fifty two percent of PCP indicated that the education for FA and A in medical school was deficient.
Conclusions: PCP have some information about FA, but they have to be educated about practical applications about the diagnosis and management of FA and A. Otherwise we could neither know the real extend end burden of FA and A nor form right practice.

P43
Abstract withdrawn
Clinical and Translational Allergy 2011, 1(Suppl 1):P43

P44
Allergic cross-reactivity between pellitory and mulberry: case report
Laura Losappio1, Francesco Contenido, Antonio Falcò, Cosimo Damiano Cannito
Dimiccoli Hospital, Emergency Department, Barletta, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):P44
Background: In Barletta, a city of Puglia in southern Italy, between May and June 2009, at the ‘Dimiccoli’ Hospital, Emergency Department, 189 people out of 4440 (about 4%) have been found positive to disturbances of allergic type. On May 25th a hot day (max. temperature: 28°C) immediately after a thunderstorm, 15 patients out of 189, rushed to the above mentioned Hospital. Among those 15 patients, there was a 51 years old woman who complained of oculo-hinitis, cough, chest tightness after being outside on her balcony once it stopped raining. Furthermore she felt face edema and worsening of respiratory symptoms after about 30 minutes from eating few mulberries. Since the clinical outcome was that of “anaphylaxis”, the woman was treated with cortisone and antihistamines injection, with successful feedback.
Methods: The patient went through skin prick tests for inhalants and foods. During the visit she reported a parental medical history of respiratory issues even though no significant history of allergy problems was found.
Results: The skin prick tests for food allergens and inhalants were positive for pellitory and mulberry. It is worth taking into account that the May 25th there was a high concentration of pellitory pollen (19 granules/m3) and the patient ingested few mulberries.
Conclusions: This is a case report of allergy to mulberry and to pellitory which confirmed the theory of allergenic cross-reactivity between these two allergens. Furthermore it proved the synergy effect that balanced on the clinical worsening of the patient after inhalation of pellitory pollen and ingestion of mulberry which ended up with the clinical outcome of anaphylaxis.

P45
Prevalence of strawberry allergy in Bosnian children and management
Adnan Bajakajic1, Slabodan Tomicic1, Semira Penavica2, Amra Mahnic3, Begler Begovic4, Amina Selimovic4, Sabina Kurtagic5, Teodora Frankic6, Jasna Gutic7, Amra Hujic8, Lutvo Sporisevic8
1Public Health Institution of Canton Sarajevo, Pediatrics Department, Sarajevo, Bosnia and Herzegovina; 2Clinical Medical Center Sarajevo, Clinical Pharmacology, Sarajevo, Bosnia and Herzegovina; 3Pediatrics Clinic Sarajevo, Department for allergology and pulmonology, Sarajevo, Bosnia and Herzegovina; 4Pediatrics Clinic Sarajevo, Department for gastroenterology, hepatology and immunology, Sarajevo, Bosnia and Herzegovina; 5Pharmacy Faculty Sarajevo, Clinical Pharmacology, Sarajevo, Bosnia and Herzegovina; 6General Hospital Sarajevo, Emergency Department, Sarajevo, Bosnia and Herzegovina; 7Dermatologic Clinic Sarajevo, Allergology Department, Sarajevo, Bosnia and Herzegovina; 8First Medical Aid New Sarajevo, Pediatrics Department, Sarajevo, Bosnia and Herzegovina
Clinical and Translational Allergy 2011, 1(Suppl 1):P45
Introduction: A strawberry allergy is an allergy to certain proteins found in strawberries. The specific symptoms that can vary considerably amongst children from a severe anaphylactic reaction to asthma, abdominal symptoms, eczema or headaches. Some experience an allergic reaction with itching and swelling in mouth and throat.
Objective: The goals were to estimate the prevalence of strawberry food allergy and to describe trends in food allergy prevalence and health care use among Bosnian children.
Methods and materials: The sample included 40 primary care pediatricians from Sarajevo during last ten years 2000-2010; 95% of the respondents reported providing care for strawberry allergic children patients. The specific criteria used to diagnose food allergy may therefore have a significant impact on the results of these studies, especially those used to measure the prevalence of strawberry allergy. The allergen was identified using blood serum from children patients experiencing adverse reactions to strawberry.
Results: Red strawberries cause allergies, but white ones do not. The symptoms for strawberry allergy occur after exposure to strawberry fruit and strawberry products. The prevalence of strawberry allergy peaks at 3% to 4% at two year of age and then falls progressively until late childhood, after which the prevalence remains stable at 0.5% to 1% in children from Bosnia and Herzegovina. Some cases of life-threatening conditions have been reported, such as anaphylactic reactions and asphixia due to the impossibility of breathing.
Discussion: All children with strawberry food allergy should also be reevaluated by their allergist at regular intervals to determine whether the allergy has been outgrown.
Conclusion: The best treatment consists of prevention: individuals should avoid eating any form of strawberries, including raw berries, jam, cakes, jellies and even some naturally-flavoured products. In most of the cases strawberry allergy is not a life threatening one. Being allergic to strawberries is fairly common specially in children.

P46
Outcomes of allergy testing after an emergency department visit for food anaphylaxis
Ronna Campbell1, Wyatt Decker2
1Mayo Clinic, Emergency Medicine, Rochester, USA
Clinical and Translational Allergy 2011, 1(Suppl 1):P46
Background: Anaphylaxis is a potentially life threatening allergic reaction. Failure to identify the inciting allergen places patients at risk of future life-threatening allergen exposure. Anaphylaxis guidelines recommend that all patients who experience anaphylaxis from an allergen encountered in a non-medical setting carry self
injectable epinephrine and follow up with an allergist. Very little data is available on outcomes of allergy follow up after an emergency department (ED) visit for anaphylaxis. The aim of our study was to determine the outcomes of allergy follow up after an ED visit for food anaphylaxis.

Methods: A retrospective cohort study was conducted in an ED setting with approximately 80,000 visits per year. Patients presenting to the ED for anaphylaxis and allergic reactions were screened from April 2008 to June 2010 and all patients who fulfilled NIAID/FAAN criteria for anaphylaxis and provided consent were included. A standardized data abstraction form was used to collect data.

Results: Two hundred and twenty patients constituted the study sample and were included in the study. The median age was 33.5 years (IQR 18.8-49.6) years. One hundred and twenty-eight (58.2%) were females. Suspected allergens in the ED were food in 79 (35.9%), medication in 47 (21.4%), insect venom in 27 (12.3%), others in 24 (10.9%) and unknown in 43 (19.5%) patients. A total of 81 patients (36.8%) followed up with an allergist. Among patients with food anaphylaxis, 40 (50.6%) followed up with an allergist of which 34 (85%) had allergy testing. Among the 34 patients, skin testing was performed on 16 (47.1%), specific IgE antibody tests in 22 (64.7%) and both tests in 5 (14.7%) patients. After testing, 25 (73.5%) had an allergen identified.

Conclusions: Allergen identification and avoidance after food anaphylaxis is important in order to avoid future reactions. Our results show that most patients who followed up with an allergist underwent allergy testing and had an allergen identified. These results support current anaphylaxis guidelines.

P47
Clinical manifestations and severity of cow’s milk anaphylaxis in children
Zahra Pourpak1, Pegah Teymournour1, Saiedeh Barzegar1, Raheleh Shokouhi1, Mohammadreza Fadollahi2, Mostafa Mooin1
Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran
Clinical and Translational Allergy 2011, 1(Suppl 1):P47

Background: Anaphylaxis is a potentially fatal allergic reaction which is rapid in onset. Cow’s milk is the most common allergen which can trigger anaphylaxis in Iranian children. The aim of this study is to describe the clinical features and severity of cow’s milk anaphylaxis in children.

Methods: In this study all children (<18 years old) with suspicious history of cow’s milk anaphylaxis who had been referred to IAARI (Immunology, Asthma and Allergy Research Institute) during 2005-2010 (SEP) were considered. A detailed questionnaire was fulfilled for each patient. A specific severity grading for anaphylaxis with five levels was also used. Skin Prick Test (SPT) with allergen extract (cow’s milk) was performed at least 4-6 weeks after patient’s last anaphylaxis attack. Cow’s milk specific IgE and total IgE level were measured by ImmunoCap system. Patients with clear history and one positive laboratory test and patients with both positive laboratory tests (SPT and cow’s milk specific IgE) were included.

Results: Among 49 patients (29 [59.2%]) were male and the rest were female. Patients’ mean age at the time of first anaphylactic attack was 5.7±4.3 months. The percentages of severity grades 1-5 were 2%, 6.1%, 18.4%, 69.4%, 4.1% respectively. Most common clinical manifestations were in descending order as: Cutaneous 98% (urticaria, periorbital oedema, flushing), Respiratory 91.8% (dyspnea, coughing, wheezing), Gastrointestinal 55.1% (nausea, vomiting, abdominal pain), Cardiovascular 46.9% and Neurologic 46.9%. Twenty-four patients had positive SPT. Mean total IgE level was 239.6±3.3 (KU/L) and mean cow’s milk specific IgE was 19.28±27.2 (KU/L).

Conclusions: Since the patients’ mean age at the time of first anaphylactic shock was 5.7±4.3 months, we conclude that cow’s milk anaphylaxis may happen very early in life. Most common manifestations are cutaneous and respiratory symptoms. Majority of attacks have been of moderate to relatively severe degree (grades 3 and 4) so equipping the general practitioners and pediatricians with enough knowledge about cow’s milk anaphylaxis is needed.

P48
A mouse model of fenugreek allergy
Nina E Vinje1, Ellen Namork1, Martinus Lovik2
Norwegian Institute of Public Health, Dept. of Environmental Immunology, Oslo, Norway
Clinical and Translational Allergy 2011, 1(Suppl 1):P48

Background: Fenugreek (Trigonella foenum-graecum L) is widely used in Indian-style spiced foods. Some cases of allergic reactions to fenugreek have been reported and a Norwegian study found cross-reactivity of fenugreek in peanut allergic individuals. Thus, we wanted to develop a mouse model of fenugreek allergy.

Methods: Female C3H/HeJ mice were gavaged at days 0, 1, 2, 7, and 21 with fenugreek in doses ranging from 0.1 mg to 10 mg. Cholera toxin (CT) was used as an adjuvant (10 μg/mouse). The mice were euthanized on day 28, and sera were analysed for fenugreek-specific IgE using the heterologous passive cutaneous anaphylaxis assay. Based on this dose-response experiment, twenty four mice were gavaged with the optimal dose of fenugreek (4.2 mg) and CT at days 0, 1, 2, 7, 21 and 28. Eight mice were gavaged with CT only and 8 mice were not treated. At day 35 all mice received a large dose of fenugreek (25.0 mg) and clinical reactions were observed.

Results: We found the optimal dose that would elicit the strongest IgE response to be 4.24 mg fenugreek. Provocation with fenugreek in immunised animals resulted in clinical reactions like scratching and rubbing around the nose and head, puffiness around the eyes and mouth as well as laboured respiration.

Conclusion: We have established a mouse model of fenugreek allergy to be used in further studies of primary fenugreek anaphylaxis and in cross-reactions with other legumes.
reactivity to HWP was not inhibited by natural wheat extracts, whereas those to natural wheat extracts were fully inhibited by HWP, indicating that the primary sensitizer of these patients is HWP.

Discussion: Our report is important in that it indicates the possible role of HWP in foods in the induction of allergy to natural wheat products.

P50  
Food anaphylaxis and augmentation factors – data of the German-speaking anaphylaxis registry

Stephanie Hompes1, Franziska Ruff1, Scherer Kathrin1, Lars Lange1, Alice Kohl1, Katja Nematz, Nicolaus Schwer1, Margitta Worm1

1Chanté - Universitätsmedizin, Department of Dermatology and Allergy, Berlin, Germany; 2Ludwig-Maximilians-University, Department of Dermatology and Allergology, Munich, Germany; 3University Hospital, Allergy Unit, Department of Dermatology, Basel, Switzerland; 4St. Marien-Hospital, Children’s Hospital, Bonn, Germany; 5University Children’s Hospital, Department of Allergy, Zürich, Switzerland; 6Universitatsklinikum Carl Gustav Carus, Department of Paediatrics, Dresden, Germany; 7Medical School, Department of Paediatrics, Hannover, Germany.

Clinical and Translational Allergy 2011, 1(Suppl 1):P50

Background: Anaphylaxis is a severe, life-threatening systemic hypersensitivity reaction. The anaphylaxis-registry collects data of patients with severe allergic reactions from 86 allergy centres in Germany, Austria and Switzerland. The present analysis was performed to get more insight into the elicitors and circumstances of food-induced anaphylaxis.

Methods: The data are delivered by a password-controlled internet-based-questionnaire. Only severe reactions with pulmonary and/or cardiovascular symptoms are accepted. After plausibility approach 2115 anaphylactic reactions, registered from July 2006 until October 2010, were included in the data analysis set.

Results: Of the 2115 anaphylactic reactions 494 cases (23%) were caused by food. These were 232 reactions in children and adolescents (range: 2 months – 17 years, median: 4 years; 65% male) and 262 reactions in adults (range: 18 – 82 years, median: 39 years; 31% male). The most common triggers among children were peanuts (n = 50), cow’s milk (n = 27), hazelnuts (n = 19) and hen’s egg (n = 14). Among adults the following triggers were registered most frequently: wheat flour (n = 29, in 25 cases in combination with exercise), soybeans (n = 19), celery (n = 16), shellfish (n = 15) and hazelnuts (n = 15).

At least one augmentation factor was observed in 29% of all patients with food anaphylaxis. Drugs (mainly NSAID and beta-blocker) were suspected in 14%, exercise in 10%, alcohol and psychological stress in 4% each of the food cases. As further possible factors acute infection, food-additives and menstruation were reported in less than 2% of the cases. Drugs were most commonly combined with vegetables (celery, carrot) and exercise with wheat flour followed by tree nuts.

Conclusions: The elicitor profile of food dependent anaphylaxis is age dependent. Possible augmentation factors like drugs and physical exercise were observed in up to one third of anaphylactic patients. Their underlying mechanism should be explored in more detail in future studies.

P51  
Anaphylaxis to beetroot (Beta vulgaris): a case report

Lucia Camargo Lopes de Oliveira1, Isabel Rugulé Genov1, Elza do Carmo Cabaña1, Yara Amuda MF Mello1, Márcia Carvalho Mallozzi1, Dircou Sole1

1UNIFESP, São Paulo, Brazil; 2Clinica de Alergia São Paulo, São Paulo, Brazil

Clinical and Translational Allergy 2011, 1(Suppl 1):P51

Background: Allergy to beetroot is very rare. Until now only a few reports about asthma and rhinoconjunctivitis induced by inhaling the vapor of cooked beet have been reported. Oral food challenge is the only means of confirming an allergy to beetroot or other foods in the general population.

Methods: We present a case of a 20 months-old male infant admitted to emergency department with severe respiratory distress after eating cooked beetroot.

Results: From our review of the literature we found 47 cases of anaphylactic reactions to beetroot. Cases reported in adults were mostly anaphylactic reactions in a context of asthma and rhinoconjunctivitis. Beetroot was not previously identified as the cause of food allergy.

Conclusions: Our case report is unusual because of the Wells score of 6 points. To our knowledge is the first reported case of anaphylactic reaction to cooked beetroot in a child. This case report highlights the need to include beetroot in differential diagnosis of food allergic reactions in infants.

P52  
Manioc anaphylaxis in a patient sensitised to latex

Isabel Carrapatio1, Borja Bartolome2, Filipi Ribeiro3, António Seguré Luis1

1Coimbra University Hospital, Immunology Department, Coimbra, Portugal; 2Bial-Aristegui, R&D Department, Bilbao, Spain

Clinical and Translational Allergy 2011, 1(Suppl 1):P52

Background: We report the case of a 51 years old female that suffered from a systemic anaphylactic episode 5 minutes after the ingestion of manioc at the age of 50. This patient reported rhinoconjunctivitis since she was 20 years-old after contact with latex gloves and rhinoconjunctivitis and oral allergy syndrome after the ingestion of kiwi, banana and mango since the age of 30. The patient had also a history of eight surgeries since the age of 24 years-old.

Methods: Skin prick tests (SPT) to commercial extracts of aeroallergens and food allergens were carried out. Prick-to-prick tests (PP) and specific IgE determinations (sIgE) to some plant foods were also performed, according to case history. The molecular mass of the IgE binding bands was calculated by means of SDS PAGE immunoblotting. In order to study the presence of cross reacting IgE in the patient serum we carried out a SDS-PAGE immunoblotting-inhibition assay using manioc extract in solid phase and banana and latex as inhibitors. Furthermore, we carried out an immunoblotting inhibition assay using banana extract in solid phase and latex and manioc as inhibitors.

Results: SPT and/or PP were positive to latex, manioc, chestnut, kiwi, tomato, banana and mango. Serum specific IgE was positive to latex (4.98 kU/L), Gold kiwi (0.4 kU/L) and banana 0.9 kU/L. The apparent molecular mass of the IgE binding bands on SDS PAGE immunoblotting assays were as follow: extract from manioc pulp: 31 kDa; extract from latex: 55 kDa; 39 kDa; 34 kDa; 25 kDa; 20 kDa; 14 kDa; extract from Gold kiwi: 34 kDa; extract from banana: 34 kDa; 32 kDa. A total IgE binding inhibition on 31kDa manioc protein was detected when banana and latex extracts were used as inhibitors. When banana extract was used in solid phase a total IgE binding inhibition with latex was observed.

Conclusions: Immunoblotting-inhibition assays proved a manioc-banana-latex cross reactive syndrome in this patient. We believe that, in this case, the primary sensitization agent is latex.

P53  
Anaphylaxis in an infant to raw potato

Pinar Uysal1, Zeynep Arican Ayyildiz1, Senol Alan2, Tuba Tunccel1, Fatih Firinci1, Ozkan Karaman1, Nevin Uzuner3

1Dokuz Eylül University Medical Faculty, Department of Pediatrics Division of Allergy, Izmir, Turkey; 2Zonguldak Karadem University Science and Art Faculty, Department of Biology, Zonguldak, Turkey

Clinical and Translational Allergy 2011, 1(Suppl 1):P53

Introduction: Potato was believed to have a lower allergenic potential and it was the one of the first preferred food for weaning period in infancy. To date, the allergenic reactions are mostly reported in adults including oral allergy syndrome, contact dermatitis, exacerbations of asthma, and rarely anaphylaxis.

Case: A 10 months-old male infant admitted to emergency department with a history of general hyperemic itchy rash, swelling around his eyes and lips, vomiting, respiratory difficulty and wheezing which started a few minutes later after the first contact with raw potato through his hands and face while playing with it. He was diagnosed as anaphylaxis and administered epinephrine IM, nebulised salbutamol, systemic...
antihistamine and corticosteroid. His previous history was normal about atopy and he had eaten cooked potato for several times before. Specific IgE level was 7.2 kU/L by ImmunoCAP (Phadia, Uppsala, Sweden) for potato. Prick-to-prick tests were performed and they were 9 mm for histamine, 13 mm for raw potato, although they were negative to cooked potato, apple and pear which might have a high probability for cross-reaction with potato. Skin prick tests with commercial extracts of latex, birch pollen, mixture of grasses, trees, cereals and weeds were all negative, as well. Immunoblot of raw and cooked potato extract were performed. Protein staining after SDS-PAGE showed different bands in the range of 15 to >30 kDa for raw potato. Immunostaining revealed a distinct IgE binding band around 92.7 kDa area in raw potato and no reaction was detected for cooked potato. A strict elimination diet for potato, label reading, and epinephrine injection were recommended.

**Conclusion:** To the best of our knowledge, this case is the smallest reported infant who had an anaphylactic reaction to raw potato at his first exposure. That novel protein might be the causative allergenic protein for raw potato allergy and moreover it is most probably a heat-labile protein.

**Methods:** Children above 6 years with IgE-mediated allergy to milk or egg. Anaphylaxis history and positive skin prick test (SPT) and sIgE levels against food. Informed consent was required. Patients received a sixteenth week treatment with anti IgE Omalizumab. SPT and single blind food challenges (SBFC) were performed after the treatment. Adverse reactions were registered.

**Results:** Ten patients were included, 3 patients suffered allergy to milk and 7 to egg. They had a positive SBFC or a previous history of food transgressions with reactions in the last six months. All patients received anti-IgE treatment without any significant adverse reaction. After 16 weeks, eight patients underwent to SBFC and complete tolerance was confirmed in four patients. Four patients presented a positive SBFC. All subjects reached a higher dose threshold than baseline SBFC. Two patients rejected SBFC. 6 patients with anaphylactic allergy were allocated in a specific oral tolerance induction (SOTI) with anti IgE treatment. During SOTI, only one subject experienced some mild side-effects, 2 patients successfully completed the treatment, and 4 patients still continue with their SOTI procedure without any significant reactions during in-patient administered doses or out-patient maintenance doses.

**Conclusions:** Anti-IgE therapy has proven an effective and safe measure in the treatment of the persistent and severe allergy to milk and egg, whether used as monotherapy or as an adjuvant measure to the process of desensitization to food, making it safer and faster procedure.

**P54**

**Specific oral tolerance induction (SOTI) to cow’s milk in an adult patient with anaphylaxis symptoms**

José Geraldo Dias, Ana Célia Costa, Elisa Pedro, Manuel Pereira Barbosa
Hospital Santa Maria, Centro Hospitalar Lisboa Norte, Immunonallergology, Lisbon, Portugal

**Clinical and Translational Allergy 2011, 1(Suppl 1):P54**

**Introduction:** Cow’s milk allergy (CMA) in adults is less frequent and tend to persist longer than in children. SOTI is a valid treatment option for patients with persistent food allergy.

**Case report:** A 20-year-old man, with no personal history of atopic disease, reported at 19 years his first episode of anaphylaxis (conjunctival hyperemia, generalized pruritus, oropharyngeal obstruction sensation, dyspnea and dysphagia) 30 minutes after ingestion of 150ml of milk and bread with butter. Since then, he mentioned oropharyngeal soreness whenever he ingested milk. One year later, he had a similar episode of anaphylaxis, 10 minutes after ingestion of a cheese/ham sandwich. He was recommended to avoid any foods that contain milk or its derivatives, but 2 months later, suffered the same reaction 1 hour after pizza ingestion. He self-administered ebastine (10mg) and prednisolone (40mg) with symptomatic relief within 1h. He denied any physical exercise or drug ingestion before the episodes, but listed egg, nuts, crustaceans and mussels, umbelliferae, tomato, positive to SPT but negative to history) was performed, resulting in one patient a single-blind placebo-controlled food-challenge (with tomato, positive to SPT but negative to history) was performed, resulting negative. The patient was recommended treatment in persistent milk and egg allergy, has been conducted.

**Discussion:** IgE-mediated CMA was confirmed. Avoiding milk and carrying self-injectable epinephrine are the current strategies for its management. SOTI to milk in this patient allowed a diet without restrictions (increased threshold dose for allergic reactions) and a substantial reduction in the risk of severe allergic reactions after inadvertent ingestion of milk or its derivatives.

**P55**

**Severe food allergy in children. Omalizumab as an alternative treatment to elimination diet**

María Pena Peloche1, Miguel Hinojosa Macías, Soledad Terrados Cepeda, Pilar Berges Gimeno, Gema Vanesa Sánchez Moreno, Emilio Álvarez-Cuesta Ramón y Cajal, Allergy Division, Madrid, Spain

**Clinical and Translational Allergy 2011, 1(Suppl 1):P55**

**Background:** Severe food allergy is a life threatening condition with few therapeutics alternatives. A pilot study with omalizumab, as an alternative treatment in persistent milk and egg allergy, has been conducted.

**Methods:** Children above 6 years with IgE-mediated allergy to milk or egg. Anaphylaxis history and positive skin prick test (SPT) and sIgE levels against food. Informed consent was required. Patients received a sixteenth week treatment with anti IgE Omalizumab. SPT and single blind food challenges (SBFC) were performed after the treatment. Adverse reactions were registered.

**Results:** Ten patients were included, 3 patients suffered allergy to milk and 7 to egg. They had a positive SBFC or a previous history of food transgressions with reactions in the last six months. All patients received anti-IgE treatment without any significant adverse reaction. After 16 weeks, eight patients underwent to SBFC and complete tolerance was confirmed in four patients. Four patients presented a positive SBFC. All subjects reached a higher dose threshold than baseline SBFC. Two patients rejected SBFC. 6 patients with anaphylactic allergy were allocated in a specific oral tolerance induction (SOTI) with anti IgE treatment. During SOTI, only one subject experienced some mild side-effects, 2 patients successfully completed the treatment, and 4 patients still continue with their SOTI procedure without any significant reactions during in-patient administered doses or out-patient maintenance doses.

**Conclusions:** Anti-IgE therapy has proven an effective and safe measure in the treatment of the persistent and severe allergy to milk and egg, whether used as monotherapy or as an adjuvant measure to the process of desensitization to food, making it safer and faster procedure.
tolerated rice alone. Razor shell (Ensis ensis) is a common mollusc, which has an elongated fragile and narrow shell shaped like a cut-throat razor.

**Methods:** Skin prick testing (SPT) with commercial standard food extracts and prick-to-prick testing with razor shell. ImmunoCAP ISAC (Phadia) determination as well as protein separation (SDS-PAGE) and immunoblotting analyses were carried out.

**Results:** SPT with standard commercial food extracts including shellfish extract (clam, mussel, octopus, shrimp) and Anisakis simplex were all negative. Prick-to-prick testing with raw and boiled razor shell resulted positive. ISAC determination was negative for all tropomyosin indicators as well as other food allergens. IgE immunoblotting performed with the sera of the patient over razor shell extract SDS – PAGE separation revealed four major bands at 40-45 kDa and 70-80 kDa.

**Conclusion:** We describe a case of anaphylaxis caused by selective sensitization razor shell. To our knowledge, there are only two other cases of immediate hypersensitivity to razor shell published to date. In our study we highlighted the identification of band profiles different to those identified in previous reports, which were present both in raw and boiled extract.

**P58**

**Allergy to fruit seeds presenting with anaphylaxis**

Paul Turner, Paul Gray, Melanie Wong, Dianne Campbell

Children’s Hospital at Westmead, Allergy & Immunology, Westmead, NSW, Australia

**Clinical and Translational Allergy 2011, 1(Suppl 1):P58**

Allergic reactions to fruits, particularly citrus, are relatively common, often presenting with symptoms of oral allergy syndrome (also known as pollen-food syndrome), with systemic allergic reactions occurring less frequently. Fruit allergy testing, including serum specific immunoglobulin E (IgE) and skin prick testing will identify the allergen in most cases, however these tests commonly use extract from the fruit and may fail to identify reactions to the seed, which may be more severe.

We report three children with anaphylactic reactions to fruit seeds, who were able to tolerate the fruit pulp. Two children experienced anaphylaxis to orange seed, and both had evidence of sensitisation to multiple citrus seeds, peanut and tree nuts. The third child developed anaphylaxis to a commercially-produced baby food containing apple puree, and was found to be sensitised to a range of fruit and citrus seeds, as well as sesame and nuts. These cases highlight the need to consider fruit seeds as a potential cause of severe allergic reactions to fruit.

**P59**

**Growth and nutritional status according to the number of sensitized food allergens in infants and young children with atopic dermatitis**

Hye Yung Yum

Seoul Medical Center, Atope Clinic, Seoul, Republic of Korea

**Clinical and Translational Allergy 2011, 1(Suppl 1):P59**

**Background:** Food allergy could affect the growth and nutritional status of children with atopic dermatitis (AD). This study was conducted to determine the association of the number of sensitized food allergens with growth and nutritional status in infants and young children with AD.

**Methods:** We studied 165 children with AD aged 5 to 47 months with AD, who visited the Atope Clinic of Seoul Medical Center. We checked birth weight, time of starting weaning foods, severity scores of atopic dermatitis (SCORAD), eosinophil counts in peripheral blood, serum total IgE and specific IgE to 6 major allergens (egg white, cow’s milk, soybean, peanut, wheat and fish). Height and weight for age and weight for height were converted to Z-scores to evaluate their effects on growth and nutritional status. Specific IgE levels ≥ 0.7 kUA/L by the CAP assay were considered positive.

**Results:** As the number of sensitized food allergens increased, the mean Z-scores of weight and height-for-age were decreased (P = 0.006 and 0.018, respectively). This number was directly correlated with SCORAD (r = 0.308), time of starting weaning foods (r = 0.332), eosinophil counts in peripheral blood (r = 0.266) and serum total IgE (r = 0.394), while it was inversely correlated with the Z-scores of weight for age (r = -0.358), height for age (r = -0.278) and weight for height (r = -0.224).

**Conclusions:** The increased number of sensitized food allergens had a negative effect on growth and nutritional status in infants and young children with AD. Therefore, a thorough evaluation of growth and nutritional status and adequate management are crucial in pediatric AD patients with a larger number of sensitized food allergens.

**P60**

**The BELANA questionnaire measures the health economic burdens of food allergy and intolerance in multinational settings**

Norbert Rösch1*, Sabine Schnadt1, Andreas Arends-Volland2, Frank Feidt1, Xavier Miller3, Sarah Kohler1, Volker König3, Petta Schmalz1, Ralph Möges1

1Centre de Recherche Public Henri Tudor, SANTEC (GA2LEN Collaborating Centre), Luxembourg, Luxembourg, 2German Allergy and Asthma Association, Moenchengladbach, Germany, 3Centre Hospitalier de Luxembourg, ORL-Ech, Luxembourg, Luxembourg, 5Luxembourg Society of Dermato-Venereology, Luxembourg, Luxembourg

University Hospital of Cologne, IMSE, Cologne, Germany

E-mail: norbert.roesch@tudor.lu

**Clinical and Translational Allergy 2011, 1(Suppl 1):P60**

**Background:** The Health economic burdens of patients with food allergies or intolerance and their Health Related Quality of Life (HR-QoL) are unknown in Luxembourg and most other countries. Within the Luxembourg MINNAna project, a new approach has been defined to evaluate health economic effects in a multinational setting.

**Methods:** The BELANA questionnaire (Burdens and Expenses of Living as Adult with Nutrition based Allergy or Intolerance) has been developed to measure the temporal and financial burdens from the patient’s perspective. BELANA includes possible temporal losses (disability days, reduction in productivity, hospitalizations) as well as direct costs (additional costs for food purchases). For the complementary measurement of Health Related Quality of Life (HR-QoL), a combined appliance of the disease-specific FAQLQ-AF (Food Allergy Quality of Life Questionnaire - Adult Form) and the generic SF-12v1 has been chosen. BELANA avoids questions, already included in the standard HR-QoL questionnaires.

**Results:** BELANA has been tested in a web-based pilot survey with 51 adults (age >18). The patient’s acceptance has been confirmed by the number of completed questionnaires (50 of 51) and the high response rates for health-economic items (76% to 100%). The combination of BELANA, FAQLQ-AF and SF-12v1 has been completed in an average of 22 minutes. An age-related selection bias has not been confirmed (median age: 37.9 years, range from 19 to 72 years, SD = 12.4 years). To minimise possible seasonal effects BELANA is further used in a one-year longitudinal study with 314 patients. According to an interim evaluation, most patient’s expenses are linked to the purchase of dietary foods.

**Conclusions:** We continue to utilize BELANA as a useful tool for the evaluation of health economic burdens of food allergy and intolerance. BELANA, coupled with the benefits of electronic data collection, offers real time feasibility checks by limiting the workload for survey completion and data evaluation.

**P61**

**Abstract withdrawn**

Clinical and Translational Allergy2014-70222011S1 P61

**P62**

**The most common cow’s milk allergic proteins regarding to allergic symptoms**

Raheleh Shokouhi Shoormasti1, Zahra Pourpak1, Zahra Yazdanyar1, Zahra Lebaschi1, Pegah Teymourpour1, Saeedeh Barzegar2, Behnaz Tazesh1, Mohammad Reza Fazlollahi1, Masoud Movahedi2, Parsa Dashghi1, Mostafa Moin1

1Immunology, Asthma and Allergy Research Institute, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran; 2Department of Immunology and Allergy, Children Medical Center, Tehran University of Medical Sciences, Tehran, Islamic Republic of Iran

**Clinical and Translational Allergy 2011, 1(Suppl 1):P62**

**Background:** One of the most frequent food allergies in childhood is cow’s milk allergy (CMA) that manifest with diverse symptoms.
Cow’s milk has four main proteins that their recognition can help to physician for patients treatment. The aim of this study was to determine the most common cow's milk allergenic proteins in children with CMA.

Methods: All of children with the positive history of CMA and positive prick test or specific IgE were entered in this study. Specific IgE were determined for Cow’s milk protein, α-lactalbumin, β-lactoglobulin, and casein and bovin serum albumin with RIDA Allergy Screen test. The specific IgE more than Class 2+ was acceptable.

Results: Eighty six patients with CMA (3month to 18 yrs) were entered in this study Fifty three patients were males (61.1%). Median of age was 2.5 yrs (Mean=3.98) and most of CMA patients was under 2 yrs (45.1%). Mean of total IgE was 343.39±93.63 (SE(0.2-5000IU/ml). The symptoms of patients was as following: (respiratory symptoms: 62.8%, Skin symptoms: 56.4%, gastrointestinal symptoms: 19.2% & Anaphylaxis: 13.6%). Totally, positive Specific IgE to cow’s milk protein, α-lactalbumin, casein, β-lactoglobulin and bovin serum albumin were 89.2%, 78.3%, 75%, 63.4%, & 45.5%, respectively. Although α-lactalbumin & casein were the most allergenic protein, mean of specific IgE concentration to β-lactoglobulin was highest in patients with CMA. There was a significant correlation between positive specific IgE to β-lactoglobulin & anaphylaxis (P=0.05) and also between respiratory symptoms and positive specific IgE to casein (P<0.01). There was significant difference between mean of specific IgE to casein between males and females (P=0.001) that was the more frequent in males.

Conclusion: In this study, α-lactalbumin and casein seems to be the most allergenic protein in cow's milk but it seems that specific IgE positivity to β-lactoglobulin is related to anaphylaxis to CM.

P63
Cytokine synthesis of Th-1 and Th-2 cells by atopic patients with food allergy and food intolerance
Olga Sidorovich1, Ludmila Luss1, Margarita Nikonova2, Almira Danetskova1
1NRC Institute of Immunology FMBA, Out-patient Department, Moscow, Russian Federation; 2NRC Institute of Immunology FMBA, Moscow, Russian Federation
Clinical and Translational Allergy 2011, 1(Suppl 1):P63

Background: In clinical practice we often face serious food allergy diagnostic and therapy problems because there are no specific clinical markers of allergic reactions to food. The problem is that adverse reactions to food could be caused by different mechanisms, for example sensitisation to food allergens and food additives by food allergy. Besides, adverse reactions to food develop by different gastrointestinal tract pathologies. The algorithm of diagnostics, treatment and prevention of food allergy and food intolerance require different methodical approaches.

The aim of this research was to bring out the peculiarities of Th1 and Th2-cells cytokine synthesis among allergic patients with food allergy and food intolerance.

Methods: In this work we analysed the expression of IL-2, 2Ra, 4, 5, 10, 12a, 12b, TGF-β, INFγ, transcription factors FOXP3, T-bet and GATA-3 which were measured by 23 patients with food allergy and by 35 patients with food intolerance by PCR method. 20 patients with food intolerance without any atopy, 20 patients with pollinosis without any signs of food allergy and food intolerance and 20 apparently healthy persons were examined as the control groups.

Results: Cytokine expression was similar in all groups. However, a high level of IL-5 expression trend was shown in the group with food allergy. A significant increased expression of GATA-3 was shown in food allergy group.

Conclusions: mRNA expression of cytokine genes showed by patients with food allergy and food intolerance in remission is comparable with mRNA expression by apparently healthy persons. An important role of GATA-3 has been proven in Th2-response activation by patients with IgE-dependent food allergy. Thus, the results of this work show the necessity of further research activities to improve immunological methods of examination of patients with food allergy and food intolerance and development of effective diagnostics, prevention and treatment of these diseases.

P64
Pediatric wheat challenge study-preliminary results
Nora Nilsson1, Gunilla Hedrin1, Caroline Nilsson1, Magnus Borres3
1Astrid Lindgren Hospital, Karolinska Institute, Allergy, asthma, Stockholm, Sweden; 2Karolinska Institutet, Department of Woman and Child Health and Centre for Allergy Research, Stockholm, Sweden; 3Karolinska Institutet and Sachs’ Children’s Hospital, Department of Clinical Science and Education Södersjukhuset, Stockholm, Sweden
Clinical and Translational Allergy 2011, 1(Suppl 1):P64

Background: In addition to cow’s milk, egg, soy, peanut, tree nuts and fish, wheat is also a food causing allergy in children. Wheat allergy is more prevalent in the northern part of Europe. Methods commonly used today in clinical practice to diagnose wheat allergy have a limited value in predicting a clinically significant wheat allergy compared with the test results for egg, milk and peanuts.

Aim: To investigate what proportion of children with a diagnose of wheat allergy exhibit clinical symptoms upon oral food challenge with wheat and to identify if some children unnecessary avoid wheat.

Material and Methods: 27 children from Stockholm sensitized to wheat and subject to an elimination diet were tested for IgE antibodies to wheat and α-5 gliadin. All 27 patients were positive to IgE antibodies to wheat and underwent food challenge test. The initial oral food challenge test consists of 0,05gr of bread which is followed by six steps with increasing dose. The final dose is 17 gr of bread. The time interval between each dose is 30 min.

Results: All 27 children presented different levels of IgE to wheat. 13 of them reacted during oral food challenge with clinical symptoms: 7 asthma attack, 10 urtikaria, 7 abdominal symptoms. We observed higher IgE levels to wheat in children who presented clinical symptoms during food challenge and additionally most of them showed to be positive to IgE antibodies to α-5 gliadin. We also observed that higher levels of IgE to wheat were correlated to reactions to lower doses of wheat.

Our findings suggest that IgE antibodies to wheat alone cannot predict the outcome of food challenge and additional markers, such as α-5 gliadin should be identified in order to improve the diagnostic workup for wheat allergy.

P65
Allergy to natural rubber latex in asthma patients
Kseniya Uspeenskaya1, Ludmila Luss1, Alexander Babakin3
1NRC Institute of Immunology FMBA Russia, out-patient, Moscow, Russian Federation; 2NRC Institute of Immunology FMBA Russia, Out-patient, Moscow, Russian Federation; 3NRC Institute of Immunology FMBA Russia, Moscow, Russian Federation
Clinical and Translational Allergy 2011, 1(Suppl 1):P65

Natural rubber latex (NRL) allergy has become an important occupational health problem in recent years. However, the prevalence of sensitization to NRL among allergic asthmatic patients is unknown. This study was undertaken evaluate the levels specific IgE in sera of 70 adult asthmatic patients (27 male and 43 female) with mild (32 patients) and moderate (38 patients) asthma, whose diagnosis was confirmed by case history, skin test results and RAST 20% of the asthmatics (14 patients) had latex-specific IgE in sera detected by Pharmacia UniCAP. Among the 14 latex sensitized asthmatics 6 patients had mild asthma and 8 had moderate asthma. 12 patients among the latex-sensitized asthmatics (86%) had banana-specific IgE. 50 (72%) of the asthma patients had high levels of total IgE and all latex-sensitized asthmatics had high levels of total IgE. Using a one point RAST inhibition assay employing 10mg/ml of Greer latex extract 50% RAST inhibition was obtained, confirming specificity of the anti-latex IgE in these asthmatics. This study demonstrated a relatively high prevalence (20%) of in vitro reactivity to NRL allergens
among patients with asthma. The source of sensitization to latex in these patients remains to be determined.

**P66**

Basophil allergen threshold sensitivity, and peanut allergen components in relation to DBPCFC in children with suspected peanut allergy

Caroline Nilsson1,2, Susanne Glau mann1, Gunnar Lilja1, Magnus Borres3, SGO Johansson3

1Karolinska Institutet, Dept. of Clinical Science and Education, Stockholm, Sweden; 2Sahlgrenska Academy of Gothenburg University, Dept. of Paediatrics, Gothenburg, Sweden, 3Karolinska Institutet, Dept. of Medicine, Clinical Immunology and Allergy Unit, Stockholm, Sweden

Clinical and Translational Allergy 2011, 1(Suppl 1)P66

**Background:** A few fatal reactions occur every year due to IgE-mediated food allergy among children and teenagers, but there are considerably more near-fatal incidents. To diagnose and give a prognosis as to who will react severely or mildly is difficult for clinicians to assess.

**Aim:** To relate the basophil allergen threshold sensitivity (CD-sens) to double blind placebo controlled food (peanut) challenge (DBPCFC) outcome to relate the concentration of IgE antibodies to peanuts and its components to the DBPCFC results.

**Methods:** DBPCFC was performed with increasing concentrations of peanut allergen (1 mg to 5 g of peanut) in 42 children with suspected IgE-mediated peanut-allergy. Blood samples were taken for analyses of CD-sens and quantification of IgE-antibodies to peanut and Ara h 1-3, 8-9. Basophils were stimulated in vitro with peanut allergen in descending doses until the threshold sensitivity was reached. CD-sens was defined on the basis of the allergen dose giving 50% of maximal basophil response, measured as expression of CD63.

A positive challenge was defined as objective allergic symptoms.

**Results:** Among the children, 27 responded with objective allergic symptoms and 15 did not react. The IgE levels to Ara h2 were significantly higher in children reacting to peanut compared to children who did not react at DBPCFC. Negative challenges correlated with high serum levels of IgE-antibodies to Ara h 1-8. All children with positive challenge, except one (challenge results were difficult to interpret), were positive in CD-sens and among the children non-reacting at challenge, all except one, were negative in CD-sens.

**Conclusions:** CD-sens using peanut allergen seems to correlate with the outcome from DBPCFC. High levels of IgE-antibodies to Ara h 2 correlates with clinical reactions to peanut in DBPCFC. Children with IgE to peanut but negative DBPCFC seems to have high levels of Ara h 8 specific IgE-antibodies. CD-sens and component resolved diagnosis may be useful tools in predicting peanut allergy.

**P67**

Diagnosis of cross-reactivity in patients with birth pollinosis

Katarzyna Napór kowska1, Zbigniew Bartu z, Magdalena Zbikowska-Gotz2, Małgorzata Graczyk1, Ewa Szy nkie wicz1

Collegium Medicum in Bydgoszcz, Department of Allergology, Clinical Immunology and Internal Diseases, Bydgoszcz, Poland

Clinical and Translational Allergy 2011, 1(Suppl 1)P67

**Background:** Patients with the birch pollen allergy frequently develop hypersensitive reactions to certain plant food. Mostly, it is caused by cross-reactivity. Diagnosis of this allergy became possible due to such method as immunoblotting.

**Objective:** The aim of this study was to investigate the role of cross-reactivity and the diagnostic value of skin test (using commercial and native extracts of allergens), total and specific IgE and immunoblotting method for patients with pollinosis.

**Material and Methods:** The clinical history and the positive SPT with the birch extract were the condition for qualifications. 23 patients included in the first group were only birch allergic. 35 patients in the other group had birch pollen allergy and they reported symptoms after eating apple, celery, carrot, tomato, banana, peach, peanut and hazelnut. The skin tests were performed and serum IgE concentration (total and specific) were determined for all individuals. The immunoblotting was performed for the patients with the positive value of birch, apple, celery and/or carrot specific IgE.

**Results:** Patients sensitive to birch pollen, with coexisting food allergy, had most often symptoms after eating apples, hazelnuts and of peaches, and less frequently after carrots, celery, peanuts, tomatoes and bananas. Sera of 12 patients revealed the reaction against the birch pollen protein with a molecular weight 17-18 kDa corresponding to Bet v 1. Sera of 2 patients revealed the presence of antibodies cross-reacting with the apple protein which may indicate Mal d 1. Serum of 6 patient revealed the presence of antibodies cross-reacting with apple and celery protein, which may indicate Mal d 1 and Api g 1. Serum of only one patient revealed the presence of antibodies cross-reacting with the apple, celery and carrot protein, which may correspond Mal d 1, Api g 1 and Dau c 1. Sera of 6 persons demonstrated the presence of antibodies reacting with apple protein with the molecular weight 10kDa which may correspond the LTP.

**Conclusions:** Although the immunoblotting is an effective method confirming cross-reactivity, it still remains the method of verifying and supplementing other tests.

**P68**

Intertmittent food allergy

Gabriel A Sosa1*, Maria Luisa Sanz2

1Hospital La Zarzuela, Allergia, Madrid, Spain; 2Clinica Universitaria De Navarra, Laboratorio de Allergia, Pamplona, Spain

Clinical and Translational Allergy 2011, 1(Suppl 1)P68

**Introduction:** To my opinion, some patients may have reversible tolerance to food allergens. This tolerance that might appear or disappear can be related to the presence of triggers that activate the mast cell, and include exercise, NSAIDs, alcohol or stress. Different authors have already stated that food allergy can be activated by NSAIDs, exercise, alcohol or stress. These authors demonstrated increase of food absorption as an explanation.

It can also suggest that these triggers lowered threshold for the release of cytoplasmatic mediators from mast cell As we can not work with mast cell we did it with basophils and we evaluate the effect of NSAID on basophile response to food allergens using BAT.

**Methods:** We present two patients who presented intermittent clinical symptoms of food allergy, only when the involved food allergen was eaten, simultaneously to NSAID treatment or exercise practice. These two cases tolerate both NSAID, exercise, or the implicated food if they were separate allergens. The Basophile Activation Test (BAT) by flow cytometry, previously reported as an Ag-specific in vitro diagnosis method, was then performed in both circumstances.

**Results:** In both patients, BAT showed that CD63 expression by flow cytometry after in vitro stimulation with ASA and culprit food were lower than when both allergens were presented together.

**Conclusions:** Food allergy commonly is not seen as an intermittent phenomenon, but I think some time it is. BAT could be a useful technic for evaluate these, also could be provocation test but it is dangerous.

The paradigm in food allergy is provocation test but we would have to change the paradigm as the patient tolerated food unless we add the trigger.
Materials and Methods: 80 patients were enrolled in the study, including 50 patients with food allergy and accompanying stomach pains, and 30 patients with dyspeptic discomfort without underlying food allergy. All subjects were subjected to gastroscopic examination, gastric mucosa biopsy for histopathological evaluation, including the presence of eosinophils in the inflammatory infiltrates, and assessment of Helicobacter pylori colonization status. Blood was collected from each subject for determination of the serum levels of the E-selectin and PECAM-1 adhesive molecules. sPECAM-1 and s-selectin determinations were performed in a Bender MedSystems ELISA assay.

Results: The average s-selectin levels in the food allergy patient population were 54.0 +/- 21.6 ng/mL, while in the allergy-free population, the average s-selectin levels were 57.7 +/-17.9 ng/mL. No statistically significant difference between s-selectin levels was found between food allergy patients and patients with dyspeptic symptoms without concomitant food allergy (Mann-Whitney U-test, p = 0.453028). In the food allergy patient population, average sPECAM-1 levels were 132.8 +/-31.4 ng/mL, while in the allergy-free population, average sPECAM-1 levels were 139.6 +/- 31.1 ng/mL. The analysis of the obtained results revealed no statistically significant difference between sPECAM-1 levels in food allergy patients and patients with dyspeptic symptoms without concomitant food allergy.

Conclusions: The results of examinations conducted in this study showed no statistically significant differences in serum PECAM-1 and E-selectin levels between the study groups.

P70
The tropomyosin specific IgE and its roles of cross-reactivity between shrimp and dust mites
En-Chin Luo, Mei-Fann Lee, Jaw-Ji Tsai
Taichung Veterans General Hospital, Taichung, Taiwan
Clinical and Translational Allergy 2011, 1(Suppl 1):P70

Tropomyosin has been reported to be responsible for the cross-reactivity between shrimp and dust mites and the measurement of tropomyosin specific IgE was found superior to shrimp extract for the predicting of shrimp allergic reaction. A total of 55 dust mite allergic patients were recruited to analyse the cross-reactivity between shrimp and mites. Tropomyosin specific IgE for shrimps (rPen a1, nPen n1, nPen m1 ), Anisakis (Anis 3 ), house dust mites (rDer p10 ) and german cockroach ( nBla g7 ) were measured using Phadebas® capillary-flow based microarray assay. Two recombinant proteins ( rTyr p10 and Tryptophan putresciensiae rPer a7 for American cockroach ) were used to investigate the cross-reactivity . Basophil histamine release (BHR) assay was used to evaluate its biological activities. The results showed that there were 13 patients (11 cases of atopic dermatitis AD, 4 cases of bronchial asthma BA and 2 cases of BA and AD) sensitive to tropomyosin. The allergen specific tropomyosin were further analysed, there were 66% (9/13) sensitive to rAnis 3, 62% (8/13) sensitive to rDer p10, 54% (7/13) sensitive to nBla g7 and nPen m1. Most patients were sensitive to at least two different species of tropomyosin. Immuno-Dot study showed that there were 8/13 sensitive to rPer a7 and 7/13 sensitive to rTyr p10. Despite the percent inhibition of BHR were similar between Der p and shrimp stimulation the relationship between the tropomyosin sensitive of all species allergens were not correlated. In conclusion, tropomyosin specific IgE can be detected in 23.6% (13/55) of Der p allergic patients and the percentage of shrimp specific tropomyosin allergy was higher in AD than BA. The poor relationship of the specific IgE between the shrimp specific tropomyosin with other species of allergen indicated that the allergenic component of tropomyosin from all allergen should be generated and used for the definite diagnosis of food allergy.

P71
It is a real hazelnut allergy? The CCD interference
Antonio Nicola Romeo, Giuseppe Menzi
ISS-State Hospital - San Marino Republic (RSM), Pediatrics, Bergo Maggiore, San Marino
Clinical and Translational Allergy 2011, 1(Suppl 1):P71

Background: Cross-reactive carbohydrate determinants (CCD) are carbohydrates chains in glycoproteins. Capable of binding human IgE from allergic they could play a role in the cross-reactivity between allergens from unrelated sources; their function still a matter of debate.

Objective: Pollen is the most important cause of the production of IgE anti-CCD. Which have been described in trees and herbs. We investigated the relationship between clinical anaphylaxis to hazelnut and the sierological positivity to nuts allergens, grasses and role of interference by anti-CCD IgE.

Methods: A six year old twins, atopic risk, father suffering from pollen asthma, reported by parents adverse reaction (Sampson, 2003 1st -2 nd grade) to hazelnut at first assumption.

Results: Skin tests positive for nuts and grasses, no mite high RAST positivity for grasses, over 100 KU/L, Alternaria 34 KU/L, Phl-1 83,1KU/L, Alt a-1- 43KU/L, Cor a8 negative, Nuts negative, MUFKP3 ( CCD) 20.3 KU/L. Food Challenge after 1 year: negative, Now allergic rhinitis.

Conclusion: IgE anti-CCD should not be able to connect mast cells and basophils and release inflammatory mediators. Patients with IgE restricted to CCD have not clinical symptoms. CCD can be considered as a potential interference in atopic diagnosis; especially in polisensitized. It ’s important to provide clinical information to laboratory test. IgE -anti CCD create a misdiagnosis of allergies to foods, latex or venom, especially in pollinosis which can lead to unnecessary therapy.


P72
Identification of marker allergens in Brazilian soy allergic patients
Renata Coco1,2, Circéu Solé1, Maria Mallozi2, Charles Naspitz2, Fredrik Bernhardsson2, Sigrid Jolander3, Marlyam Poorafshar2, Anita Kober2
1Federal University of São Paulo, Pediatrics, São Paulo, Brazil; 2Phadia AB, Uppsala, Sweden
Clinical and Translational Allergy 2011, 1(Suppl 1):P72

Background: Soy allergy is established as one of the most common food allergies. Therefore, we decided to analyze whether there are specific protein markers among Brazilian soy allergic patients, using microarray techniques.

Method: Thirteen patients presenting with immediate symptoms after ingestion of soy formula and IgE reactivity to soy extract were selected after failing oral food challenges. Sixteen patients with no symptoms (negative soy challenge), but presenting with positive specific IgE to soy (ImmunoCAP > 0.35kU/L) were used as controls. In order to allow for simultaneous measurement of IgE responses, a number of purified proteins and protein mixes were used for analysis in a multiplexed capillary-flow based microarray assay.

Results: Significant differences between children with symptoms and without symptoms were found for [l]conglycinin (Gly m 5) and glycinin (Gly m 6), the storage proteins of soybean, β-conglycinin showed higher response and glycinin, lower response by the tested patients.

Conclusion: The highest and most prevalent IgE reactivity in the group of children with soy allergy was directed to the two storage proteins of soy, β-conglycinin and glycinin. Both proteins appear to be good marker allergens for soy allergy in Brazilian children.

P73
Role of double blind placebo controlled challenge test with wheat followed by exercise in patients suspected of wheat dependant exercise induced anaphylaxis (WDEIA)
Mauritus Van Maaren1, Nicolette De Jong1, Frans Mertens2, Henk Stam, Roy Gerth van Wijk1
1Erasmus University Medical Center, Allergology, Rotterdam, Netherlands; 2Erasmus University Medical Center, Respiratory Physiology, Rotterdam, Netherlands
Clinical and Translational Allergy 2011, 1(Suppl 1):P73

Background: Double blind placebo controlled food challenge tests (DBPFC) are essential for diagnosing food allergy. However, open food challenges followed by exercise are used to establish the diagnosis of Wheat Dependent Exercise Induced Anaphylaxis (WDEIA). The presence of specific IgE to α-5 gliadine ≥ 0.89 KU/L was highly predictive for WDEIA in one study.
Methods: Patients characterized by a history of at least two anaphylactic reactions during exercise within four hours following ingestion of wheat and the presence of specific IgE to \( \varepsilon_5 \)-gliadin \( \geq 0.09 \) kU/L were asked to undergo a DBPFC with wheat masked in a pancake followed by an exercise test. Patients with negative responses were asked to participate in an open challenge test thereby consuming a 2.5 fold higher amount of wheat compared to the dose ingested in the blinded test.

Results: Eight patients aged 34 – 57 years, fulfilling the inclusion criteria were willing to participate in a double blinded challenge – exercise test. One patient had a history of consistent reactions during exercise after wheat ingestion; in others reactions varied. Most patients recognized concomitant factors such as intake of alcohol or sudden temperature change during exercise induced reactions. None reacted in the double blinded test. Five were willing to participate in an open challenge test. Two reacted in this open challenge test. They revealed higher levels of specific IgE to \( \varepsilon_5 \)-gliadin (37.5 and 14.0 kU/L respectively) compared to the other 3 patients (6.3, 3.97 and 2.17 kU/L respectively).

Conclusions: A DBPFC is not suitable to establish the diagnosis WDEIA probably because of the low maximum dose of wheat that can be masked in a food matrix and the presence of concomitant factors in real life. The presence of specific IgE to \( \varepsilon_5 \)-gliadin 0.89 kU/L is not sufficient to establish the diagnosis of WDEIA.

P74

IgE-mediated cow’s milk allergy in patients under 2 years of age, suffering from AD

Nino Lomidze1, Maia Gotua1, Tamar Gotua2

1Center of Allergy & Immunology, Tbilisi, Georgia; 2Jvania’s Children Hospital, Tbilisi, Georgia

Clinical and Translational Allergy 2011, 1(Suppl 1):P74

Background: Food allergy affects 6-8% of children before the age of 5 and is a frequent cause of many allergic diseases. Sensitization in infancy predominantly occurs first to cow’s milk and egg white. It is estimated that 2 to 5% of infants develop milk allergy. Food allergy is a known provoking cause of Atopic Dermatitis (AD) in a subset of affected children and triggers skin symptoms in about 30% of children. The aim of our study was to evaluate the role of sensitization to cow’s milk under 2 years of age with AD in Georgian population.

Method: 121 patients under 2 years of age with AD (male-60, female-61) were investigated. Analyzed data included clinical history, Severity Scoring of Atopic Dermatitis Index (SCORAD), measurements of total serum IgE and specific IgE to food allergens was tested by CAP System; fluorescent enzyme immunoassay (ImmunoCap, Phadia). Specific IgE level \( \geq 0.35 \) kU/A was considered as positive.

Results: Specific IgE to cow’s milk was positive in 33.9% of cases. Among them the high level of allergen specific IgE to cow’s milk (RAST classes 4-5) revealed in 2.4% of patients with atopic dermatitis, moderate level (3 class) - 4.9%, low level (1-2 classes) - 27.3%. Increased value of total IgE was detected in 45.4% of studied children. In some patients suspected having allergy to other food allergens, specific IgE to casein (29 investigated cases), to flour mixture - wheat, oat, maize, sesame, seed, buckwheat (32 cases), and to hen’s egg (30 cases) were measured. Co-sensitization with milk was revealed in 20.7% of cases studied cases, 15.6% of flour mixture and 26.6% of hen’s egg positive cases. 0.8% of infants with atopic dermatitis showed positive results to cow’s milk, hen’s egg and flour mixture. The degree of sensitization was correlating with SCORAD.

Conclusion: Our study demonstrates that 33.9% of children under 2 years of age with AD in Georgia is sensitized to milk allergen, that should be considered for early induction of proper dietary, treatment and preventive measures. Further investigations are strongly recommended.

P75

Single blood drop diagnostic activation test (DAT) for food allergies

Amit Singht1, Scott Selk2, Marco Garcia1, Kevin Mckee3, Trevor Longbottom4, Brittany Weldon, Grace Yu, Sue Naale-May, Jennifer Jenkins, Seung Sin Lee, Kari Nadeau

1Stanford University, Pediatrics Department, Stanford Medical School, Stanford, USA

Clinical and Translational Allergy 2011, 1(Suppl 1):P75

Background: Quantitative measurement of basophil cell surface markers, CD63 and CD203c, by flow cytometry has been developed as useful tool for the diagnosis of IgE mediated allergies. Available methods require large volume of blood and include extra steps such as prior cell purification, priming with IL-3, stopping cell activation and fixing. We have developed a new basophil based test which can be performed with small amount of whole blood directly from skin prick or from small amount of the whole blood where multiple allergens can be tested at the same time for high-throughput testing.

Materials and Methods: Patients who have been diagnosed with the peanut allergies were examined for their CD203c and CD63 inducible expression before the in vitro activation. Whole blood, 1-2 drops, was collected by skin prick in to the allergen and anti-coagulant coated 96 well plate. Alternatively 3-5 ml of the whole blood was collected in the EDTA or Heparin coated tubes and 100μl was incubated with multiple allergens in 96 plate for high-throughput testing. After 20 minutes of incubation at 37°C, the whole blood was stained with fluorochrome conjugated antibodies and lysed with ammonium chloride buffer. Basophil characterization was done by gating on CCR3High and SSClow cells. Eosinophils were excluded on the basis of granularity and T cells were excluded on the basis of low expression of CCR3. The CD203c or CD63 expression was analyzed before and after stimulation.

Results: The CD203c expression on basophils, as gated on the CCR3High and SSClow cells, showed shift of the mean fluorescence intensity (MFI) before and after activation with allergens. Control allergens did not show any change in the MFI before and after the incubation, which suggested allergen specific CD203c induction on basophil cell surface. This shift in the CD203c cell surface expression was consistent with the results obtained with other basophil stimulation tests used in allergy diagnosis. However our new method is fast and efficient in performing allergy diagnosis which does not require extra steps used by other protocols for example use of two or more basophil markers, basoehil priming and fixing of cells.

P76

An unusual case of meat allergy

Paola Minale1, Elena Penza1, Susanna Voltoini1, Donatella Bignardi1, Paola Dignetti2

1Istituto Polifunzionale, Allergy Unit, Genova, Italy; 2ASL22, AL, Italy, # Emergency Dept, Villa Scassi Hospital, Allergy Dept, Genova, Italy

Clinical and Translational Allergy 2011, 1(Suppl 1):P76

A 35 years old woman presented with allergic rhinitis and asthma with cat epithelium’s sensitivity (Skin prick test positive) treated with antihistamines, nasal and bronchial steroids.

The patient has been maintaining the cat in her apartment. After a couple of years from the onset of respiratory allergic disease, she presented an oral allergy syndrome type clinical reaction, gastric pain and diarrhea at once after eating cooked pork meat. Skin prick test (SPT) performed with commercial extracts and fresh meat were positive for pork meat according to the ‘pork-chat syndrome’.

Subsequently she presented the same symptoms after eating goat cheese and goat meat.A prick by prick for the culprit foods confirmed the food allergy. Recently the same symptoms presented after eating not well cooked beef meat. In her personal history we focused on an anaphylactic reaction occurred at 23 y.o. after injection of antirabbit serum used for antipneumococcal vaccination. The specific IgEs detection (microarray IMMUNOCAP ISAC system) was positive only for bovine (Bos d6), cat (Fel d2 ) dog (Can f3), horse (Equ c3) serum albumin and cat, dog lipocalin (Fel d 4, Can f 1).

No other foods or respiratory allergens specific IgEs were detected.

Meat allergy is a rare allergic disorder, more frequent during the first year of life but unusual in adults. Usually the sensitization to pork meat presented before the goat and beef allergy.

Interestingly no milk allergy was found associated to meat allergy (while in children is frequent ). As it’s common the patient presented cat sensitivity and subsequently a crossreactivity towards dog,cat and beef serum albumins. The patient avoids pork, sheep,goat meat but she can eat well cooked beef meat.
**P77**

**Tomato hypersensitivity in peach allergic patients: rPru p 3 and rPru p 1 positivity is predictive of the symptom severity**

Marta Piantanida1, Laura Fario1, Joseph Scibilia1, Ambra Mascheri1, Valerio Pravettoni2, Laura Primavesi3, Michele Nichelatti4, Alessandro Marocchi5, Jan Walter Schroeder6, Chyssi Stafylarakis1, Elide Anna Pastorello7

1Foundation IRCCS Ca’ Granda Ospedale Maggiore Policlinico, Clinical Allergy and Immunology Unit, Milan, Italy; 2Niguarda Hospital, Laboratory Medicine, Milan, Italy; 3Niguarda Hospital, Allergology and Immunology, Milan, Italy; 4Niguarda Hospital, Center for Clinical Research, Milan, Italy

Clinical and Translational Allergy 2011, 1(Suppl 1):P77

**Background:** allergy to tomato is very common in the Mediterranean area, where tomato consumption has increased in the last years: fresh in salads, cooked in household sauces or industrially processed foods. Many patients allergic to tomato present severe reactions and have symptoms also with commercial tomato products.

**Objective:** to examine the possibility of a relationship between severe allergic symptoms to tomatoes and peach; and, in the event of such a relationship, examine the correlation between severe tomato allergy and IgE positivity to peach allergens, i.e. Pru p 3 and Pru p 1.

**Methods:** within a population of patients with different grades of OAS for peach (mild-OAS, group A; and severe systemic symptoms to peach, group B) we selected patients with documented allergic reactions to tomato. We investigated the type of reaction to tomato by means of a clinical questionnaire, skin prick tests, prick + prick with fresh tomato and anti-rPru p 1, 3, 4, anti-Bet v 1, 2 and 4 IgE specific measurements. We compared the kind of clinical reactions to tomato between group A and group B patients. Statistical analyses were carried out with parametric and non parametric tests to examine the relationship between anti-rPru p 1 and 3 IgE levels and symptom severity.

**Results:** patients with severe symptoms to peach (group B) were at major risk of presenting severe symptoms to tomato (p=0.017). We investigated this correlation and found that patients with systemic severe symptoms to tomato presented higher specific IgE levels to rPru p 3 than patients with mild OAS (p= 0.0291). On the contrary patients with mild OAS to tomato presented higher rPru p 1 specific IgE levels than patients with severe systemic symptoms (p=0.047).

**Conclusions:** peach and tomato allergy are strictly interrelated and IgE positivity to rPru p 1 can be considered a biological marker of severe symptoms to tomato, whereas IgE to rPru p 1 can be considered a marker for milder symptoms.

**P78**

**Hypersensitivity to fennel is frequent in peach allergic patients and LTP is a major fennel allergen**

Chyssi Stafylarakis1, Laura Fario1, Joseph Scibilia1, Maria Grazia Giuffrida1, Ambra Mascheri1, Valerio Pravettoni2, C Baro3, Marta Piantanida3, Laura Primavesi3, Michele Nichelatti4, Alessandro Marocchi5, Jan Walter Schroeder6, Elide Anna Pastorello1

1Niguarda Ca Granda Hospital, Allergy and Immunology Unit, Milan, Italy; 2Niguarda Ca Granda Hospital, Department of Laboratory Medicine, Milan, Italy; 3Foundation IRCCS Ca’ Granda Ospedale Maggiore Policlinico, Clinical Allergy and Immunology Unit, Milan, Italy; 4National Research Council, ISPA, Turin, Italy; 5Foundation IRCCS Ca’ Granda Ospedale Maggiore Policlinico, Clinical Allergy and Immunology Unit, Milan, Italy; 6Niguarda Ca Granda Hospital, Center for Clinical Research, Milan, Italy

Clinical and Translational Allergy 2011, 1(Suppl 1):P78

**Background:** fennel is usually consumed as seeds in Northern Europe, while in the Mediterranean area the plant is also consumed fresh. Because of the low consumption there aren’t many studies that regard the identification of fennel allergens in the literature.

**Objective:** to study 1) the possible correlation between severe allergic symptoms to peach and severe symptoms to fennel; 2) identify fennel allergens; 3) evaluate whether the rPru p 3 recombinant allergen could help identify subjects with severe reactions to fennel.

**Methods:** within a population of patients with peach allergic symptoms of variable severity we investigated which patients also had documented allergy to fresh fennel (ClinicalTrials.gov, protocol ID NCT00715156). We examined the type of allergic reaction to fennel by means of a clinical questionnaire, skin prick test, prick-prick with fresh fennel, open challenge and IgE-specific levels to fennel and to the following recombinant allergens: anti-rPru p 1, 3, 4, anti-Bet v 1, 2 and 4. We compared the different clinical reactions to fennel between patients with mild symptoms to peach (group A, 21pts) and patients with severe systemic symptoms to peach (group B, 16 pts). SDS-Page and IgE immunoblotting were performed with fennel extract and the N-terminal sequences of the allergenic molecules were determined analyzing the proteins eluted by SDS-gel on a protein sequencer. Immunoblotting inhibition was performed to evaluate the cross-reactivity between fennel and peach extract.

**Results:** we found a significant association between severe symptoms to fennel and peach induced severe symptoms (p=0.0081). IgE immunoblotting showed that more than half of the patients reacted toward a IgE-binding protein of about 9 kDa. The aminoacids of the N-terminal sequence were Ala-Ile-Thr-Xxx-Gly-Qln-Val-Thr-Ser-Lys-Leu-Gly, corresponding to a nsLTP. The immunoblotting inhibition experiment with peach extract showed a total inhibition of IgE binding to the 9 kDa band of fennel.

**Conclusion:** Peach and fennel allergens are correlated and fennel is a food that should be considered in the LTP syndrome.

**P79**

**Severe allergic symptoms to peach are a risk factor for severe symptoms to other plant food allergens**

Ambra Mascheri1, Joseph Scibilia1, Laura Fario1, Chyssi Stafylarakis1, Valerio Pravettoni1, Marta Piantanida2, Laura Primavesi3, Corrado Mirone4, Michele Nichelatti5, Alessandro Marocchi4, Jan Walter Schroeder6, Elide Anna Pastorello1

1Niguarda Ca Granda Hospital, Allergology and Immunology Unit, Milan, Italy; 2Niguarda Ca Granda Hospital, Department of Laboratory Medicine, Milan, Italy; 3Foundation IRCCS Ca’ Granda Ospedale Maggiore Policlinico, Clinical Allergy and Immunology Unit, Milan, Italy; 4Niguarda Ca Granda Hospital, Center for Clinical Research, Milan, Italy

Clinical and Translational Allergy 2011, 1(Suppl 1):P79

**Background:** The hypersensitivity reactions to plant-food allergens may consist of oral allergic symptoms (OAS) only or OAS plus systemic symptoms up to anaphylaxis. Currently there is great interest in evaluating the risk factors for developing the more severe and systemic reactions.

**Objective:** A group of 148 peach allergic patients, recruited in a ongoing clinical study (ClinicalTrials.gov, protocol ID NCT00715156) aimed at studying the relationship between the clinical manifestations to peach and the positivity to different peach major allergens (Pru p 3, 1 and 4), were divided into 2 groups according to peach induced symptoms: group A (mild-OAS; 76 pts) and group B (severe-OAS with systemic symptoms, 72 pts). These patients were examined to see if severe allergic symptoms to peach were a risk factor for developing severe symptoms to other plant foods allergens.

**Methods:** We investigated the type of reaction to peach and to other foods by means of a clinical questionnaire and confirmed their allergy with open food challenge (fresh fruits and vegetables) or double blind challenge (maize, rice and wheat) and, when necessary, double blind challenge + exercise. In all the patients we performed skin prick test, prick-prick with natural food, and IgE-specific levels for all the considered plant-food allergens and for the following recombinant allergens Pru p 1, 3, 4, Bet v 1, 2 and 4. Then we compared all the reported parameter between the two groups.

**Results:** In general there was a significant association between patients belonging to group B (severe peach induced symptoms- OAS) and having severe symptoms to many of the other tested plant foods allergens. Moreover for the majority of these foods, the IgE positivity to Pru p 3 resulted to be a biological marker of food allergy severity.

**Conclusions:** This study suggests that patients with severe allergic symptoms to peach have a major risk of presenting severe allergic symptoms to other plant foods allergens.
P80

Estimation specific food allergy in children from Sarajevo
Adrian Bajjakatarić, 1,2 Semira Penava, 1 Begler Begovic, 3 Goran Todosićević, 4,5 Amina Selimović, 6,7,8 Zijo Begić, 2,3 Haris Nikić, 2,3 Teodora Frančić, 2,3 Aida Đujića-Dujićević, 3,9 Aida Resic Sekerbecioglu, 3,9 Lutvo Sporisavljević, 3,10 Branka Đukić 1
1 Public Health Institution of Canton Sarajevo, Pediatrics Department, Sarajevo, Bosnia and Herzegovina; 2 Clinical Medical Center Sarajevo, Clinical Pharmacology, Sarajevo, Bosnia and Herzegovina; 3 Clinical Medical Center Sarajevo, Emergency Department, Sarajevo, Bosnia and Herzegovina; 4 Pediatrics Clinic Sarajevo, Department for allergology and pulmonology, Sarajevo, Bosnia and Herzegovina; 5 Pediatrics Clinic Sarajevo, Cardiology Department, Sarajevo, Bosnia and Herzegovina; 6 Pharmacy Faculty Sarajevo, Clinical Pharmacology, Sarajevo, Bosnia and Herzegovina; 7 General Hospital Sarajevo, Emergency Department, Sarajevo, Bosnia and Herzegovina; 8 Dermatologick Clinica Sarajevo, Allergology Department, Sarajevo, Bosnia and Herzegovina; 9 First Medical Aid New Sarajevo, Pediatrics Department, Sarajevo, Bosnia and Herzegovina

Clinical and Translational Allergy 2011, 1(Suppl 1):P80

Introduction: Food allergy most often begins in the first 1 to 2 years of life with the process of sensitization, by which the immune system responds to specific food proteins. Symptoms of a food allergy reaction commonly involve localized hives and worsening eczema, with moderate-to-severe atopic dermatitis a frequent comorbid condition of food allergy. Acute urticaria is much more likely to be caused by food allergy than is chronic urticaria.

Methods: A blood test measured child immune system’s response to particular foods by checking the amount of allergy-type antibodies in bloodstream, known as immunoglobulin E (IgE) antibodies. Allergy testing was otherwise conducted in more than 1000 children during period 2000-2010 in Sarajevo, Bosnia and Herzegovina on Department for Allergy Testing.

Results: Overall, 19% of the children were reported to have an adverse food reaction, and the reactions were confirmed by challenge in 6%. In that study, industrial meat and canned meat as sausages had been the most frequent food reactions among 2500 children (about 37%) , egg allergy had been in 261 of 1000 children patients (26%), compared with 61 of 1000 with milk allergy (6%), 35 of 1000 with strawberry allergy (3.5%), 25 of 1000 with peanut allergy (2.5%) and other food allergy as citrus fruits, milk allergy, soy allergy, other nuts allergy, fish, tomato, herbal allergy, wheat allergy and other allergy had been in 249 of 1000 cases (about 25%). The duration of the reactions overall was short, with approximately two thirds of the reactions resolving within six months of their onset.

Conclusion: Six percent of Bosnian children have documented food allergy. Currently available diagnostic methods for food allergy, such as prick skin tests and serum food allergen-specific IgE levels, do not distinguish between children who will achieve food tolerance and those who will have persistent food allergy. The diagnostic approach to the child patient should parallel those used in diagnosis of other adverse reactions to foods.

Key Words: Allergy, Food, Children, Therapy

P81

Plant food allergy in mugwort sensitised patients: two case reports
Eugenia Almeida, 1,2 Isabel Carapatoso, 1,2 Filipe Ribeiro, 1,2 Nuno Sousa, 1,2 Antonio Segorbe Luis 3
Coimbra University Hospitals, Immunology Department, Coimbra, Portugal

Clinical and Translational Allergy 2011, 1(Suppl 1):P81

Background: Allergy to celery, other vegetables and spices from Apiaceae family is frequently seen in pollen allergic patients and can be associated with several immediate symptoms, from oral allergy syndrome to anaphylactic reactions. The association with spices belonging to a different family is frequently seen in celery allergic patients included in celery-mugwort-spice syndrome.

Case reports: The authors describe two clinical cases.

Case 1: Thirty one years old male that presented at age 15 allergic rhinoconjunctivitis and cutaneous pruritus after ingestion of honey and spices. Three years later, he had the same symptoms with ingestion of pepper. Skin prick tests were positive to grass, mugwort, dandelion and ragweed pollen, as well as pepper, curry, paprika and anise. Serum specific IgE was positive to carrot, pea, white bean and chick pea, mugwort, dandelion and grass. ImmunoCAP ISACR was positive to Art v1, Art v3, Phl p 1 and Cyn d 1.

Case 2: Twenty two years old male with history of anaphylactic reactions (urticaria, angioedema and loss of consciousness) after the ingestion of spicy food and pizza. The systemic episodes developed only after physical activity (30 to 60 minutes). SPT were positive to grass, mugwort, olive and plantain pollen, as well as tomato, capsicum, curry and nuts. Prick-prick tests were positive to celery, carrot and peach. Specific IgE was positive to mugwort, plantain, timothy, rye, olive, peach, celery, nut, hazelnut, peanut, garlic and onion. ImmunoCAP ISACR was positive to Phi p1, Pru p 3, Art v 3 and Cor a 8.

Conclusions: In case 1 allergy to spices appears to be a consequence of pollen sensitisation to mugwort, plantain and dandelion with involvement of Art v1 and the LTP Art v 3. In the case 2 hypersensitivity to mugwort is related to sensitisation to LTP (Art v 3) which seems to cross-react with LTP from peach and hazelnut, causing an anaphylactic reaction. Two different patterns of sensitisation to mugwort are observed in these patients.

P82

The clinical role of positive latex IgE in patients with food/pollen adverse reactions
Arianna Arauanno, 1 Eleonora Nucera, 2 Alessandro Buonomo, 2 Tiziana De Pasquale, 1 Valentina Pecora, 3 Sonia Musumeci, 1 Amira Colagiovanni, Vito Sabato, 1 Lucia Pascolini, Anna Maria Ricci, 2 Angela Rizzi, 2 Domenico Schiavino, 1 Policlinico A Gemelli, Allergy Department, Rome, Italy

Clinical and Translational Allergy 2011, 1(Suppl 1):P82

Natural rubber latex allergy (NRL-A) is an international problem of public health. About 50-60% of NRL-A patients may present adverse reactions after ingestion cross-reacting vegetable foods. This condition is called “Latex-fruit Syndrome” and is matter of research. The aim of our study is distinguishing between clinical/subclinical latex-fruit syndrome and cross-sensitization to latex and food/pollens allergens on the basis of latent recombinant allergens. We studied 19 patients with food hypersensitivity and serological evidences of NRL sensitization. They underwent an accurate allergological evaluation (skin prick test with latex, food and pollen extracts, specific IgE to latex and recombinant allergens, challenge provocation tests). The patients were divided in two groups: group 1) 9 patients allergic to fruits/vegetables and/ or pollens, with serological, but not clinical NRL-A; group 2) 10 patients with clinical and serological latex and fruits/vegetables allergy. The same number of patients was positive to pollens in each group. All group 1 patients presented negative provocation challenges and a monosensitization to Hev b8 (and other recombinant profilins), probably linked to a cross-sensitization to pollens and foods. These data suggest that profilin sensitization determines false positivity from NRL-A diagnostic test. Consequently the observed in vitro reactivity to NRL is not clinically relevant in patients with adverse food reactions and it does not determine always a latex-fruit syndrome. Instead, in group 2 we observed positive NRL provocation challenges and it does not determine always a latex-fruit syndrome. We supposed that the available panel of recombinant latex allergens could be effective to demonstrate a significant difference between latex-fruit syndrome and cross-sensitization to latex and food/pollens allergens. So further investigations are needed with a larger group of patients.

P83

Evaluation of peripheral blood eosinophilia, serum ECP levels of eosinophils in inflammatory infiltrates of gastric mucosa in food allergy patients
Małgorzata Graczyk, 1 Zbigniew Bartuzi, 1 Michał Przybyszewski, 2 Katarzyna Napiorowska, 2 Magdalena Zbikowska-Gotz, 3 Jacek Tippa, 2 Ewa Szykiewicz, 2 Robert Zacniewski, 2 Ewa Socha, 2 Collegium Medicum in Bydgoszcz, Department of Allergology, Clinical Immunology and Internal Diseases, Bydgoszcz, Poland

Clinical and Translational Allergy 2011, 1(Suppl 1):P83

Introduction: Eosinophilic infiltration may be found in all segments of the gastrointestinal tract. The goal of this study was to evaluate the...
peripheral blood eosinophilia, serum ECP levels and presence of eosinophils in inflammatory infiltrates of the gastric mucosa in food allergy patients.

Materials and methods: 80 patients were enrolled in the study, including 50 patients with food allergy and 30 patients with dyspeptic discomfort without underlying food allergy. All subjects were subjected to gastroscope examination, gastric mucosa biopsy and Helicobacter pylori colonization status. Blood was collected from each subject for determination of peripheral blood eosinophilia and ECP levels.

Results: The presence of eosinophils in gastric mucosa from food allergy patients was found in 42% of subjects, and the average eosinophil count of >10 per field was observed in as many as 20% of patients. Helicobacter pylori colonization was observed in 38% of subjects suffering from food allergy and in 60% of patients with dyspeptic symptoms without concomitant allergy. Arithmetic average serum ECP levels in food allergy patients was 24.604 +/- 40.36 μg/L. The average serum ECP levels in allergy-free patients was 29.9 +/- 64.76 μg/L. The average peripheral blood eosinophil count determined in the study population of food allergy patients was 221.34 +/- 175 eos/mm². In patients with dyspeptic symptoms without concomitant food allergy, the average peripheral blood eosinophilia was 121.4 +/- 100.75 eos/mm².

Conclusions: The study showed that the presence of eosinophils in gastric mucosa was more prevalent in food allergy patients compared to patients without food allergies; however, the difference was not statistically significant. Analysis of the results revealed no statistically significant differences between serum ECP levels in food allergy patients and patients with dyspeptic symptoms without concomitant food allergy. Both study groups showed a statistically significant differentiation of average peripheral blood eosinophil counts. The statistically significant positive correlation was found between the ECP levels and peripheral blood eosinophilia in food allergy patients.

**P84**

**Blinding of freeze-dried cod – a recipe developed for the FAST project**

Heidi Julius Schnoor, Marianne Witten, Ronald van Rhee, Fernandez-Rivas Montserrat, Lars K Poulsen

1Copenhagen University Hospital, Allergy Clinic, Gentofte, Denmark; 2AMC, Amsterdam, Netherlands; 3Fundacion Hospital Alcorcon, Madrid, Spain

Clinical and Translational Allergy 2011, 1(Suppl 1)P84

Background: The FAST project (Food Allergy Specific Immunotherapy) aims at the development of safe and effective treatment of food allergies. Classical allergen-specific immunotherapy (SIT) for treatment of food allergy using subcutaneous injections with food extracts has proven to be effective but too dangerous due to anaphylactic side-effects. FAST aims at developing a safe alternative by replacing food extracts with hypoallergenic recombinant major allergens, the active ingredients of SIT. Fish allergens derived from a single major allergen parvalbumin. In phase I and II of the study randomized double-blind placebo-controlled trials will be performed. A recipe for fishblinding does not exist and is needed to determine the clinical reactivity when including patients in the trial and to assess efficacy in the Phase II trial.

Double-blind placebo-controlled challenges: The aim was to develop a recipe that could blind the highest possible amount of freeze-dried cod in the lowest amount of edible low-allergenic vehicle. Several recipes were developed and tried in the attempt to hide the texture and taste of the freeze-dried cod. A burger primarily made of minced chicken meat, onion, rice and spices was able to blind cod successfully. Cumin seed is an important ingredient, that has the ability to mask the taste of cod that would otherwise remain in the mouth after intake.

Recipe for freeze-dried cod-blinding: Freeze-dried cod powder (in active challenge)

**Minced chicken meat**

**Onion**, **chopped**

**Olive oil**

**Flattened rice (rice flakes)**

**Thyme**

**Cumin seeds**

**Salt**

**Pepper**

**Turmeric**

All ingredients are thoroughly mixed in a food processor, to a homogeneous paste. Formed to a burger and cooked in a pre-heated oven at 180°C. 7 doses are given from 50ug - 4g protein, accumulated dose of 22g of cod fish. Preliminary testing (triangle test) show that it is not possible to tell the active challenge from placebo.
Paola Minale1, Elena Penza1, Susanna Voltoini1, Donatella Bignardi1, Paola Dignetti2

1St Martino Hospital, Allergy Unit, Genoa, Italy; 2ASL22, AL, Italy. # Emergency Dept, Villa Scassi Hospital, Allergy Dept, Genoa, Italy

Clinical and Translational Allergy 2011, 1(Suppl 1):P87

From one year of liver’s transplantation and cyclosporin (CSA) maintenance treatment (100 mg a day), a 43 years old women presented with abdominal pain and diarrhea immediately after eating milk and egg. She underwent the transplantation after an acute liver toxicity caused by iodinamide during tuberculosis treatment. Increasing hyper eosinophila (40%) and eosinophilic oesophagitis (EE) presented with food allergy. Total IgE was low (45 U/L). Commercial skin prick test and prick by prick as specific IgEs detection (IMMUNOCAP) were positive for milk’s proteins, egg, rice and wheat flour. Hyper eosinophila persisted inspite of an elimination diet for the culprit allergens while the clinical symptoms of food allergy improved. Other causes of hyper eosinophila were excluded. Interestingly only an inhaled fluticasone propionate treatment (FP, 250 mg/c mcg bid) for three months was followed by a outstanding reduction of hypereosinofilia as generally occurs in transplant patients. Our patient elimination diet wasn’t followed by a reduction of hyper eosinofilia as generally occurs in pediatric cases. Our patient didn’t present any allergy before the transplantnaton.No information was available on donor’s known allergy. Different mechanisms are supposed underlying the new onset of food allergy and hyper eosinophila in liver’s transplantation:

• An imbalance between Th1/Th2 cells or an increased enteric permeability.
• Immune effects of viral infections associated with the immunosuppressive state.

• Acquired food allergy and hyper eosinophila due to a transfer of hepatic hematopoietic stem cells or active IGE from the donor’s liver. More study are needed in a controlled setting to identify similar findings among liver transplants.Moreover in the pretransplant investigation should be included the allergic status both of the donor as the recipient.

P88

Anaphylactic reactions to pomegranate: identification and characterization of eliciting IgE-reactive components

Andr Petersen1, Andreas Kleinheinz2, Uta Jappe3

1Research Center Borstel, Clinical and Molecular Allergology, Borstel, Germany; 2Dermatological Center Buxtehude, Buxtehude, Germany

Clinical and Translational Allergy 2011, 1(Suppl 1):P88

Background: Reports on anaphylactic reactions to exotic fruits, e.g. kiwi and dragon fruit, are increasing. Therefore, the allergenic risk assessment and the identification of allergenic components are important. 9 cases of allergic reactions to pomegranate have already been reported, but the responsible allergens have so far not been characterized in detail. Patients and methods: A 26 year old female patient developed erythema, swelling of the ears and pruritus within 10 min after ingestion of pomegranate. She is allergic to birch pollen and apple. Prick and IgE tests revealed a positive reaction to mites, tree and grass pollen, ambrosia, mugwort and apple. Scratch test was positive for pomegranate, the seeds showing a stronger reaction than the juice. Oral provocation test with kiwi, peach and cherry was negative. The serum was analysed for IgE reactivity by Western blotting. As extracts served different sections of pomegranate (juice, extract and seed). IgE-reactive protein bands were analyzed and identified by protein sequencing and homology screening. Results: The IgE-binding patterns differed between juice with one band of 9 kDa and the seeds with three IgE-reactive components of about 21, 16 and 6 kDa. The 9 kDa allergen was identified as a lipid transfer protein (LTP), which revealed a 77% sequence identity to the LTP from peach. While the 21 kDa protein of the seeds was N-terminally blocked, the 16 kDa component showed sequence similarity to Bet v 1-homologous proteins, which is in line with the patient’s reactivity to birch and apple. The 6 kDa protein revealed no significant sequence similarities to proteins in the databases. Tryptic mass fingerprinting is in progress to identify the allergens in more detail. Conclusions: Pomegranate is a relevant allergen source which shows different IgE-reactive components in its compartments. The structural characterization of these components is necessary to define their allergenicity and the underlying IgE-binding epitopes for improving in vivo and in vitro diagnosis and to estimate the potency of novel allergens in the future.

P89

Soybean allergy in a population with a low prevalence of betulacae pollen allergy and a high soybean consumption

Yuma Fukutom1, Sigrid Sjölander2, Magnus Bores3, Takuya Nakazawa1, Toyota Isii1, Satoshi Nakayama4, Akira Tanaka1, Masami Taniguchi1, Akemi Saito1, Hiroshi Yasueda5, Hiroyuki Nakamura5, Kazuo Akyama5

1Sagamihara National Hospital, Clinical Research Center for Allergy and Rheumatology, Sagamihara Kanagawa, Japan; 2Phadia AB, Uppsala, Sweden; 3Goteborg University, Department of Pediatrics, Sahlgrenska Academy, Goteborg, Sweden; 4Phada KK, Tokyo, Japan; 5Graduate School of Medical Science, Kanazawa University, Department of Environmental and Preventive Medicine, Kanazawa Ishikawa, Japan

Clinical and Translational Allergy 2011, 1(Suppl 1):P89

Background: Recent evidence has shown that birch pollen-related soybean allergy mediated by Gly m 4 is common in central Europe. However, the impact of sensitization to Gly m 4 in soybean allergic patients in a population with a low prevalence of Betulaceae pollen allergy and a high soybean consumption is unknown. Methods: The aim of this study was to elucidate the prevalence of sensitization to rGly m 4 in adults with soybean allergy, and to analyze the diagnostic efficiency of the IgE antibody to rGly m 4 (ImmunoCAP®) in soybean allergy in central Japan. Twenty-one soybean-allergic patients were prospectively recruited from Jan, to Dec. 2009, and their levels of IgE antibody to rGly m 4 were compared with those of general alder pollen-allergic control subjects without soybean allergy (n=85).

Results: Although sensitization to alder pollen was not prevalent in the general outpatient departments of allergy departments, all the soybean–allergic patients were sensitized to alder pollen and rGly m 4. Sixty-two percent of the general alder pollen-allergic control subjects were also sensitized to rGly m 4. However, the levels of IgE antibody to rGly m 4 in soybean-allergic patients were markedly higher than those in alder pollen-allergic control subjects. The area under the receiver-operating characteristics curve for levels of IgE antibody to rGly m 4 in the diagnosis of soybean allergy was 0.86, which was significantly higher than that to the natural soybean extracts.

Conclusion: A strong relationship between adult soybean allergy and sensitization to rGly m 4 was also observed in this population with high soybean consumption. The level of IgE antibody to CAP-rGly m 4 was an effective tool in discriminating soybean allergy from general alder pollen-allergy. This result highlights the impact of respiratory allergy to pollen-derived cross-reactive allergens on the epedimics of adult plant food allergy.
A case of adult eosinophilic oesophagitis

Isabel Sky phá la, Stephen Till

Royal Brompton & Harefield NHS Trust, Rehabilitation & Therapies, London, UK; Imperial College, London, Allergy and Clinical Immunology, London, UK

Clinical and Translational Allergy 2011, 1(Suppl 1):P90

Reports of adults with eosinophilic oesophagitis (EO) are rare. However, we describe two adult cases which have been treated successfully with an elemental diet followed by planned reintroduction of foods.

Background: Adults with Eosinophilic Oesophagitis (EO) often present with a history of dysphagia and food impaction. Many are also atopic and sensitisation to foods is common. 81% of adults with EO in one study were sensitised to one or more food or inhalant allergen, and 50% had positive skin prick tests to one or more foods. Exclusion of foods has been reported to improve clinical symptoms; 94% of adults improved on a food elimination diet, and in children, the use of an elemental formula has been proven to be effective.

Method: We describe an adult male patient aged 30 years with a suspected diagnosis of EO. Skin prick testing with fresh foods and specific IgE blood tests (Phadia ImmunoCAP) revealed sensitisation to a number of foods. Following an acute episode of dysphagia requiring dilatation, the patient commenced a complete exclusion diet. Nutritional support was maintained solely through the consumption of a nutritionally complete liquid elemental diet (Elemental 028™). After six weeks, one new food was introduced every 2-3 days.

Results: The patient was sensitised to birch and grass pollen and a wide variety of foods including potatoes, carrots, broccoli, lettuce, spinach, beer, wine, grapes, apple juice, mango, peanut, mustard, marmite, rice, wheat, barley, yeast and the peach liquid transfer protein allergen Pru p 3. Following the 6-week elemental diet, to date the following have been successfully reintroduced into the diet: rice, fish, onions, eggs, olives, lamb, corn, barley, milk, vodka, red wine, champagne, barley, peas, pak choi, pork, turkey. Soy and grapes, both previously eaten regularly may not be completely reliable.

Conclusions: This demonstrates that in the face of multiple sensitisation to foods, an elemental diet followed by careful staged reintroduction of foods may be effective in establishing which foods can be safely be consumed.

P91

Urticaria and angioedema after ingestion of grapes

Ana Célia Costa1, Pedro Morais Silva2, Maria Conceição Santos2, Manuel Pereira Barbosa1

1Santa Maria Hospital - CHLN, Immunology Department, Lisbon, Portugal; 2Molecular Medicine Institute/Lisbon Medical School, Clinical Immunology Unit, Lisbon, Portugal

Clinical and Translational Allergy 2011, 1(Suppl 1):P91

Background: Grape (Vitis vinifera) allergy is considered rare and usually found in association with pollenosis. Recent publications identified Vit v 1, a grape lipid transfer protein (LTP), as a major allergen that is sometimes involved in severe reactions. Other minor allergens, like a protein homologous to the cherry thiamatin-like protein may also play a role in cross-reactivity reactions.

Case report: We report the case of a 28-year-old female who developed acute generalized urticaria and facial angioedema one hour after ingesting grapes of several varieties. The reaction was treated at Emergency Room level with parenteral administration of corticoids and anti-histamines. She previously ingested grapes and other fresh fruits with no reaction and denied rhinitis complaints. Skin prick tests with a large battery of aeroallergens, including latex, were positive to peach LTP, peach, apple, and plum but were negative with grape commercial extract. prick by prick procedure performed with the pulp and peel of a variety of red and white grapes yielded positive results, as well as with fresh cherry. Specific IgE (KUA/I, ImmunoCAP®, Phadia) were present for peach (1.16), peach LTP (1.79), apple (1.17), plum (1.36) and cherry (0.8) and were negative for grape.

Conclusions: Although infrequent, grape allergy may present with severe reactions. In this case, a LTP seems to be the major allergen responsible for the patient’s reaction. Prick by prick procedure should be performed in patients with a grape allergy suspicion because commercial extracts may not be completely reliable.

P92

Basophil activation test is food adverse reactions

Patrizia Pignatt1, Giselda Colombo2, Mona-Rita Yacoub2, Gianni Palai1

1Fondazione Salvatore Maugeri, Allergy and Immunology Unit, Pavia, Italy; 2San Raffaele Scientific Institute, IRCSS, Allergy and Immunology Unit, Milan, Italy

Clinical and Translational Allergy 2011, 1(Suppl 1):P92

Background: Some subjects with reported food adverse reactions have negative skin prick tests (SPT) and serum specific IgE (sIgE) for the suspected foods. The aim of the present study was to compare data of basophil activation test (BAT) with SPTs and sIgE results in subjects with food adverse reactions.

Methods: 83 subjects (66/17 females/male) with reported food adverse reactions were included in the study. Eighteen atopic/allergic subjects were included as controls for the foods to which they had reported no reactions. BAT was performed on heparinized blood incubated with food extracts. CD63 activation marker was evaluated on basophils by flow-cytometry. The stimulation index (SI) was calculated as ratio: CD63% on basophils incubated with food extract/CD63% on basophils with wash buffer.

Results: CD63>5% and SI>2 was chosen as positive cut-off on the basis of control subjects’ results. We performed 664 BATs in the subjects considered. 62.2% of the subjects presented a positive BAT for at least one food extract, 39.0% a positive SPT and 34.7% had detectable sIgE for foods. 78.2% was the concordance between BAT and SPT and 74.2% between BAT and sIgE. A positive BAT was more frequent with peanut, peach and apple extracts and was found in 91.7% of the subjects with a history of food anaphylaxis, 52.6% with urticaria/angioedema, 45.4% with gastrointestinal symptoms and 55.5% of the subjects with mixed symptoms (urticaria/angioedema and gastrointestinal symptoms). Among the subjects with a positive BAT, 20.4% had negative sIgE and 17.8% had negative SPTs.

Conclusions: a good correlation between positive BAT and food adverse reactions was shown in subjects with a history of anaphylaxis or with mixed symptoms of food allergy. We identified a group of patients with negative in vitro and/or in vivo tests and positive BAT. In these subjects double-blind placebo control challenges should be performed to confirm their allergic condition.
significant. The presence of IgE for Mal d1 in apples fruit was diagnosed in 14 patients (66.6%), in 3 it was weaker, whereas 7 persons (33.3%) have not revealed any reaction. Antibodies against Mal d3 from the apple peel extract was detected in serum of 6 patients (28.6%). The simultaneous presence of IgE against Mal d1 and Mal d3 proteins was detected in 6 patients. 11 subjects (53.4%) revealed the presence of sIgE for Api g1, in 4 patients the reaction was weak, and only 1 person (4.7%) had IgE for Dau c1. Within the control group, the presence of IgE against birch proteins has been detected in 6 patients, to apple - in 3, to celery - in 2, to carrot - in 1, which may correspond to Bet v1, Mal d1, Api g1, and Dau c1. Within this group, 1 patient was positive to protein of <10kDa of apple peel extract. Positive signal in immunobloting to proteins of 17-18 kDa present in all examined extracts was detected only in 1 person from patients group as well as 1 from control group.

P94
Method for the execution of skin tests in young pediatric patients with suspected allergy to milk and egg proteins
Elisa Panfili,1 Arianna Latini, Giulia Maria Campus, Miriam Castagnino, Emanuele Belardi, Francesco Marcucci
University of Perugia, Department of Medical Surgical Specialty and Public Health, Perugia, Italy

Prick tests, which are used on children up to the age of 2 in order to diagnose a suspected food allergy to milk and egg proteins, are difficult to carry out due to their lack of compliance. In order to overcome this problem, we have put into practice a method allowing to accurately carry out skin tests and reducing thereby by a single act the immobilization time. The method is based on the creation of a device which contains 3 needles 3 cm away from each other for testing 2 allergens, milk and egg white, and histamine at 1% from Stalleugenes. The device we have created to perform the skin test is made up of a base in which centre the 3 needles for the prick test are fixed in sequence. The base comes with a handle to be held by the health worker to perform the multi-test on the forearm perpendicularly. In 18 children whose age ranges from 2 to 24 months already positive to egg and/or cow’s milk and in 10 negative skin tests children, the abovementioned allergens and the histamine were carried out with the traditional method and with the new one within a span of one week from each other. With the two methods 3 children were positive to milk and to egg, 5 only to milk and 10 only to egg in a perfectly identical way; 10 healthy controls were negative in all cases. By comparing the diameter of the wheals we observed that the results were completely superimposable. Based on our findings, we can say that the method we developed has the same sensitivity and specificity as the traditional method, with the advantage of being easier to carry out because it works faster and less painfully (1-2 sec) for these patients.

P95
Role of basophil activation test for monitoring the immunological changes during desensitization to cow’s milk: a case report
Valentina Pecora,1 Eleonora Nucera, Amira Colagiovanni, Alessandro Buonomo, Tiziana De Pasquale, Sonia Musumeci, Angela Rizz, Arianna Anruanno, Lucilla Pascolini, Anna Giulia Ricci, Vito Sabato, Domenico Schiavino Policlínico A. Gemelli, Allergy Department; Rome, Italy
Clinical and Translational Allergology 2011, 1(Suppl 1):P95

The basophil activation test (BAT) has proven to be a useful tool for the diagnosis of IgE-mediated food allergy and the evaluation of clinical tolerance in food allergic patients. Until now, successful oral desensitization to food allergen has been correlated with changes in cytokine production (IL-4 and INF-γ) and allergen-specific IgE and IgG4 antibodies. We report a case of a 12-year-old male affected by cow’s milk allergy. The diagnosis was based on a positive allergological work-up, included skin prick test with commercial food extracts (Alk-Abelló) and fresh cow’s milk (pick-by-prick method), detection in serum of total and specific IgE (ImmunoCAP System, Phadia), basophil activation test and finally a double-blind placebo-controlled food challenge. Skin prick test, specific IgE, BAT and oral food challenge were positive and so we decided to carry on a sublingual-oral desensitization treatment with cow’s milk, performed according to standardized protocol. In order to evaluate the immunological changes occurred during the immunotherapy, we performed further laboratory tests, included the detection in serum of total and specific IgE and BAT at the end of protocol. Desensitization was successfully carried out within 12 months, reaching the maximum dose of 150 ml of cow’s milk without side effects. The patient showed a decrease of specific IgE levels without reaching normal values and an increase of specific IgG4 levels; whereas the BAT starting from a positive value of 59% became negative after 12 months of treatment.

This case report shows how it is possible to monitor allergen-specific basophil responses using the flow cytometry in order to identify an acquired tolerance induced by desensitization. Although further studies are needed, it was interesting to note that the basophil activation test seems to be more sensitive and characterized by a close correlation with the clinical tolerance.

P96
Correlations between in vivo and in vitro tests with commercial extracts and fresh foods and specific IgE in children with food allergy
Mirjana Zivanovic1, Marina Atanaskovic-Markovic2
1Special Hospital Sokobanja, Allergology, Sokobanja, Serbia; 2University Children’s Hospital of Belgrade, Pediatric Allergology, Belgrade, Serbia
Clinical and Translational Allergology 2011, 1(Suppl 1):P96

Background: The incidence of food allergy in children seems to be approximately 6 to 8% in developed countries. The diagnosis of food allergy has to be confirmed by skin test, by performing specific IgE and by food challenge.

Aim: The aim of this study was to assess the correlations between results obtained with skin prick tests (SPT) using commercial extracts and prick-prick test (PPT) with fresh food, and the correlations between these results and those obtained with specific IgE.

Methods: We performed a retrospective review of 249 children referred to the University Children’s Hospital of Belgrade for assessment of food allergy (cow’s milk, hen eggs, wheat, peanuts, soybeans and kiwi) between 2008 and 2010. Children underwent cutaneous (SPT, PPT), serologic (Specific IgE) diagnostic and provocative test with commercially available allergen reagens and extracts.

Results: 132 (53%) SPT were assessed as being positive: 33 (47.8%) for CMP, 29 (51.7%) for egg white, 25 (44.6%) for egg yolk, 21 (47.7%) for peanuts, 11 (39.2%) for wheat, 9 (33.3%) for soybeans, 4 (16%) for kiwi. 121 (85%) PPT were assessed as being positive: 50 (72.5%) for CMP, 41 (73.2%) for egg white, 37 (66.07%) for egg yolk, 27 (61.4%) for peanuts, 21 (75%) for wheat, 16 (59.25%) for soybeans, 19 (76%) for kiwi. Specific IgE levels were being positive in 228 (91.5%) children. The conformable between a positive SPT and serum measurement specific IgE was 57.8% and the conformable between positive PPT and serum measurement specific IgE was 92.5%.

Conclusion: Fresh food extracts are more effective in detecting sensitization. We obtained better conformable between fresh food tests and specific IgE, than with commercial extracts and measurement specific IgE.
Clinical and Experimental Allergology, IDI-IRCCS, Rome, Italy; \textsuperscript{3}Christian Doppler Laboratory for the development of allergen chips, Department of Pathophysiology and Allergy Research, Medical University of Vienna, Vienna, Austria; \textsuperscript{4}Christian Doppler Laboratory for Allergy Research, Department of Pathophysiology and Allergy Research, Medical University of Vienna, Vienna, Austria.

\textbf{Clinical and Translational Allergy 2011, 1(Suppl 1)}

\section*{P97}

\textbf{Introduction:} Wheat (\textit{Triticum aestivum}) is a main component of the daily diet but can cause three distinct forms of wheat allergy: Baker's asthma, wheat food allergy and wheat pollen allergy. The panel of wheat allergens is still incomplete. The aim of the study was to identify and characterize wheat allergens for the development of improved diagnostic tests and allergen-specific forms of treatment.

\textbf{Methods:} A cDNA library was screened with serum from wheat food allergic patients. The cDNAs coding for allergens were subjected to sequence comparison, cloned into \textit{E. coli} expression vectors and recombinant allergens were purified. The IgE reactivity of the recombinant allergens was tested by non-denaturing RAST-based dot blot analysis with sera from clinically well defined patients suffering from wheat food allergy or Baker's Asthma.

\textbf{Results:} We isolated a cDNA coding for the C-terminal part of a low molecular weight glutenin which has not yet been described as an allergen. The C-terminal part as well as the full length protein were expressed as soluble proteins in \textit{E. coli} and purified. More than 80\% of wheat food allergic children (n=26) showed IgE reactivity with the complete recombinant glutenin whereas only 5\% of Baker's Asthma patients (n=60) showed specific IgE reactivity.

\textbf{Conclusion:} We identified a low molecular weight as a novel major wheat food allergen which can be used for the development of component-resolved diagnostic tests for wheat food allergy and eventually for specific immunotherapy.

\section*{P98}

\textbf{Respiratory findings are not less frequent in food allergic children}

Derya Altintas, Gulbin Karakoc, Seval Kendirli, Mustafa Yilmaz, Dilek Dogruel Cukurova University Faculty of Medicine, Pediatric Allergy and Immunology, Adana, Turkey.

\textbf{Clinical and Translational Allergy 2011, 1(Suppl 1)}

\textbf{Background:} Food allergy (FA) has increased dramatically in recent years and it is now recognized as worldwide problem and accounts for a bread spectrum of disease. Although food induced respiratory symptoms are less frequent, their presence, usually are associated with other symptoms. In this report we evaluated respiratory and other clinical outcomes during food challenge in children.

\textbf{Patients and method:} 136 children with the positive food challenge were on follow up in Cukurova University, Pediatric Allergy and Immunology Division were enrolled to the study. Clinical history, physical examination, skin prick test and food specific IgE levels and clinical outcomes during food challenge were evaluated in all children. Open food challenge was performed in children younger than 2 years or in older children who refused the food because of different tastes.

\textbf{Results:} There were 56 girls (41.1\%) and 80 boy (48.9\%) with the mean age of 38.9±23.9 months. Cow's milk was the most common allergen in all ages (57.3\%) and followed by egg white (30.8\%), wheat (17.6\%) and peanut (5.1\%). Skin reactions (urticaria, eczema) were the major symptoms occurred during food challenge and identified in 96 cases (56.5\%). As the second most common symptoms, upper and/or lower respiratory tract symptoms were observed in 62 patients (53.4\%) and 12 patients (9.2\%) showed gastro intestinal symptoms. Of the positive allergen provocation, 78/57.35\% were immediate type reaction and 20/14.7\% late-onset reaction. 38 patients (27.9\%) had combined reactions. 22 patients with respiratory symptoms developed inhalant allergen hypersensitivity (35.48\%).

\textbf{Conclusion:} In this study we found food induced respiratory symptoms more frequently compared to the previous studies. These patients should be followed up for the development inhalant allergen hypersensitivity.

\section*{P99}

\textbf{In vivo and in vitro studies on the sensitisation to a panel of allergens in a large roseaccea allergic group of patients}

Ignacio Garcia Nuñez, Ana Arandia, Ana Belen Blazquez, Maria Jose Torres, Maria Luisa Galindo, Miguel Blanca, Maria Luisa Sanz.

1Hospital Universitario Carlos Haya, Allergy Department, Malaga, Spain; 2Clínica Universitaria de Navarra, Allergy Department, Pamplona, Spain.

\textbf{Clinical and Translational Allergy 2011, 1(Suppl 1)}

\textbf{Background:} Allergy to peach and apple is a frequent problem in the Mediterranean area. Both fruits share allergens between them and with those from other plants and pollens. Component resolved diagnosis assays (CRD) enable to detect IgE antibodies to a wide panel of allergens. A detailed clinical evaluation plus CRD permit a precise analysis of sensitizations to many allergens. Our aim was to analyse sensitisation to fruit and pollen allergens by in vivo/in vitro methods in patients allergic to peach and/or apple.

\textbf{Methods:} We included 107 patients. A detailed history, including questions related with response or tolerance to different fruits and plants, skin prick test (SPT) with a large panel of representative allergens in our area, and specific IgE antibodies using a CRD platform (iSAC, Phadia).

\textbf{Results:} Sixty-six cases (61.6\%) had symptoms with peel peach, 46 (42.9\%) with pulp peach and 21 (19.6\%) with apple. SPT with Pru p3 was positive in 53 (49.5\%), to Pru p1 in 9 (8.4\%), and to Mal d1 in 38 (35.5\%). CRD was positive to Pru p3 in 45 (42.0\%) and to Mal d1 in 6 (5.6\%). From the total group, 27 (25.2\%) tolerated peel peach, 47 (43.9\%) pulp peach and 76 (71.0\%) apple. Patients had skin test and CRD positive to allergens from fruits that they tolerated. Furthermore, different degree of clinical response and sensitization was obtained with all the other allergens evaluated.

\textbf{Conclusions:} In vivo and in vitro evaluations with an extensive panel of allergens enable to make a precise diagnosis of allergic patients to fruits. However, discrepancies exist between clinical response and sensitization. Further studies are in progress for understanding these findings.

\section*{P100}

\textbf{Usefulness of peanut and hazelnut molecular components for the diagnosis of nut allergy. Our experience in clinical practice}

Giuseppina Rotiroti, James Gardner, Katrien Coppens, Jennifer Parker Royal Free NHS Trust, London, UK.

\textbf{Clinical and Translational Allergy 2011, 1(Suppl 1)}

\textbf{Background:} Children with moderate/severe Eczema frequently develop sensitisation to several foods leading to specific elimination diets. A positive test to nuts is often considered a potential risk for anaphylaxis. Dietary restriction and a constant fear of potential anaphylaxis has a significant impact on patients of life. Component Resolved diagnosis is not yet widely available in the UK and despite the numerous recent publications in the field the experience in clinical practice remains limited in our population. We have recently introduced this methodology in the evaluation of patients attending our paediatric allergy clinic modifying our diagnostic decision pathway by incorporating the results of these new specific component IgEs. Previously some cases would not have been challenged based on published positive predictive values. We report here our 6 months experience with the use of Ara-h2 and Cor-a8 in the evaluation of children with a positive allergy test to nuts. Amongst all the children investigated 12 (4 female and 8 males) mean age 10.5 (range 2-14) tested negative for Ara h2 and or Cor a8. On the bases of the negative test results all underwent food challenges with Peanut and or hazelnut despite having a positive SPT and/or specific IgE to these nuts. All of these children passed a supervised graded challenge with up to 15 grams of the nut as per validated protocols.

\textbf{Specifically:} Eight children had positive allergy test to peanut (mean SPT diameter 4.5mm - range 2-7mm), Specific IgE to Peanut mean 0.75, range 0.4-23.2). Eight children had positive Specific IgE to Hazelnuts (mean value 15.69 range 0.66-90.24) of them had positive SPT. Post challenge all the 12 children were able to reintroduce the nuts uneventfully in their diet.

A mini food allergy quality of life questionnaire was performed pre/post challenge demonstrating a significant improvement in quality of life.
Our observation is limited by the very small number of patients involved nevertheless it underlines the usefulness of component resolved diagnosis in the investigation of patients with food allergy.

P101
Beneficial effect of hydrolyzed egg in allergy
Sophie Nutten1, Antoine Wermelille2, Sébastien Holvoet3, Alexandre Panchaud2, Fénel Hacni-Rachinel2, Guenolée Prout2, Rodolphe Fritsche2, Annick Mercenier2
1Nestle Research Center, Nutrition and Heath, Lausanne, Switzerland; 2Nestle Research Center, Lausanne, Switzerland; 3Nestle Research Center, Tulln, Austria
Clinical and Translational Allergy 2011, 1(Suppl 1)P101

There is clinical evidence to recommend the use of partially hydrolyzed infant formulas (HA-IF) for at risk children as an option for prevention of allergic diseases, particularly atopic dermatitis/eczema (Szajewska et al. 2010). As cow’s milk allergic infants are at risk of developing allergy to newly introduced foods at weaning, we aimed to extend the concept of HA-IF to egg, another potentially allergenic food. Hydrolyzed egg (HA egg) was produced using a specific combination of heat and enzymatic treatments of whole egg. Characterization and reproducibility of the product was assessed using Size Exclusion Chromatography. Residual antigenic proteins (ovalbumin and ovomucoid) were quantified using ELISA. Allergenicity of the HA egg was tested both in vitro (serotonin release assay) and in vivo (rat model of allergy to ovalbumin). The capability of HA egg to induce oral tolerance to ovalbumin was assessed in both rat and mouse models. HA egg production was shown to be highly reproducible in terms of peptide profiling, residual allergenic proteins and in vivo benefits. Composition of HA egg, as compared to whole egg showed a clear shift towards peptides <1000 Da. The content of major allergenic proteins was reduced by at least 1000 fold in comparison to whole egg. The allergenicity of HA egg was also highly reduced in vitro and almost no allergic response (assessed by RMCPII quantification in sera) was observed in rats preliminary sensitized to ovalbumin and orally challenged with HA egg. Moreover, we showed that HA egg is able to induce oral tolerance to ovalbumin when used in similar quantity as whole egg. In conclusion, we have shown that the concept of “low allergenicity linked to induction of oral tolerance” can be applied to other food allergens than cow’s milk. A small human SOTI trial with HA eggs is being launched.

P102
Feeding of cows’ milk formula at maternity hospital and the development of cows’ milk allergy
Stefania Mazzolari1
Aulis 16 Regione Veneto, Padova, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1)P102

Background: Early feeding with cows’ milk (CM) formula may cause CM allergy (CMA). Contribution of CM formula feeding at maternity hospital in the development of CMA was studied.

Methods: 27 children with CMA were retrospectively examined in this study: 12 boys and 15 girls, the median age at the beginning of symptoms was 5 months (range 18 days - 6 years). In 18 children symptoms began quickly after ingesting CM (urticaria and angioedema 8 cases, anaphylaxis 7, skin rash 2, vomiting 1 case); in 9 children symptoms began several hours after. All children performed skin prick test and food challenge test.

Results: In 12 out of 27 patients (44%) symptoms of CMA appeared after ingestion of the “first” meal of CM formula or dairy products at home. Children with rapid reaction had symptoms after the “first” meal of CM in 66% of cases. A retrospective examination of neonatal charts revealed that nine out of 12 children who reacted to the “first” meal of CM at home had received CM formula at the hospital and were fully breastfed after discharge. Only two out of 12 of these children was born to atopic parents.

Conclusions: In our experience feeding of CM formula at the maternity hospital is involved in about one-third of CM allergy. Avoidance of bottles during the establishmet of breastfeeding may give a relevant contribution to the prevention of CMA in children. This measure should be applied to all neonates from atopic and non-atopic parents.

P103
The role of allergic history in patients having supratentorial gliomas
Olgia Markova2, Anna Shmelova, Oleksander Gladatsky
1The Academician A.P. Romodanov Institute of Neurosurgery under the AMS of Ukraine, Department of Neuroimmunology, Kyiv, Ukraine
Clinical and Translational Allergy 2011, 1(Suppl 1)P103

Allergization mirrors some peculiarities of the cytokine balance in the human immune system. Individual specific features of immunoreactive patients with gliomas exert effect on the results of their combined treatment, however the role of patient allergization in the clinical course and postoperative treatment still remains unclear.

The goal was to analyze the treatment results of patients with supratentorial gliomas, who had allergic manifestations (to food and some drugs). Comparative analysis of the treatment results was performed for 45 patients with supratentorial (mostly frontal) gliomas, who received a combined treatment (surgery, chemotherapy etc). Tumor histostructure was studied: typical gliomas – 12 cases; anaplastic gliomas - 36 cases; glioblastomas - 2 cases. Two groups of patients were isolated: group I – patients with allergic reactions; group II – patients with uncompromised allergic history. Allergic reactions (allergy to food, etc) were compared to atopic diseases, postoperative complications and duration of the relapse-free disease period.

The study showed that 8 of 45 patients complained of allergic reactions (group II). Specific feature of the tumor histostructure in this group was pronounced lymphoid infiltration, whose intensity correlated with a degree of the allergic history compromise but not with that of glioma anaplasia. The tumor histostructure in group II had some isolated lymphoid infiltrates, mostly in patients with III- IV grade gliomas.

Atopic diseases (asthmatic bronchitis) took place in 1 of 8 allergen-challenged patients. Prior to surgical intervention, in 3 of 8 patients the specific weight of eosinophils exceeded 5%. In half of the allergen-challenged patients (4 of 8) there were the postoperative complications (meningoencephalitis – 1 case; bilateral bronchopneumonia – 1 case; laryngotracheitis – 1 case; fever of unrevealed genesis – 1 case). Clinical specificities showed that patients with pronounced glioma lymphoid infiltration had a longer relapse-free period. Further studies may clear up the role of allergic mechanisms not only in gliomogenesis, combined treatment, but also in prognostication of such a treatment.

P104
Neutral formulation of neutral lactase improves digestion of dairy products in case of lactose intolerance
Lucas Fraiss1, Roland Leitner3, Albert Missbichler2
1University of applied Sciences Wr. Neustadt, Dept of Biotechnical Processes, Tulln, Austria; 2Medical University of Vienna, Austria, Dept of Medical Biochemistry, Vienna, Austria; 3Sciotec Diagnostic Technologies GmbH, Tulln, Austria
Clinical and Translational Allergy 2011, 1(Suppl 1)P104

Background: Lactose intolerance is the insufficient ability to digest lactose, a sugar commonly found in dairy products. It is caused by a deficiency of the enzyme lactase, which is resident in the small intestine. Lactase breaks down lactose into glucose and galactose, which are readily absorbed into the bloodstream. Lactase deficiency develops slowly over time, most persons concerned do not experience symptoms of lactose intolerance until late adolescence or adulthood. Typical symptoms are abdominal pain, bloating, diarrhea and nausea.

Treatment: Most people with lactose intolerance can tolerate some amount of lactose in their diet. Thus a reduction of dairy products is the method of choice. Nevertheless, lactose often is present in processed food and instant food, making it difficult to keep a lactose-reduced diet. Lactase, the enzyme degrading lactose, was made available as a food supplement by different companies. All these products use acid lactase in a formulation that makes enzyme activity available in the stomach. Depending on food intake, activity of acid lactase is destroyed within 15 to 45 min in the stomach by gastric juice. Thus it is difficult for the user
to find a dosage of enzyme that reliably degrades the lactose taken up with food.

Improvement: The new formulation presented here for the first time uses neutral lactase, produced in Myerozymes lactis, a yeast well known from cheese production. The enzyme is stabilized in small pellets of 1 mm diameter, which are enteric coated with shellac thus protecting lactase from gastric juice. Because of the small size the pellets pass the stomach within 15 min to reach the small intestine. In the neutral surroundings the pellets disintegrate and release the activity of the neutral lactase. Because of the slow peristalsis in the small intestine neutral lactase activity persists for approximately 4 hours. This long period of activity ensures reliable and complete degradation of lactose in the small intestine.

Results: An observational study with 64 persons showed high acceptance of the product and a highly significant reduction of symptoms: abdominal pain: 58%; bloating: 75%; diarrhea 67%; nausea 58%.

P105
Oor experience in the early management of patients with IgE-mediated cow's milk allergy (CMA)
Javier Boné1, Angela Claver2, Isabel Guillar7
1Hospital Universitario Miguel Servet, Zaragoza, Spain; 2Hospital Universitario Miguel Servet, Pediatric Allergy, Zaragoza, Spain
Clinical and Translational Allergy 2011, 1(Suppl 1):P105

Background: Strict avoidance of food allergens has been advised for sensitization prevention and management. However, recent studies suggest that is the early introduction of food allergens, rather that avoidance, which might induce tolerance.

Methods: January 2007-December 2009: 48 infants (< 1 year old) were diagnosed in our Unit of IgE mediated CMA after a complete evaluation (anamnesis and physical examination, skin prick test and specific serum IgE levels) Subsequently, ALL patients underwent an open food challenge (OFC). The OFC was postponed only in 1 case: a 4-month old boy with previous anaphylaxis whose parents refused OFC until age one. In the OFC, we do not look for reactions, but for a well-tolerated dose as a starting point for reaching tolerance.

Objectives: To evaluate the effectiveness and safety of our performance.

Results: Most patients (44/48), presented a negative OFC (36/44) or mild symptoms (2 oral allergy syndrome, 1 urticaria, 1 rhinoconstrictions, 4 vomiting) Subsequently, patients underwent a gradual dose increase at home. Slower increases for cases with mild/moderate symptoms were recommended. The remaining patients (4/48), presented a positive OFC (3/48 mild anaphylaxis) or persistent symptoms in home dosing (1/48 daily vomiting). An elimination diet was prescribed, followed by a second challenge 3-6 months later - it was negative in 2 patients, who continued gradual increases and a free diet at age two, and positive in 2, who began a standardized desensitization treatment.

Comments: Our results show the possibility for early management in IgE mediated CMA. An early OFC, could be not only a diagnostic tool but also the beginning of the treatment, especially in infants: Could a diagnosed infant be a treated infant? Mild/moderate symptoms are common but usually disappear with slower increases. We believe that by anticipating clinical tolerance, we could change the natural history of CMA in many patients.

P106
The result of desensitization of children with severe IgE mediated cow's milk allergy
Silviva Novakova1, Ivan Novakov, Manuela Joncheva
University Hospital, Plovdiv, Bulgaria
Clinical and Translational Allergy 2011, 1(Suppl 1):P106

Background: Our aim is to demonstrate the success of desensitization in children with severe IgE mediated cow's milk allergy.

Materials and methods: 10 children from 6 to 10 year of age were desensitized by introducing increasing doses of cow milk (CM) till 200 ml or the highest tolerated quality for approximately 6 months. Ig-E mediated cow's milk allergy was convinced by skin prick test and/or specific IgE.

Double – blind placebo controlled food challenge has confirmed the diagnosis. All children were observed on the first and the third months after concluding the desensitization.

Results: Eight of the children (80%) successfully achieved the amount of 200 ml of CM daily in six months, with no adverse reactions. One of the children (10%) tolerated 32 ml and another one (10%) reached to 128 ml. All children did not present any symptoms, taking whole CM even on the third month.

Conclusions: We successfully desensitized 8 of 10 children and induced tolerance to a smaller amount of CM in another 2. The protocol is well tolerated and results are reliable.

P107
A new oral liquid formula including high dose prednisolone
Patra Staabach1, Adriane Groffik, Eugenij Goloborodko, Heidrun Mitzel-Kaoukhov, Joachim Saloga
Department of Dermatology University Mainz, Mainz, Germany
Clinical and Translational Allergy 2011, 1(Suppl 1):P107

Background: Corticosteroids are active agents, which are especially administrated orally in the dermatological emergency medicine. Due to German anaphylaxis guidelines patients emergency kit must contain a corticosteroid with a Prednisolone-equivalent of at least 100 mg. Due to different reasons, a liquid corticosteroid is to be recommended. At the present time, there is no comparable liquid remedy available. The alternative is intravenously administered prednisolone. Due to this reason, a new formula is created by a research group of pharmacologists and dermatologists. They are working close to the Pharmaceutical Laboratory of the New Prescription Formulary (NRF) in Germany, which is developing new formulations, also the Prednisolone formula. The new formula contains a Prednisolone-equivalent up to 500 milligrams per 100 milliliters liquid agent.

Methods: We studied 60 patients, who came on an emergency basis to our university hospital with severe acute or chronic spontaneous urticaria and/or angioedema, half of them including throat swallowing. We observed the efficacy of the new prednisolone liquid in different concentrations as well as possible adverse events during the course of the treatment in comparison to intravenously administered prednisolone.

Results: Up to the dosage over 250 mg Prednisolone-equivalent – similar to the intravenous therapy with the same dosage – a fast reduction of the symptoms (less than 30 minutes) was realized in urticaria, angioedema and throat swallowing comparable with the intravenous injections. No adverse events occurred.

Conclusions: This new Prednisolone formula is a new therapeutic alternative rescue medication.

P108
Systemic nickel allergy syndrome. Biological monitoring of dietary nickel intake and induction of immunotolerance
Ctica Angelino Mario
Centro Italiano Medicina Ambiente Lavoro, Section of Allergy, Cremona, Italy
Clinical and Translational Allergy 2011, 1(Suppl 1):P108

Nickel sensitized patients may suffer of contact dermatitis, but also of urticaria-like, pruriitus-erythema and cutaneous rush, sometimes associated with intestinal symptoms. The role of Nickel absorption due to food is still debated, but a clinical framework of Systemic Nickel Allergy Syndrome (SNAS) may be proposed, while a possible induction of oral tolerance deserves to be investigated.

In the same Allergy Unit 152 subjects (126 F,26 M) were diagnosed as allergic by positive patch test to Nickel sulphate (class 2-3). All underwent Urinary Nickel determinations (NIU), by AAS with Zeman corrector and results standardized to creatinine concentration. According to single diagnosis patients were selected. Group A (65 pt) with only contact dermatitis. Group B (87 pt) with skin troubles of SNAS. At the first determination NIU values in Group B (mean 2,25 mcg/g creatinine) were significantly higher when compared to Group A (mean 0,87 mcg/g creatinine), with p<0,0001. Abnormal values measured at free
Sunflower seed allergy is seen rarely in children and may be presented as angioedema or anaphylaxis. Respiratory allergies have been reported previously in adults owning birds fed on sunflower seeds. We present a case with sunflower seed allergy who had been already sensitized with sunflower pollen or dust and developed sunflower seed allergy afterwards.

**Case report:** A 9-year-old boy, with a history of allergic rhinoconjunctivitis and asthma reported that he experienced generalized urticaria and facial angioedema within minutes after consuming small amounts of sunflower seeds. He had similar episodes three times since the age of 3 years. He told that he experienced worsening of respiratory symptoms since infancy when he traveled to his homeland where sunflower harvest was held in summers. Allergy was confirmed by a positive prick to prick test to sunflower seeds, positive specific IgE (12.7 kU/l) (Phaiida, Uppsala, Sweden), and a positive oral challenge test. After ingestion of 15 g of sunflower seed, he developed severe vomiting, urticaria and itchy, red eyes. His previous skin prick test was positive for grasses, cereals, pines, weeds, mugwort and animal dander. Specific IgE for sunflower pollen was also found positive (11.1 kU/l) (Phaiida, Uppsala, Sweden).

**Conclusion:** Sunflower seed allergy is rarely seen in children. This is the first reported pediatric case who developed sunflower seed allergy after sensitization with sunflower pollen or dust. We presented this case to also underline that sensitization by inhalation may also precede food allergy in the future.

---

![Page 65 of 67](https://example.com/image-url)
Patients

Maternal diet during pregnancy and lactation, as well as

(Suppl 1):

WH and CH showed similar NPU (67.18%, 69.55%), BV (72.99%,

e dr is ko of C M Ai nt h eo f f s p r i n g( O R

hydrolysates complied with the

in utilization (NPU), biological value

A population-based birth cohort with a genetic susceptibility to type

1(Suppl 1):

WH and CH are good protein sources to be used in the

of patients with fruit and nut allergy, average latency time

in development of allergic diseases.

Methods:

A population-based birth cohort with a genetic susceptibility to type

1 diabetes was recruited in two study areas in Finland in 1997-2004 (n = 6753).

Maternal diet during pregnancy and lactation was assessed by a validated, 181-

item semi quantitative food frequency questionnaire. Age at introduction of

foods in the infant diet and CMA were queried from parents up to the age of

3 yrs of the child, and register-based information on diagnosed CMA was

obtained from the Social Insurance Institution. Sociodemographic and perinatal

factors were derived from the Finnish Medical Birth Registry and inquired from

parents. Parental asthma and allergic diseases were queried in a questionnaire.

The associations between diet and CMA were analyzed by logistic regression

comparing highest and lowest quarters to the middle half of consumption and

adjusted for potential confounders.

Results:

High consumption of cow’s milk during pregnancy was more

strongly associated with a decreased risk of CMA in the offspring (OR 0.30, 95% CI 0.13-0.68) than maternal consumption during lactation,

when considered simultaneously. Even taking into account the age of

introduction of cow’s milk in the infant diet, high maternal milk

consumption during pregnancy remained inversely associated with CMA in the

offspring (OR = 0.59, 95% CI 0.38-0.92). When stratified according to

maternal allergic rhinitis and asthma, only children of non-allergic

mothers seemed to benefit from high maternal cow’s milk consumption during

pregnancy (OR 0.30, 95% CI 0.13-0.68). In children of allergic

mothers, cow’s milk consumption was neither risk nor a protective factor.

Conclusion: High maternal consumption of cow’s milk products during

pregnancy may protect children from developing CMA, more so than

maternal consumption during lactation. This association is evident only in

children of non-allergic mothers. These results support data from animal

studies on possible enhancement of tolerance already in utero.

Nutritional value of two protein hydolsates selected for the design of a

new therapeutic infant formula

Esther Matencio 1, Sergio Muñoz 2, Jasone Olza 3, Saray Santamaría 3,

Fernando Romero 2, Pedro Abellán 3, Angel Gil 1

1 Hero Institute for Infant Nutrition, Research, Spain; 2 Institute of Nutrition and

Food Technology. Centre of Biomedical Research University of Granada,

Biochemistry and Molecular Biology II, Granada, Spain; 3 Hero Institute for

Infant Nutrition, Research, Murcia, Spain

Clinical and Translational Allergy 2011, 1(Suppl 1) P113

Background: Breastfeeding is the gold standard of infant feeding,

however not all infants with cow’s milk protein allergy (CMA) tolerate human milk. In these cases, it seems recommended the use of extensively hydrolyzed formula (eHF). Preliminary analyses such as antigenicity and protein quality evaluation are needed to ensure that new formula will be nutritionally suitable, tolerated and safe for infants with CMA. The aim of this study was to determine the protein quality of a whey hydrolysate (WH) and casein hydrolysate (CH).

Methods: The Thomas-Mitchell method modified was used. Male Wistar rats weighing about 50 g were housed in metabolic cages and distributed in three groups fed with diets only differ in protein source. Group 1 fed with WH, group 2 fed with CH and group 3 fed with casein +5% DL-methionine reference diet. Acclimatization of five days followed of ten days with experimental diet. In the last seven days we controlled dietary intakes and collected faeces and urine. For estimation of the protein quality, true digestibility, net protein utilization (NPU), biological value (BV) and protein efficiency ratio (PER), were used. Nitrogen content was measured by means of Kjeldahl method in diet, faeces and urine.

Results: WH and CH showed similar NPU (67.18%, 69.55%), BV (72.99%,

75.26%) and PER (3.62, 3.60). NPU, BV and PER in control diet were

(81.01%, 85.64% and 4.14). Both hydrolysates complied with the

requirements of PER higher than 2.5 and BV higher than 70, considered as adequate sources of amino nitrogen for human nutrition.

Conclusions: WH and CH are good protein sources to be used in the

design of a new eHF for the nutritional treatment of infants with CMA.

Maternal cow’s milk consumption during pregnancy is inversely

associated with the risk of cow’s milk allergy (CMA) in the offspring in a

prospective birth cohort study

Jetta Tuokkola 1, Päivi Luukkainen 1, Heli Tapanainen 1, Minna Kaila 1,

Michael G Kenward 2, Lauri Virta 3, Ritta Veijola 4, Olli Sillmä 1, Jorma Ikonen 5,

Mikael Knip 2, Susi M Virtanen 6

1 University of Helsinki, Hjalt-Institute, Helsinki, Finland; 2 Helsinki University Hospital, Hospital for Children and Adolescents; Helsinki, Finland; 3 Institute for Health and Welfare, Helsinki, Finland; 4 London School of Hygiene & Tropical Medicine, Department of Epidemiology and Population Health, London, UK; 5 Social Insurance Institution, Helsinki, Finland; 6 University of Oulu, Department of Pediatrics, Oulu, Finland. 7 University of Turku, Department of Pediatrics, Turku, Finland.

Clinical and Translational Allergy 2011, 1(Suppl 1) P114

Background: Maternal diet during pregnancy and lactation, as well as early infant feeding, is suggested to play a role in the development of allergic diseases.

Methods: The thomson-mitchell method modified was used. Male Wistar rats weighing about 50 g were housed in metabolic cages and distributed in three groups fed with diets only differ in protein source. Group 1 fed with WH, group 2 fed with CH and group 3 fed with casein +5% DL-methionine reference diet. Acclimatization of five days followed of ten days with experimental diet. In the last seven days we controlled dietary intakes and collected faeces and urine. For estimation of the protein quality, true digestibility, net protein utilization (NPU), biological value (BV) and protein efficiency ratio (PER), were used. Nitrogen content was measured by means of Kjeldahl method in diet, faeces and urine.

Results: WH and CH showed similar NPU (67.18%, 69.55%), BV (72.99%,

75.26%) and PER (3.62, 3.60). NPU, BV and PER in control diet were

(81.01%, 85.64% and 4.14). Both hydrolysates complied with the

requirements of PER higher than 2.5 and BV higher than 70, considered as adequate sources of amino nitrogen for human nutrition.

Conclusions: WH and CH are good protein sources to be used in the

design of a new eHF for the nutritional treatment of infants with CMA.

Serum diamine oxidase (DAO) activity as a diagnostic test for histamine intolerance

Ema Music 1, Mira Slatar, Peter Korosec, Mitja Koznik, Matija Rijavec

University Clinic of Respiratory and Allergic Diseases Golnik, Golnik, Slovenia

Clinical and Translational Allergy 2011, 1(Suppl 1) P115

Histamine intolerance is mainly caused by an imbalance of histamine intake and the capacity for histamine metabolism and degradation. The main enzyme for metabolism of ingested histamine is diamine oxidase (DAO). Determination of DAO activity in serum might be useful for differential diagnosis of histamine intolerance. Over the 3.5-year-long period we have recruited 316 patients with suspicion of histamine intolerance and excluded food allergy together with 20 healthy controls. Serum DAO activity was measured with Enzyme immunoassay for the quantitative determination of histamine-degradation activity by DAO.
in serum. Twenty patients with histamine intolerance and highly reduced initial activity of serum DAO (<40 HDU/ml) went to a histamine-free diet and after 6 to 12 months of histamine-free diet all clinical parameters and serum for determination of DAO activity were taken again.

We found that DAO activity was significantly lower in patients than in healthy control subjects (P<0.0001). Furthermore, 54 patients had highly reduced activity of DAO (<40 HDU/ml). The main symptoms involved the skin, gastrointestinal tract, respiratory system and eyes. In all 20 patients after the histamine-free diet the main clinical symptoms typical for histamine intolerance have disappeared. Furthermore, the measured values for activity of serum DAO have decreased significantly (P<0.0001).

We can conclude that determination of DAO activity in serum is a useful diagnostic tool, together with detailed history to differentiate between food allergy and histamine intolerance. It should be performed in suspected patients with symptoms like headache, tachycardia, urticaria, pruritus, diarrhea and hypotension, where food allergy was excluded. Furthermore, our results showed the benefit of histamine-free diet, since after the diet majority of histamine related symptoms have disappeared as well as the DAO activity in serum has increased.

### P117

**Abstract withdrawn**

Clinical and Translational Allergy 2011, 1(Suppl 1) P117

### P118

**Very-early-onset FPIES and its difficult management**

Daniele Ghiglioni1,2, Oscar Mazzina1, Elena Calcina1, Marco Albarini1, Marco Trezzi1, Alessandro Fiocchi1

1Melloni Paediatria, Milan, Italy; 2PLADA SpA, Milan, Italy

Clinical and Translational Allergy 2011, 1(Suppl 1) P118

A 6-month-old girl presented referred for FPIES of difficult management. Admitted for suspected sepsis at 15 days after receiving milk thickened with cream of rice, she was hospitalized for suspected anaphylaxis at 5 months soon after her first rice-containing meal. Correctly diagnosed with rice-induced FPIES, she was challenged with maize to which she reacted with vomiting, hypotonia and bloody diarrhoea. Referred to this institution for investigation of cereal tolerance, we suspected industrial maize food contamination with rice and requested from a manufacturer a whole wheat flour which was tolerated at challenge. The girl reacted strongly to two accidental contacts with rice. A special diet was initiated in collaboration with the manufacturers who used the same rice-free flour to make pasta to which she did not react. Introduction of solids was predicated on a series of challenges, including beef, carrot, potato, pork, chicken, zucchini and spinach. Of note, after 5 symptom-free months, the girl reacted to accidental ingestion of a fragment of a sweet left over from the day before.

This case report highlights how FPIES onset can be very early, though patients may respond to dietary management with cross-contaminant-free baby foods.

### P119

**Association of sensitization to food and inhalant allergens in patients of asthma and rhinitis**

Raj Kumar

University of Delhi, Vallabhbhai Patel Chest Institute, Department of Respiratory Allergy & Applied Immunology, and Department of Pulmonary Medicine, Delhi, India

Clinical and Translational Allergy 2011, 1(Suppl 1) P119

**Background and objective:** Recent estimates suggest that IgE-mediated food allergy affects 6%-8% children and 3%-4% adults. The present study was conducted to investigate the association of sensitization to food and inhalant allergens in patients of asthma and rhinitis.

**Methods:** Diagnosed patients of Asthma and rhinitis were evaluated for sensitization to food and inhalant allergens. Patients (12-62 years) were screened using standard questionnaire. The skin prick-tested (SPT) was done with common foods and aeroallergens in history positive patients of food allergy.

**Results:** Of 1860 patients screened, 1097 (58.9%) gave history of food allergy. Of the history positive patients 470 were skin prick tested. 29.3% (138/470) exhibited positive reactions to one or more foods. Rice elicited SPT positive reaction in maximum (6.2%) cases followed by blackgram (5.9%), lentil (5.5%), citrus fruits (5.3%), pea (3.8%), maize (3.8%) and banana (3.6%). Among food sensitised cases 35.5% (49/138) patients also showed positive skin reaction to one or more pollen extracts. A majority of the food sensitized patients (52.1%) were skin test positive to insect allergens while only 14.7% showed positivity with fungal extracts. Positive skin reaction with food co-existed with positive SPT to insects extracts. Sensitisation to food allergen (potential food allergy) was significantly associated with asthma alone (P=0.0065) whereas inhalant allergens (pollen, fungal and insects) were strongly related to rhinitis (P<0.01). However sensitisation with pollens was less common in patients of asthma with rhinitis. Sensitisation to food allergens was significantly associated with asthma alone (P=0.0001). But food sensitivity is significantly less common in cases of asthma associated with rhinitis (P<0.028). Correlations between sensitisation to aeroallergens and ten common foods were analyzed.

**Conclusions:** The results suggest that concomittant sensitisations to food with pollen and insect may enhance the risk of asthma and rhinitis or contribute towards exacerbation of symptoms. The synergistic action of these factors may influence the development and progression of atopic manifestation.