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### POSTER PRESENTATIONS

**P1**

**Likelihood of Stachybotrys atra sensitization in Canadian populations**

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**Purpose:** Stachybotrys atra has achieved great notoriety recently as a mould capable of producing mycotoxin, a potentially quite harmful substance. Because of news reports, patients have become quite concerned about “mould allergy” as the cause of an increasing number of symptoms. We set out to discover what percentage of patients referred to regional Allergy clinics have become sensitized to moulds, but especially Stachybotrys atra.

**Method:** Consecutive patients 12 years of age or older in 2007 were assessed in two separate clinics and prick tested to Stachybotrys atra (provided by Allergy Canada) in addition to the usual screen of allergens. Also noted were sensitization to mould spores in general and atopic status. Any positive skin test to any allergen would indicate atopy and any mould spore test that was positive would indicate mould sensitization.

**Results:** 2855 patients were enrolled, 1231 in Kitchener and 1624 in Barrie. The likelihood of atopy was 50% in Kitchener and 62% in Barrie. The likelihood of mould sensitization in the atopic population was 18% in Kitchener and 21% in Barrie. The number of positive tests to Stachybotrys was 10 (2 true positives and 8 borderline) in Kitchener and 11 (2 true positives and 9 borderline positives) in Barrie. This represents 0.6% of the total population tested and 1% of the atopic population.

**Conclusions:** Stachybotrys atra has been suggested to be a major cause of mould allergy recently in North America. Sensitization does not indicate true mold allergy but is a marker for exposure in an atopic population. The extremely low level of sensitization suggests that Stachybotrys atra is not a significant cause of mould allergy in Ontario and is not required in an allergy screen.

**P2**

**Oilseed rape allergy: is it significant? An investigation into its prevalence in an East Anglian population, UK**

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**Background:** Oilseed rape production is widespread in East Anglia. Many patients attending our rhinoLOGY clinic for seasonal allergy claim that they are allergic to it.

**Aim:** To determine the prevalence of oil-seed rape allergy in our general population attending a rhinology and allergy clinic in an East Anglian district general hospital, UK.

**Methods and materials:** Retrospective chart analysis. The results of 1475 consecutive patients who underwent skin prick allergy testing over a 2-year period were analysed.

**Results:** Allergy to grass pollen was found to be most common (n=375, 25.1%) followed by house dust mite (n=373, 25%) and cereals (n=301, 20.1%). Oilseed rape allergy was relatively uncommon, comprising only 1.89% of the population tested (n=28).

**Discussion:** Despite the abundance of oil-seed rape in our geographical region, it does not seem to be responsible for most of our cases of seasonal allergy. Other environmental factors may be contributory.

**P3**

**Early life nutrition, the developing immune system and subsequent allergic manifestations**

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Over the last half-century, chronic disease incidence, including allergic manifestations (AM), has increased exponentially in developed nations and amongst the wealthy in developing nations. Concurrently, there has been a “nutrition transition” in the same populations. Dietary patterns have shifted from a prudent diet (high fruit and vegetable-, and omega-3 fatty acid intake; low omega-6 fatty acid intake) to a western-style diet (higher levels omega-6 fats, lower amounts of fresh fruits and vegetables, and omega-3 fats). While diet can impact health at any life stage, it is likely to be most important during the fetal and infancy periods, when the immune system is immature. Based on an extensive review of the literature, we considered this hypothesis for the 3 nutritional progressions from fetal life through infancy: prenatal nutrition, breastfeeding and introduction of solid foods. While there is little conclusive evidence to support that a prudent diet is protective against AM especially after birth, modest evidence suggests that a prenatal maternal nutrition high in n-3 and micronutrients (e.g. vitamins C, D and E) protect against AM. This indicates that there may be a window of opportunity during fetal development in which allergic manifestation risk may be altered. The effect of breastfeeding on the prevention AM is unresolved. Despite this, exclusive breastfeeding to 4-6 months should be encouraged as human milk contains numerous immunological properties and is associated with...
other health benefits. If breastfeeding is not possible, hydrolyzed formulas seem to confer a greater protective effect than traditional formulas. Solid foods should be introduced at age 4-6 months. The order of introduction seems to have little effect on AM. At present, it is impossible to conclusively state that a particular dietary pattern or food will alter AM.

Results:

226 patients were included. Of the 486 children, 49 undertook a home environment modification. Parent modification of their child’s bedroom. Of the 113 families, 49 undertook a home environment modification.

Conclusion: Eighty per cent of the time, primary care physicians were correct in their clinical suspicion that their patient should be given an AAI prescription. If one excludes the LLR patients, which could be accomplished through CPD, the accuracy would increase to 84% (35/215). The vast majority of patients being prescribed AAI’s are receiving them appropriately.

P5

The impact of participation in the SAGE study on parent behavior

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Objective: To assess whether participation in the SAGE study, a non-interventional child health cohort study, impacted on behavior change of study participants.

Hypothesis: Among children sensitized to house dust mites (HDM), families will modify their home environment if the child has asthma.

Method: This was an analysis of the SAGE nested case-control, comprised of children with asthma (40%), no asthma and no allergy (40%), and rhinitis no asthma (20%). 486 children were seen at 8-10 years and again at 12-13 years. All children were assessed by a pediatric allergist and had skin testing to common aeroallergens. At 8-10 years, the families of children with a positive sensitization to HDM received an information brochure on environmental control for HDM. Parent modification of their home environment was defined as encasement of the child’s mattress or pillow and/or removal of carpet for the child’s bedroom.

Results: 113 of the 486 children were sensitized to HDM (D.pteronyssinus or D.farinae). Of the 113 families, 49 undertook a home environment change. 30/49 (61%) of parents had children with asthma and 19/49 (39%) did not. Interestingly, the percent of parents who modified their environment did not significantly differ between those with asthmatic children (44%) and those with healthy children (42%).

Conclusion: Almost two-thirds of the families in the SAGE study made changes to their home environment because of HDM sensitization in their asthmatic child. However, these families were no more likely to change their environment than families with a child without asthma. We need to better understand the factors involved with parents’ willingness to modify their home environment for a child with asthma.

P6

Asthma control – components and clinical importance

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Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 1)P6

The 2006 GINA report recommends control driven treatment of asthma in children. This raises the question of how to define good asthma control. A pragmatic and short definition of asthma control could be: Resolution of symptoms and elimination of disease variability. This sounds easy to assess, but several studies have found that accurate assessment of asthma control is difficult in clinical practice. Physicians often over-estimate the level of asthma control and patients often under-report symptoms and the impact the asthma has on their daily life. A main reason for this is that accurate assessment of symptom resolution and disease variability requires assessment of a variety of outcomes such as day and night symptoms, need for rescue medication, impairment of daily activities such as school, work and participation in physical activities, frequency of exacerbations and measurement of the variability of lung function with time, either spontaneously or in association with a beta2 agonist or a provocation test such as a standardized exercise challenge. Assessment of all these outcomes in a child is complex due to communication problems with the child and the family and an unconscious adjustment of the daily lifestyle.

To facilitate this accurate assessments of asthma control a variety of validated, easy to use instruments have been developed. These include the Asthma Control Test (ACT) (http://www.asthmacontrol.com), the Childhood Asthma Control Test, the Asthma Control Questionnaire (ACQ) (http://www.qoltech.co.uk/acq.html), the Asthma Therapy Assessment Questionnaire (ATAQ) (http://www.ATAQinstrument.com), and the Asthma Control Scoring System and the Asthma Quality of Life Questionnaire. Most of these have been developed for and validated in adults, but some also exist in a version validated for paediatric use in school children. Their value in clinical practice, which may be quite different from the research setting in which they have been validated, requires further evaluation.

The value and shortcomings of the various measurements and tools normally used to assess asthma control in children is discussed and the importance of using combinations of several outcomes and validated, easy to use instruments is emphasised. Due to communication problems with children and their families some objective measures should always be included in the assessment of control.

A combination of the 1) Childhood Asthma Control Test, 2) three weeks of diary recordings of symptoms, rescue beta2 use and morning and evening peak expiratory flow rate and 3) a standardized exercise challenge test will detect more than 95% of uncontrolled asthma in a population seen in primary care.

P7

Long-term safety of inhaled corticosteroids in children

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Low doses of inhaled corticosteroids control more asthma outcomes to a greater extent than any other asthma therapy in the vast majority of patients and all international guidelines now recommend inhaled corticosteroids as first line treatment in all children who require regular controller therapy for asthma. This paradigm shift in asthma management is based on solid evidence from several controlled trials. Whenever these guideline recommendations are implemented and followed health-care statistics improve markedly in the society. However, several studies have found that often the guideline recommendations are not being followed. There are several reasons for this, including concerns about the safety of long-term use of these agents, particularly in children. These concerns mainly stem from the findings in short-term studies assessing the effects
of inhaled corticosteroids on lower leg growth rate or the hypothalamic–
pituitary–adrenal axis or markers of bone formation and degradation. However, the clinical relevance of findings in such studies for long-term
treatment is unknown and uncertainty exists regarding the predictive
value of changes in cortisol levels and clinically relevant changes in long-
term growth or bone density.

A recent review on the long-term safety of ICS found that there was
some evidence of a small decrease in stature growth rate during the
beginning of inhaled corticosteroid therapy. This effect was more marked
at daily doses above 200 µg and did not apply to all treatment regimens.
Studies examining final attained adult height found no difference
between patients treated with inhaled corticosteroids and those receiving
non-steroidal therapy. None of the studies investigating effects on bone
mineral density found any adverse effects of inhaled corticosteroid
therapy. Finally, recommended doses of inhaled corticosteroids generally
had little or no effect on plasma or urine cortisol levels versus non-
steroidal therapy. In contrast, use of short courses of oral steroids (which
is common practice in many countries) has been found to increase the
risk of fracture in children. The review concluded that recommended
doses of inhaled corticosteroids can be administered to children for the
long-term management of asthma with minimal risk of clinically relevant
adverse effects. This conclusion is supported findings in a study on peak
bone mineral density and risk of fracture in 275 ICS treated patients and
161 healthy siblings. The asthma patients had been treated with ICS for
2-22 years (mean 13.7 years) at a mean daily dose of 350 µg ICS. In
adulthood there was no statistically significant difference between BMD
Z-score in ICS treated children (mean Z-score 0.29) and the z-score of
their healthy siblings (mean Z-score = 0.34). Moreover, in the asthma
group no statistically significant difference was seen between BMD
Z-score at study entry (-0.10) and in adulthood (+0.04).

P8
Estimation of the environmental attributable fraction of asthma among
Canadian children: a systematic review
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Background: We systematically summarized studies that evaluated the
associations between environmental exposures and asthma development
by calculating the population attributable fraction (PAF) of Canadian
childhood asthma due to modifiable environmental exposures.

Methods: Asthma incidence among Canadian children was estimated from
population-based surveys and administrative datasets. The prevalence of
Canadian exposure to airborne pollutants, environmental tobacco smoke (ETS), indoor allergens, and home mould and moisture
were determined from peer-reviewed publications and government reports. International estimates of the relative risk of physician-diagnosed
asthma were determined from peer-reviewed studies and used to
determine attributable risk (AR) for PAF calculation.

\[
\text{PAF} = \frac{\text{AR} \times \text{Exposure prevalence}}{100\%}
\]

Asthma incidence

Results: The Canadian childhood asthma incidence was between 2.8%
and 5.3%. Canadian exposure prevalences were: PM10, 16%; outdoor PM2.5
7.1%, indoor PM2.5 1.7%, indoor NO2 25%, indoor NO2 3.3%, O3 22%,
SO2 0.1%, CO 0.1%, environmental tobacco smoke (ETS) 9.0%, cat 22%,
dog 12%, mouse 17%, cockroach 1.7%, dust mite 30%, moisture 14%,
and mould 33%. Median odds ratios of physician-diagnosed asthma used
to determine the AR were above 1.00 for PM10, PM2.5 2.5, NO2, CO, ETS,
mouse, cockroach, mould, and mould. The PAF estimates were: PM10
11%, outdoor PM2.5 1.2%, indoor PM2.5 0.30%, outdoor NO2 1.4%, indoor
NO2 0.19%, ETS 4.0%, mouse 3.8%, cockroach 0.22%, moisture 4.5%,
mould 10%, and for O3, SO2, CO, cat, dog, and dust mites.

Conclusions: This systematic review suggests contributions to Canadian
childhood asthma development from exposure to particulates, NO2, ETS,
mouse, cockroach, mould, and moisture, although the results are not
consistent enough to imply causation. The associations with cat, dog,
and dust mite allergen exposure appear to be more complex. These findings
highlight the need for longitudinal methods to more accurately estimate
the contributions of modifiable environmental exposures to childhood
asthma development.

P9
Assessing a community-based asthma education intervention
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Asthma prevalence has increased dramatically in western countries in
the last 25 years, and it has been estimated that allergies and asthma affect
30 to 35% of the Canadian population. It has been generally estimated that
there are approximately 714,000 Canadians diagnosed with chronic
obstructive pulmonary disease (COPD), but it is also estimated that 50% of
affected individuals remain undiagnosed, suggesting that there are
over 1.4 million Canadians suffering from COPD. The literature has shown
that asthma, associated allergies and COPD present tremendous social
and health impacts for both individuals and communities; however, a
recently piloted community-based asthma education program underscores
difficult it is to increase patient awareness and knowledge about asthma, associated allergies and COPD, improve early
detection of these diseases, and therefore improve quality of life and
overall chronic disease management. Quantitative surveys, along with
asthma, allergy and COPD assessments (peak flow testing) were
undertaken to ascertain participants’ levels of asthma/COPD, knowledge of
these diseases, and disease management strategies. Additional findings
from a follow-up survey helped to confirm these findings. Overall,
preliminary findings reveal that the pilot’s success was limited. Barriers
and facilitators to community-based asthma, allergy and COPD education
and awareness, peak flow screening, and strategies to encourage proper
chronic disease prevention and management, are discussed in this
presentation.

Key Priority Areas
1- Chronic disease
2- Physical and built environment
3- Public health workforce development

P10
Are teachers knowledgeable and confident about dealing with allergy
emergencies?
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Introduction: There is little information on teachers’ perspectives on
assessment and management of allergy emergencies at school.
Method: An electronic survey was sent to school boards for distribution
to all schools.
Results: 724 teachers (8%) completed the survey. 48% had at least one
student under their direct supervision with a severe allergy. 28% believed
that all students with severe allergies had a management plan for
treatment. 18% never reviewed this plan. More than 80% were confident
in recognizing and knowing what to do for a severe reaction, and in
using an epinephrine auto-injector. Teachers learned auto-injector
technique from public/community health professionals (63%), parents
(19%), or were self-taught (7%). 12% had no instruction. Children carried
the auto-injector in 50% of cases. 11% reported that auto-injectors were
locked in the principal’s office and 21% were uncertain of its location.
91% identified common causes of anaphylaxis. More than 70% would
administer the auto-injector with symptoms such as difficulty swallowing.
looking blue, loss of consciousness, tongue swelling or shortness of
breath after possible ingestion; less than 53% would administer the auto-
injector for generalized itching, generalized hives, or feeling faint. 24%
would administer the auto-injector without symptoms. 59% identified the appropriate level of activity after auto-injector use. To reduce risk of an allergic reaction, 80% thought that instructing the child not to share food, 69% thought that washing hands with soap and water after eating, and 66% thought that a total ban of peanut-containing food would be effective. 25% incorrectly thought that using a hand sanitizer would reduce risk.

**Hypothesis:** Development of standardized training/protocols for all schools may increase teachers’ knowledge and confidence in managing allergy emergencies.

**P11 Assessing a population-based approach to the management of respiratory disease**

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The prevalence of respiratory disease (asthma, allergies and COPD) has increased dramatically in the last 25 years, with a heavy economic and social burden. Provision of information is recognized as a means to improve patient knowledge and self-management skills, and can overall result in improved disease management and quality of life. The Partnership in Lung Age Testing and Education (PLATE) Programme was a one-year demonstration project designed to investigate the effectiveness of a population-based approach to the management of respiratory disease. The PLATE objectives were: to improve patient education and disease management skills; increase public awareness about respiratory disease; and promote a healthy lifestyle. During phase one, 13 Airways Clinics were established in Toronto and Hamilton at various community settings (e.g., pharmacies, shopping malls, libraries), providing community residents with respiratory health education, which aimed to improve the implementation of best practices for chronic disease management through clinical assessments, peak flow testing, and follow-up with regular health care providers. Project participants were categorized into three groups: 1) with physician-diagnosed asthma (61%); 2) with physician-diagnosed COPD (11%); and 3) with respiratory symptoms, but without a diagnosis and/or long-time smokers (28%). More than half (60%) of the participants were female; over 75% were over the age of 40 years. Participants were provided with an educational kit to encourage ongoing education for management of their chronic disease. Phase two is currently under-way and includes a community outreach component, in addition to a follow-up survey to examine changes in the levels of knowledge gained from phase one. Despite the small sample size (87 participants), findings indicate that the highest level of interest came from high-needs communities, and that pharmacies are the most appropriate setting within which to host clinics, while shopping malls are best for information displays. More research is needed to confirm these findings.

**P12 Effectiveness study of an online anaphylaxis training program for school personnel: overview of methods for a pilot study in a large Canadian school board**

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*Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 1):*P12

**Background:** All school personnel in Ontario need to be trained to recognize anaphylaxis, manage an anaphylactic reaction including the administration of an epinephrine auto-injector, and be aware of risk reduction strategies in their school. Training capacity is limited and costly; an online training program offers a potentially efficient, effective and cost-effective model for human resource training.

**Objective:** To determine if an online anaphylaxis training program is effective for improving school personnel’s knowledge of anaphylaxis and required skills to recognize and respond to an anaphylactic reaction.

**Methods:** Setting and Participants: A sample of volunteer personnel using the Toronto District School Board’s learning management system representing the key roles/positions employed within the Board. 72 participants will be recruited, comprised of 60 school-based staff (20 secondary school staff, 40 elementary school staff) and 12 administrative staff (e.g. vice-principals). Design: Prospective pretest/immediate post-test/delayed post-test educational research effectiveness study. Intervention: A 45 minute online training program on anaphylaxis, based on the second edition of the handbook, *Anaphylaxis in Schools and Other Settings* (2005-2009, CSACI) and training materials from Anaphylaxis Canada, and adapted for e-learning using best practices in multimedia training.

**Primary Outcomes:** In addition to self-report of learning satisfaction and self-efficacy, knowledge acquisition and retention will be assessed via pretest, immediate post-test, and delayed post-test. Skills to recognize an anaphylactic reaction and administer an epinephrine auto-injector will be assessed by scenario-based questions and tasks. Utilization and completion rates of the program, as well as time on task, will be measured by the Learning Management System. Analysis: Repeated measures ANCOVA will be performed with co-variates of time on task, Internet access to training program, and prior knowledge level.

**Implications:** If effective, online training may become an important strategy for widespread education on anaphylaxis in schools and other environments.

**Project partners:** Rita Simmons and Elaine Dimeglio, Toronto District School Board

**Study sponsor:** AllerGen NCE Inc.

**P13 Inhibition of IgE and IgE/anti-IgE mediated responses in mast cells by Omalizumab**

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**Background:** IgE binding via the high affinity FcεRI receptor modulates FcεRI expression and cytokine production in mast cells. Antigen crosslinking of bound IgE further activates mast cells, inducing degranulation and inflammatory mediator release. Omalizumab (Xolair; Genentech Inc) is a recombinant human monoclonal anti-IgE antibody that prevents IgE binding to FcεRI.

**Objective:** We investigated the effects of omalizumab on IgE-mediated responses in human mast cells.

**Methods:** LAD2 and CD34+-derived human mast cell degranulation was determined by measuring the release of the granular enzyme, β-hexosaminidase. Toll-like receptor (TLR) expression was measured by quantitative (qPCR) and western blot analysis. IgE binding and FcεRI expression was determined by flow cytometry.

**Results:** Omalizumab (10 ug/mL) inhibited IgE binding to LAD2 cells by 78% (P=0.007) compared to untreated control. Omalizumab (10 ug/mL) further blocked IgE-dependent upregulation of FcεRI expression by 90% (P=0.03). In addition, omalizumab removed FcεRI-bound IgE in a time-dependent manner; an effect that was detected as early as 24 hrs (57% removal; P<0.001) after addition of omalizumab resulting in a concomitant decrease in IgE-dependent FcεRI expression (30%; P<0.001). Omalizumab attenuated degranulation induced by anti-IgE crosslinking of bound IgE in a dose dependent manner, with 66% inhibition (P<0.001) at 25 ug/mL. Furthermore, 100 ug/ml omalizumab prevented cytokine leukotriene production and FcεRI-dependent modulation of TLR expression.

**Conclusions:** Omalizumab inhibits IgE and IgE/anti-IgE dependent degranulation and receptor expression by human mast cells. Furthermore, Omalizumab is able to remove pre-bound IgE from sensitized mast cells thereby reducing their response to FcεRI-dependent signals. This data suggests that omalizumab is an effective inhibitor of both sensitized and unsensitized human mast cells.

**Acknowledgements:** Funded by a collaborative research grant from Genentech, Inc.
P14
Comparison of the inhibitory effects of resveratrol and tranilast on IgE, 48/80 and substance P dependent mast cell activation
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Background: Several health promoting effects have been attributed to the polyphenol resveratrol including anti cancer, anti-oxidant and anti-inflammatory activities.

Objective: We investigated the effects of resveratrol on LAD2 and CD34+-derived mast cell activation in comparison to the known anti-allergy drug tranilast.

Methods: Degranulation was quantified by β hexosaminidase assay, and cytokine, chemokine and cytokine leukotrienes (cysLT) expression was measured by real time PCR and ELISA. Fura-2 Ca2+ imaging was employed to measure [Ca2+].

Results: In LAD2 cells, both resveratrol and tranilast (10 μg/ml) inhibited degranulation induced by mast cell activators IgE/anti-IgE (39% and 15%, respectively; P<0.03), composite in 48/80 (9% and 6%), and substance P (23% and 28%; P<0.03). This may be attributable to modulation of Ca2+ levels, as resveratrol, and to a lesser extent tranilast, attenuated substance P-dependent increases in [Ca2+]. Resveratrol and tranilast blocked cytokine formation, reducing substance P-induced TNF production (65%: P=0.04 and 46%; P=0.09, respectively), but not MCP-1 production. Furthermore, resveratrol inhibited Fc epsilonRI-mediated production of cysLT by 31% compared to control, whereas tranilast had no effect. The effects of resveratrol on degranulation and release of cysLT were more marked in human primary mast cells (HuMC) (64% and 90% inhibition, respectively; P<0.05), and the polyphenol was found to be significantly more efficacious than tranilast in these cells.

Conclusions: Resveratrol inhibited mast cell function at the level of degranulation, and cytokine and cysLT production, and was comparable, and in some cases, more potent than the anti-allergy drug tranilast. Thus resveratrol may be an effective therapeutic agent for the treatment of allergic disease.

Acknowledgements: Funded by intramural NRC funds.

P15
Human mast cells respond to viral infection by recruiting NK cells and T cells
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In addition to their role in allergic disease, mast cells can respond to many pathogens through the production of proinflammatory mediators. Mast cells are located close to blood vessels and sites of pathogen exposure. T and NK cells must reach sites of infection to eliminate affected cells, however possible mechanisms mediating this migration are poorly understood. We hypothesized that human mast cells exposed to virus-associated stimuli can recruit T cells and natural killer (NK) cells.

Primary cultures of human cord blood-derived mast cells (CBMC) were activated with poly(C), a synthetic analogue of double-stranded RNA (dsRNA), or infected with mammalian reovirus. CBMC stimulated with poly(C) or reovirus produced several chemokines including CCL4 and CXCL8. In vitro chemotaxis assays using human peripheral blood T cells and NK cells demonstrated a predominant migration of NK cells to poly(C)-CBMC supernatants. Reovirus infection of CBMC induced the recruitment of both NK cells and multiple T cell subsets, NK cell recruitment was dependent on CXCL8. Overall, this is the first study to demonstrate that virus-stimulated mast cells induce the chemotaxis of NK cells and T cells. These findings may be useful for developing approaches to recruit potent immune effector cells to sites of viral infection, and enhance our understanding of the mechanisms of virus-induced exacerbations of allergic disease.

This work was supported by the Canadian Institutes for Health Research.

P16
Differential effects of C5a on human and mouse mast cells may be mediated by C5aR and C5L2
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Rationale: The complement anaphylatoxin 5a (C5a) is an inflammatory mediator associated with the pathology of inflammatory diseases such as sepsis. C5a mediates its pro-inflammatory effects via interaction with two C5a receptors, C5aR and C5L2. C5aR initiates G protein-coupled receptor signaling while C5L2 is not coupled to G proteins and its role in C5-mediated immune processes is not well understood. We hypothesized that mast cells (MC) expressed C5aR and/or C5L2 and that C5a activated MC through these receptors.

Methods: Human MC (LAD2) and bone marrow-derived MC (BMMC) were stimulated with C5a and degranulation was determined by measurement of β-hexosaminidase release. BMMC were cultured from bone marrow of wild type and CL52 knock-out mice in interleukin-4 (300U/ml) and stem cell factor (50ng/ml). Tumor necrosis factor (TNF), granulocyte macrophage colony-stimulating factor (GM-CSF), monocyte chemotactic protein-1 (MCP-1) and interferon-inducible protein-10 (IP-10) production was measured by cytometric bead array. Expression of C5aR and C5L2 receptors was analyzed by quantitative PCR (qPCR) and flow cytometry.

Results: C5a (100ng/ml) stimulated LAD2 degranulation (25%) and production of TNF (22 ± 1.3pg/ml), GM-CSF (15 ± 0.4pg/ml), MCP-1 (53 ± 3.6pg/ml) and IP-10 (32 ± 4.3pg/ml). qPCR showed that LAD2 expressed mRNA for C5aR and C5L2 and flow cytometry showed that LAD2 expressed surface C5L2 but not C5aR. BMMC from wild type mice expressed both C5aR and C5L2 but did not degranulate in response to C5a. However, BMMC from C5L2 knock-out mice expressed C5aR but not C5L2 and degranulated (14.5 ± 0.8%).

Conclusions: LAD2 express C5L2 but not C5aR and respond to C5a by releasing granule contents, cytokines and chemokines suggesting that C5L2 is an excitatory receptor in human MC. BMMC expressing C5aR but lacking C5L2 degranulated in response to C5a suggesting that C5L2 may function as a decoy receptor in mouse MC. These data show the potential importance and complexity of C5a and its two receptors in immune responses.

P17
Atopy affects LPS responsiveness and TLR-4 expression in children peripheral mononuclear cells
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Background: Lipopolysaccharide (LPS) exposure in early life is associated with a lower incidence of atopy. We sought to determine whether atopy regulates TLR-4 expression and LPS-induced signal transduction on
Peripheral immune cells e.g. CD4 T Helper T cells, monocytes and B cells of a large pediatric cohort.

**Methods:** Over 350 subjects were recruited from the Pediatric Center of the Montreal Children’s Hospital and a questionnaire was administered to determine presence of a history of atopic diseases. 3-Scc of anti-coagulated blood was taken and peripheral blood mononuclear cells were cultured for up to 24h with IL-4 (13.5ng/ml) and/or LPS (up to 5pg/ml). We conducted flow cytometric analysis for surface TLR-4 expression, along with T Helper lymphocyte marker CD4, pan-B lymphocyte marker CD19, monocyte marker CD14, and for intracellular phosphorylated p44/p42 and p38 signaling molecules.

**Results:** Non-atopic monocytes prominently internalize TLR-4 and trigger signal transduction (e.g. phosphorylation of p44/p42 and of p38) upon LPS exposure. Such LPS responsiveness was strikingly impaired in monocytes from atopic children. Compared with monocytes, reduced proportions of CD4+ T Helper’ lymphocytes and CD19+ B cells express TLR-4. In T cells, TLR-4 expression varies with age (it peaks between 7-17 years of age) and atopy; atopic children display reduced TLR-4 expression compared with controls. Recombinant IL-4 also interferes with LPS signaling, and was found to differentially modulate TLR-4 expression in T Helper’, B lymphocytes and monocytes.

**Conclusion:** Peripheral TLR-4+ CD14+ CD4+Low monocytes may be used to discriminate between atopic and non-atopic children based on reduced LPS-induced signaling in atopic subjects. TLR-4 expression greatly varies with age and appears to be affected by both atopic status and IL-4. Our data suggest that atopy and Th2-type immune bias may impair TLR-4-mediated innate immune function during childhood and, therefore influence allergic disease manifestations.

**Research funding sources:** AllerGen NCE Inc., J.T. Costello Memorial Research Fund. Fonds de Recherche en Santé du Québec (FRSQ).

**P18**

**Does IgE-mediated mast cell activation reduce oral tolerance to food antigens?**

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**Mast cell activation in response to food allergens can result in symptoms such as anaphylaxis. It is unclear how this activation impacts on the immune response to other foods that are present. The objective of this study was to investigate the role of immunoglobulin E (IgE)-mediated mast cell activation in the regulation of oral tolerance to a food antigen using a mouse model.**

**Oral tolerance to common food allergens – egg protein (OVA) or peanut - was established in C57Bl/6 mice. Mice were then immunized and challenged with the relevant food antigen. One group had mast cells via IgE/antigen at the site of immunization to food antigen. Antibody responses to food antigen were compared between groups. This was repeated with OVA in mast cell-deficient (Kit-Wsh/Wsh) mice.**

**Oral tolerance was successfully induced by OVA-feeding as assessed by specific IgE, IgA, IgG1, and IgG2a antibody responses.** Tolerance was not maintained in the IgG1 and IgG2a subclasses when mast cells were activated at the site of immunization in OVA-fed animals. OVA-feeding also induced tolerance in mast cell-deficient animals, but IgE/antigen treatment did not modulate OVA-specific antibody production. **Feeding peanut reduced the anti-peanut IgE response to peanut immunization, but this tolerance was not maintained if mast cells were activated at the site of immunization in peanut-fed animals.**

**These findings suggest that mast cell activation may reduce the effective tolerance to food antigens. This research highlights a possible role for mast cell activation in the development of multiple food allergies that could aid in the design of novel preventative strategies.**

This work was supported by AllerGen NCE Inc. and by the Natural Sciences and Engineering Research Council.

**P19**

**Local Toll-like receptor-mediated mast cell activation inhibits melanoma growth**

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**Mast cells are abundant at the periphery of the majority of solid tumors where they typically promote angiogenesis and enhance tumor growth. However, there is some evidence from epidemiological studies that allergic disease reduces cancer risk. In the context of infection, mast cell activation with Toll-like receptor (TLR) agonists induces the production of multiple mediators which mobilize and activate known anti-tumor effector cells. TLR agonists can also be effective in tumor immunotherapy. We demonstrate that the TLR2 agonist Pam3CSK4 is tumor inhibitory and mediates its effects via mast cell activation and reversal of the normal pro-tumorigenic activity of mast cells. TLR2 agonist treatment decreased B16.F10 tumor growth in wild-type mice, but not in mast cell deficient Kit-Wsh/Wsh mice. Tumor growth inhibition following TLR2 agonist administration was restored in Kit-Wsh/Wsh mice by local reconstitution with wild-type, but not TLR2-deficient mast cells. Mast cell dependent tumor growth inhibition occurred independently of tumor necrosis factor (TNF) production and was not associated with direct tumor cytotoxicity or degranulation in vitro. Tumor growth inhibition was associated with mast cell dependent recruitment of natural killer (NK) and T cells. This study demonstrates that local mast cell activation provides a novel opportunity to modify the tumor microenvironment for successful cancer immunotherapy. Supported by the CCSRI and CIHR. S.A.O is a recipient of support from the Nova Scotia Health Research Foundation.**

**P20**

**Interleukin-33 in asthma: insights into pro-inflammatory roles of airway structural cells**

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**Background:** Interleukin-33 (IL-33) is a novel cytokine that triggers inflammatory immune responses, but evidence of its role in human asthma, a common allergic airway disease, is lacking. There is also a paucity of information regarding which cells express IL-33, and what conditions promote its expression. We sought to investigate whether IL-33 is expressed in the lung tissue from patients with asthma.

**Methods:** We obtained lung biopsy tissue specimens from asthmatic adults and from healthy control subjects, along with normal primary cells from human airways that were cultured in vitro. We studied expression of IL-33 in lung tissue specimens, and determined whether conditions seen in asthma promote IL-33 expression in vitro. We also assessed whether IL-33 expression is sensitive to glucocorticoid treatment.

**Results:** Higher expression of IL-33 is detected in lung tissue from asthmatic patients compared to control subjects. IL-33 expression correlates TFN-α e.g. a hallmark of inflammation. Airway epithelium, smooth muscle cells and endothelium are all sources of IL-33. When exposed to inflammatory conditions, in vitro cultured bronchial smooth muscle and epithelial cells increased their IL-33 expression, which surprisingly remained intracellular. Finally, glucocorticoid did not significantly reduce TNF-α-induced IL-33 expression.
Conclusions: Our study first describes IL-33 expression in asthma; it is
anaphylaxis was referred.

Mast cells (MC) are primary effector cells of IgE-mediated allergic inflammation. Nitric oxide (NO) is a short-lived free radical that regulates MC activities including inhibition of MC degranulation. To elucidate the molecular mechanisms underlying the effects of NO in MC, we investigated protein tyrosine nitration in human mast cell lines treated with the NO donor S-Nitrosogluthathione (SNOG). Using 2D gel western blot analysis with an anti-nitrotyrosine antibody together with mass spectroscopy, we identified aldolase A, an enzyme of the glycolytic pathway as a target for tyrosine nitration in MC. Human MC lines HMC-1 and LAD-2 were treated with SNOG and the total aldolase activity and intracellular fructose 1,6 bisphosphate (FBP), the substrate for aldolase activity. Nuclear Magnetic Resonance (NMR) was employed to define the metabolic changes associated with NO treatment. MC degranulation was measured using j-l-hexosaminidase assay. Aldolase A nitration was associated with reduction in the Michaelis constant (Km) and maximum velocity (Vmax) of aldolase in HMC-1 and LAD-2. NMR analysis showed that despite these changes in activity of a critical enzyme in glycolysis, there was no significant change in total cellular ATP content, although the AMP/ATP ratio was altered. Elevated levels of lactate and pyruvate suggested that NO treatment enhanced glycolysis in MC. Moreover, reduction in MC aldolase activity was associated with increased intracellular levels of its substrate, fructose 1,6 bisphosphate (FBP). Interestingly, FBP inhibited IgE-mediated MC degranulation in LAD-2 cells. Inhibition of MC degranulation by FBP has the potential to regulate MC function through multiple signaling pathways including phospholipase C (PLC). We are currently dissecting the precise signaling pathways underlying the effects of FBP. Analyses of the possible links between aldolase nitration, altered FBP levels and the regulation of MC function will evaluate the potential immunoregulatory role of FBP in allergic and immune diseases.

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Rifampin hypersensitivity in a two-year-old child with successful rapid oral desensitization

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A two year, 10 month-old child was referred to a tertiary allergy clinic following an adverse reaction to rifampin. Her mother had isoniazid-resistant pulmonary tuberculosis. The child was born in Canada, was asymptomatic, had a normal chest x-ray and liver enzymes. Mantoux induration was 17 mm. The child was treated with oral rifampin 150 mg per day for 3 months. Thirty minutes after ingesting the first dose, she developed swelling of the lips, eyes and face; and a pruritic rash to the extremities and face. Anti-histamine was administered; the rash resolved over thirty minutes and facial swelling over 2-3 hours. There were no other IgE-mediated symptoms. Rifampin was discontinued. Past history was negative for atopy, adverse drug reactions, and food allergies.

Intravenous rifampin (600 mg/mL) was used for skin prick and intradermal testing. The patient was admitted to hospital and intravenous access established. Skin prick test results were negative to undiluted rifampin and saline; the histamine response was positive (5 mm). Intradermal testing was performed at 15-minute intervals with dilutions of 1:10,000, 1:1000 and 1:100. The 1:100 dilution test was positive. Rapid desensitization to oral rifampin was performed over 3.25 hours. The first dose was 1/10,000 of the total dose. Thirteen incremental doses were administered every 15 minutes until a cumulative dose of 151.08 mg had been ingested (Table 1). No adverse events were noted. The child was subsequently continued on a dose of oral rifampin 75 mg twice daily and has not had subsequent reactions. This case highlights the rare occurrence of rifampin hypersensitivity in a child. Desensitization was motivated by the lack of alternative therapies. Rifampin desensitization protocols previously reported have occurred predominantly in the adult population over several days. We describe a case of rapid oral desensitization to rifampin in a two year-old child.
During three reactions she self administered epinephrine that led to improvement within minutes. She had one biphasic reaction. She did recall being stung by a vespid but was asymptomatic.

Her two – three hour reactions consisted of abdominal pain, nausea, vomiting, diarrhea, weakness, pruritis with flushing, and documented hypotension. Occasionally, there was nasal congestion, stridor, palpitations, presyncope. On two occasions she had syncope. There are no triggers including cholinergic, foods, and catamenial.

Physical examination was unremarkable. She neither had Darier's sign nor urticaria pigmentosa.

Skin prick testing to common allergens was negative. Her serum tryptase was 8.3 ug/L. Tryptase immediately after a reaction was 33 ug/L. Normal metanephrines, metanephrines, vanillylmandelic acid, 5-hydroxyindoleacetic acid, 24 hour urine catecholamines for noradrenaline and dopamine, serum chromogranin A and calcitonin were all normal. Her CT abdomen and pelvis was normal.

She continued to have episodes on ranitidine 150mg and ketotifen 4mg twice daily as well as cetirizine 20mg and singular 10mg once daily.

On bone marrow biopsy she meets three WHO minor criteria for systemic mastocytosis: greater than 25% mast cells having cytologically atypical hypogranular spindle shapes; flow cytometry showing positive aberrant co-expression of CD25 and CD2 on mast cells; and mutational analysis of the c-kit gene being positive for the D816V C-KIT mutation. Tryptase at bone marrow aspiration was 7.6ug/L.

In patients with idiopathic anaphylaxis, consider a bone marrow biopsy for systemic mastocytosis in spite of a negative physical exam and normal tryptase.

**P25**

Adjuvantive treatment of chronic idiopathic urticaria and angioedema with sulfasalazine

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Rationale: Urticaria is a common condition that affects as many as 25% of people at some time in their lives. Chronic recurrent urticaria and angioedema can be frustrating and often refractory to conventional treatment. The purpose of this study was to evaluate the efficacy of Sulfasalazine in the treatment of unremitting recurrent urticaria and angioedema.

Methods: We performed a retrospective chart review of 20 patients with chronic idiopathic urticaria/angioedema (CIU) treated with Sulfasalazine as adjunctive therapy at the Winnipeg Health Science Centre from 2003-2009. We recorded demographic data, response to Sulfasalazine, presence of the IgE receptor antibody, and side effects.

Results: 20 patients were treated with Sulfasalazine as adjunctive therapy and 1 patient was lost to follow up. The patient’s ages ranged between 27-75 years with a mean of 48 years and 10 (50%) were female. IgE receptor antibody status was determined in 12 patients and 6 patients were positive. Out of the 19 patients who are still being followed, 10 (52.6%) failed to respond to the Sulfasalazine, and 9 (47.4%) responded to Sulfasalazine with 2 partial responders and 7 complete responders. Side effects noted included: increased liver function tests, leucopenia, dyspepsia, flatulence, nausea, pyrosis and a rash.

Conclusions: Sulfasalazine may be a useful adjuvantive treatment for patients with CIU. Larger blinded, placebo controlled trials are required to confirm its efficacy.

**P26**

Raw wheat allergy: a case report

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Background: There is evidence that individuals with milk and egg allergy may be able to tolerate the allergen in question if it is thoroughly heated. There is no published literature on raw versus cooked wheat allergy. We describe a case of hypersensitivity to raw wheat in an individual who is able to consume cooked wheat products.

Methods: The outpatient clinic chart of our patient was reviewed. Our patient gave consent to having her data presented in case report format.

Results: A 28 year-old female with a history of persistent allergic rhinitis and Arterial Tortuosity Syndrome had two episodes of anaphylaxis following a meal. In each instance she had ingested food cooked in batter. Skin prick tests to all foods ingested during the meals, including commercial wheat extract, were negative. Skin prick testing to wheat flour, white flour, the uncooked batter in question, as well as several commercial pancake mixes, were strongly positive. Our patient did not wish to undergo a double-blinded placebo controlled food challenge due to her underlying medical condition.

Conclusions: Our patient demonstrates IgE-mediated hypersensitivity to raw wheat, including uncooked batter. Her episodes of anaphylaxis occurred on ingestion of battered fish and chicken, which may have contained raw wheat if only partially cooked. We theorize that she is sensitized to a conformational epitope. Research is warranted in this area to further explore the possibility of raw wheat allergy.

**P27**


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Background: Hereditary Angioedema (HAE) is a rare disorder (1:10,000 – 1:50,000) characterized by episodic, localized edema of skin or mucosa of airway, genitourinary tract or gastrointestinal tract. It is due to inherent deficiency of the serpin known as C1 Inhibitor leading to unopposed kallikrein, producing excess bradykinin which binds to G-protein coupled receptors known as B1 and B2 receptors. Icatabant, a ten amino acid peptide analogue of bradykinin is an effective blocker of the B2 receptor and has been shown to provide rapid and complete relief of symptoms compared to Tranexamic acid (Fast-1) or placebo (Fast-2). Rapid relief of laryngeal edema was confirmed in the open label arm. A new trial (Fast-3) has begun. Primary Objectives are to compare icatibant vs placebo on the time to symptom relief using a 3 symptom Visual Analog Scale (VAS) score during moderate to very severe acute cutaneous and/or abdominal attacks in patients with type I or type II hereditary angioedema (HAE).

Secondary Objectives are to compare the global outcome following treatment with icatibant vs placebo using patient-reported (single symptom and 8 symptom composite score) and physician-reported outcome measures at 4 and 8 hours; to compare the time to almost complete symptom relief following treatment with icatibant vs placebo during moderate to very severe acute cutaneous and/or abdominal attacks; to assess safety and tolerability of icatibant vs placebo; and to assess the efficacy and safety of open-label icatibant treatment in patients experiencing laryngeal edema attacks. 88 patients, aged 18 or older, with an attack of at least moderate severity on skin, abdomen or larynx/pharynx will be randomized to double-blind treatment with either 30 mg of Icatibant SC or placebo.

**P28**

The controlled allergen challenge experience: comparison of allergic upper respiratory symptoms in the environmental exposure unit (EEU) and during seasonal exposure

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Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 1):P28

Background: Traditional assessment of seasonal allergic rhinitis (SAR) medication efficacy utilizes randomized controlled trials over 2-4 weeks in
season. An additional study method employs single-dose responses using controlled allergen challenge such as the Environmental Exposure Unit (EEU). A comparison of allergic symptoms generated by controlled allergen challenge to those occurring in ragweed season symptoms has not been done.

**Methods:** 1821 subjects with known SAR to ragweed were mailed a survey during the third week of ragweed season, soliciting the nature and severity of SAR symptoms. Subjects participating in a subsequent controlled allergen challenge study using the EEU, were again asked to complete a similar survey that documented symptoms generated in this model. Those who completed both surveys comprised the primary analysis group.

**Results:** 550 subjects completed the ragweed season survey, 516 subjects completed the EEU survey, and 270 completed both. Symptoms generated by EEU exposure were similar to those elicited during ragweed season, with the exception of cough (68% vs. 27%, respectively, p <0.01). Subjects reported that symptoms were more severe in the EEU than those experienced on a typical ragweed season day, but less severe than those during peak ragweed season days.

**Conclusion:** Allergic upper respiratory tract symptoms produced during controlled ragweed pollen exposure in the EEU were similar in nature and degree to those experienced during ragweed season, supporting evidence that the EEU is a valid model for studying SAR.

*This study was self-funded.

**P29**

**Onset of action of loratadine/montelukast combination in subjects with seasonal allergic rhinitis in the environmental exposure unit**

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**Background:** Onset of action is recognized as an important pharmacologic property of allergic rhinitis medications and can be reliably determined under the controlled conditions of the Environmental Exposure Unit (EEU).

**Objective:** To evaluate the onset of action of loratadine/montelukast (10 mg/10 mg) versus placebo in subjects with ragweed-induced seasonal allergic rhinitis (SAR).

**Methods:** A single-center, double-blind, parallel-group study of ragweed-sensitive allergic rhinitis subjects (N=310), performed in the EEU. Subjects were exposed to ragweed pollen in the EEU and symptoms were recorded at 30, 60, 90, and 120 minutes prior to a single dose of loratadine/montelukast or placebo. After dosing, symptoms were recorded for 4 hours - at 15-minute intervals for the first 2 hours and 30-minute intervals for the final 2 hours. The primary endpoint was the time to onset of action for loratadine/montelukast, defined as the first time point at which the mean change from baseline in total symptom score (TSS) for loratadine/montelukast became and remained significantly better than placebo. Secondary endpoints included nasal congestion scores and peak nasal inspiratory flow (PNIF).

**Results:** The onset of action of loratadine/montelukast for TSS was 1 hour 15 minutes (p=0.005 versus placebo). Loratadine/montelukast reduced nasal congestion as indicated by significant improvements in both the nasal congestion score (p=0.011) and PNIF measurements (p=0.007) within 1 hour 15 minutes post dose. The incidence of treatment-emergent adverse events was similar between groups.

**Conclusion:** The onset of action following treatment with loratadine/montelukast was 1 hour 15 minutes for TSS, as well as for nasal congestion. Loratadine/montelukast was well tolerated.

**Acknowledgements:** Funding for this study was provided by Schering-Plough/Merck Pharmaceuticals.

**P30**

**Managing paediatric eosinophilic gastroenteropathies: a community experience**

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**Introduction:** Awareness and diagnoses of eosinophilic gastroenteropathies have increased over the past decade. We report 3 cases of eosinophilic gastroenteropathies in children who were diagnosed by endoscopy, allergy tested by skin prick and patch testing, and managed with the use of avoidance/elemental diets.

**Case series:** KG, a 5 year old girl with daily abdominal pain, was diagnosed with eosinophilic esophagitis. Initial endoscopy revealed 20 eosinophils/hpf in the distal esophagus. Avoidance diet based on allergy testing was an ineffective treatment. An elemental diet of Neocate (8 weeks) resulted in resolution of symptoms and 0 eosinophils/hpf on repeat biopsy. She is currently on a gradual reintroduction diet.

CD, an 11 year old boy with chronic diarrhea/constipation, abdominal pain and disruptive behaviour, was diagnosed with eosinophilic colitis. 60 eosinophils/hpf An avoidance diet (8 weeks) based on allergy testing resulted in resolution of all abdominal symptoms and better behaviour. Repeat colonic biopsies revealed colonic eosinophils to be reduced back to normal limits. CD returned to normal diet, and symptoms have recurred.

TD, a 9 year old boy with daily stomach aches and vomiting, was diagnosed with eosinophilic esophagitis (20 eosinophils/hpf). An avoidance diet based on allergy testing resulted in resolution of all abdominal symptoms and better behaviour. Repeat colonic biopsies revealed colonic eosinophils to be reduced back to normal limits. TD returned to normal diet, and symptoms have recurred.

**Conclusion:** Allergists play an important role in trying to identify the triggers for these conditions and implementing appropriate diets for management. The challenges in managing these conditions in the community include i) no standard of care for management ii) availability of the 3 subspecialists (paediatric pathology, allergy and paediatric gastroenterology) with an interest/expertise in eosinophilic gastroenteropathies iii) health care resources (eg. availability of operating room time to perform repeat biopsies) iv) tolerability of avoidance/elemental diets.

**P31**

**Treatment of initial allergic reactions to peanut inside and outside of health care facilities**

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Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 1):P31

**Background:** Recent studies suggest increased admission rates for food-related anaphylaxis. The only effective treatment for anaphylaxis is prompt administration of epinephrine.

**Objectives:** To characterize treatment practices of initial allergic reactions inside and outside health care facilities (HCF).

**Methods:** Individuals with an allergic-confirmed peanut allergy were recruited from the Montreal's Children Hospital and Canadian food allergy
Of 751 individuals who had an allergic reaction to peanut, 613 (47.2%) were treated in 4 hours. 24% in the ED may improve outcomes of (33.3-53.7) and antifibrinolytic agents. We (45.2-54.4) (9.2%) and insect stings (3.4%).

67.4% food (6.9%), food-unknown (19.5%), and 34.5% had non-food related allergic reactions (15.1%). Hereditary angioedema (HAE) is a rare disorder (3.0) versus only 3% (1.8-5.1%). Eosinophilia (3.0) versus only 3% (1.8-5.1%)

Results of this systematic review found the C1-inhibitor concentrate to be an effective option in the treatment of acute HAE attacks, and as a short- and long-term prophylactic agent.

P32
A systematic review of the efficacy and safety of a purified, pasteurized C1 inhibitor concentrate for the treatment of patients with type I or II hereditary angioedema

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Background: Hereditary angioedema (HAE) is a rare disorder characterized by a congenital deficiency of the C1-inhibitor. It is a potentially fatal illness as laryngeal edema may lead to asphyxiation. Treatment of HAE is mainly performed with C1-inhibitor concentrate, icatibant, attenuated androgens, and antifibrinolytic agents. We conducted a systematic review to evaluate the efficacy and safety of a purified, pasteurized C1 inhibitor concentrate in the treatment of patients with type I or II HAE.

Method: An electronic search of five databases (Medline, EMBASE, Biosis Previews, CINAHL and the Cochrane Library) was performed with no language or date restrictions applied. Two reviewers used pre-defined criteria for inclusion of studies and the data were tabulated and analyzed. The data were found to be inappropriate for meta-analysis, and thus a qualitative synthesis was performed.

Results: We found a total of 63 studies that met our inclusion criteria. Treatment with the C1-inhibitor concentrate was consistently associated with clinically significant reductions in both the time to onset of symptom relief and duration of acute attacks. There were no cases of angioedema in patients who received the C1-inhibitor concentrate as short-term prophylaxis, and use of the C1-inhibitor concentrate as a long-term prophylactic agent resulted in a significant decrease in the frequency of attacks. No serious AEs were reported in any patients who were treated with the C1-inhibitor concentrate, and there were no treatment-related AEs as far as the injections were performed correctly. Treatment with the C1-inhibitor concentrate was not associated with transmission of viruses or development of autoantibodies.

Conclusion: Results of this systematic review found the C1-inhibitor concentrate to be an effective option in the treatment of acute HAE attacks, and as a short- and long-term prophylactic agent.

Cite abstracts in this supplement using the relevant abstract number, e.g. Bork et al: Characteristics of anaphylaxis in a pediatric emergency department (ED): does management follow published guidelines? Allergy, Asthma & Clinical Immunology 2010, 6(Suppl 1):P33

Introduction: Guidelines for the management of anaphylaxis have been published. We characterized anaphylaxis and its management in a pediatric ED.

Methods: We conducted a chart review of visits to the IWK ED from January 2005 to December 2007 with possible anaphylaxis. Of 201 potential cases, 87 visits by 75 patients fulfilled the diagnosis based on published criteria.

Results: There were 40 males (7.2 ± 4.9 (mean ± SD) years) and 35 females (6.7 ± 4.8 years). 36% of the first and 42% of the second episode were diagnosed as anaphylaxis. Symptoms included respiratory (84%), cutaneous (90%) and gastrointestinal (59%). No patient had hypotension, but the blood pressure was not documented in 25% of cases. Triggers were peanuts/nuts (46%), fish/seafood (6.9%), food-unknown (19.5%), food-other (11.6%), unknown/no agent (9.2%) and insect stings (3.4%). 39% of cases had asthma, 25% had atopic dermatitis, and 10% had allergic rhinitis. Time from exposure to symptoms was 31.9 ± 69.6 min. Epinephrine was administered to 34.5% of patients. Time from onset of symptoms to epinephrine administration was 70.0 ± 61.0 min and 15.4 ± 19.4 min from presentation to the ED. Length of stay in the ED was 209.0 ± 163.0 minutes. 37% of patients were observed in the ED for 4 hours. 24% of patients left the ED without access to an epinephrine auto-injector and 19.5% were not referred to an allergist.

Conclusions: There are gaps between anaphylaxis guidelines and actual management in a typical ED. Failure to diagnose anaphylaxis leads to suboptimal treatment that may lead to adverse outcomes. Adoption of standard protocols for anaphylaxis in the ED may improve outcomes of potentially life-threatening reactions.

Table 1 (abstract P31)

<table>
<thead>
<tr>
<th>Severity</th>
<th>All reactions</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
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<tbody>
<tr>
<td></td>
<td>21.3 (17.0-26.3)</td>
<td>4.9 (1.5-16.2)</td>
<td>15.1 (10.4-21.5)</td>
<td>38.5 (29.4-48.6)</td>
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<td></td>
<td>50.7 (45.0-56.4)</td>
<td>39.0 (25.6-54.4)</td>
<td>54.1 (46.3-61.7)</td>
<td>50.0 (40.1-59.9)</td>
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<tr>
<td></td>
<td>28.0 (23.2-33.5)</td>
<td>56.1 (40.1-70.2)</td>
<td>30.8 (24.1-38.4)</td>
<td>11.5 (6.5-19.4)</td>
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<td>3.0 (1.8-5.1)</td>
<td>0.0 (0.0-2.6)</td>
<td>4.3 (2.3-7.8)</td>
<td>4.5 (1.8-11.2)</td>
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<tr>
<td></td>
<td>47.2 (42.6-51.8)</td>
<td>50.4 (41.1-58.5)</td>
<td>46.8 (40.4-53.2)</td>
<td>43.2 (33.3-53.7)</td>
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<tr>
<td></td>
<td>49.8 (45.2-54.4)</td>
<td>49.6 (41.5-57.8)</td>
<td>48.9 (42.5-55.4)</td>
<td>52.3 (41.9-62.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Peanut allergy diagnosed prior to reaction</th>
<th>Yes</th>
<th>No</th>
</tr>
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<tbody>
<tr>
<td>value (MEDIAN)</td>
<td>17.2 (7.7-34.8)</td>
<td>20.9 (16.0-26.8)</td>
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<tr>
<td>value (IQR)</td>
<td>48.3 (31.3-65.7)</td>
<td>53.6 (47.0-60.2)</td>
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<td>value (95% CI)</td>
<td>34.5 (200-52.9)</td>
<td>25.5 (201-31.6)</td>
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<td>value (95% CI)</td>
<td>6.5 (2.3-17.6)</td>
<td>2.7 (1.4-5.0)</td>
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<tr>
<td>value (95% CI)</td>
<td>67.4 (52.8-79.2)</td>
<td>44.7 (39.4-50.0)</td>
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<tr>
<td>value (95% CI)</td>
<td>26.1 (15.6-40.4)</td>
<td>52.6 (47.3-58.0)</td>
</tr>
</tbody>
</table>