Conference Report

I attended the annual meeting of AAAI (American academy of allergy, asthma and immunology) during the period of Feb. 20-24, 2015. My interests were more focused in the field of cytokine response in allergic diseases and allergy prevention. The seminars in which I attended are majorly related with the issues of immune response and prevention of allergy (in relation to the research I am working on).

I attended several lectures on immune response and allergy and I believe has helped me greatly in regard to my present clinical practice. The following are the messages that I brought back from the seminars and will definitely help with clinical practice

**Immunologic cytokine response**

1. The work from Dr. Kato:

   "Virus Detection and Cytokine Profile in Relation to Age Among Acute Exacerbations of Childhood Wheezing" explored the association between age, respiratory viruses, serum eosinophil cationic protein (ECP), and cytokines/chemokines in acute exacerbations of childhood wheezing/asthma. They used antigen detection kits and/or RT-PCR to detect viral sequences and measured peripheral eosinophil counts, and the serum levels of ECP and 27 types of cytokines/chemokines in 71 virus-induced acute wheezing cases and 13 controls. Their had detected viruses in around 80% of the 88 samples. The three major viruses detected were rhinoviruses, RS viruses, and enteroviruses. Serum concentrations of ECP, IL-5, and IP-10 were significantly elevated in virus-induced acute wheezing cases compared with controls. Serum ECP and IL-5 production correlated significantly with age, whereas serum IP-10 showed an inverse correlation with age. Their conclusion showed that age-related differences in cytokine profiles and eosinophil activation may be related to virus-induced acute exacerbations of childhood asthma.

2. The presentation from Dr. Seroogy

   "Use of Multi-Parameter Flow Cytometry to Determine Cord Blood Innate Immune Function Associated with Prenatal Farming Exposure" presented a study of pregnant women who were recruited from rural Wisconsin. They were grouped according to farm exposure. Flow cytometry assay was developed to define cord blood innate cell responses to varied TLR agonists and rhinovirus for sample processing. The results showed revealed potential differences in TNF responses between the farm vs. non-farm groups. Their
data demonstrate the validity of this assay for interrogating the impact of in utero farm exposure on immune maturation and subsequent protection from allergic and respiratory diseases.

3. the work from Dr. Patel

"Neonatal Exposure to Microbial Phosphorylcholine Dampens the Development of HDM Allergy Later in Life" works with an animal model that showed neonatal mice immunized with bacterial vaccines sustain antibody production, specific for conserved immunodominant epitopes, into adulthood. The procedure was immunizing mice with PC-bearing or PC-devoid pneumococcal strains early in life. At 8 weeks of age, these mice were sensitized and challenged with HDM allergen and PC-specific antibodies were quantified from the serum and in the lung. The severity of allergic disease was determined by the production of serum IgE, TH2-associated cytokines, and mucus in the lower airways. In addition, cellular mediators of allergic disease infiltrating the bronchoalveolar space, lungs, and mediastinal lymph node were quantified. Their result showed that mice neonatally immunized with PC-bearing pneumococcus sustain anti-PC antibodies into adulthood. The mice that sustain anti-PC antibodies into adulthood were able to dampen the production of serum IgE, decrease TH2-associated cytokines, delay the development of goblet cell hyperplasia, and decrease the infiltration of inflammatory mediators. They concluded that early exposure to PC-bearing pneumococcus dampens the development of HDM allergy later in life.

4. The work that raised my interest is the "Development and Initial Testing of Whole Blood Cell Stimulation Assay to Determine Th1 Vs. Th2 Immune Profiles" as I work with immune profiles. They enrolled 10 children with well-controlled asthma and 10 age- and gender-matched control subjects without asthma. Whole blood (WB) and peripheral blood mononuclear cells (PBMC) were collected and cultured with immunological stimuli {tetanus toxoid, Staphylococcal endotoxin B (SEB), house dust mite extract, concanavalin A, lipopolysaccharide}. The levels of Th1 (IFN-γ), Th2 (IL-4, IL-5, IL-13), and Th17 (IL-17) cytokines as well as IL-2 that were produced and secreted by PBMC and WB in 24 hours were measured. Their result demonstrated moderate to good correlation for the cytokine ratios between both WB and PBMC cultures. They concluded that Th1 and Th2 cytokine profiles secreted by WB after stimulation with SEB for 24 hours (e.g.,
IL-2/IL-5 ratio) may be a suitable marker for detecting Th2-immune profiles associated with asthma. As opposing to using PBMC which is time and labor consuming, this might be an alternative method we can use in the future to detect cytokine production in our research in regard to immune cytokine response.

Food allergy

1. “Serum Zinc and Secretory IgA Levels Are Important Factors in Children with Food Allergy” from Dr Baba emphasize the role of zinc as it is an essential nutrient and its deficiency causes malnutrition and results in defects in innate and acquired immune responses. In addition, IgA antibody is massively produced in the intestinal Peyer’s patches, therefore secretory IgA (sIgA) may also plays an important role on mucosal immune responses. Their study investigated serum zinc and sIgA levels in children with food allergies and studied their relationship with allergy symptoms. They analyze the white blood cell counts (eosinophils and basophils) and the serum levels of specific IgE, total IgA, sIgA, TARC (thymus and activation-regulated chemokine), and zinc. Their result showed that children with low levels of sIgA and serum zinc have past histories of atopic dermatitis, and their serum levels of specific IgE was significantly higher, but their serum IgA level was significantly lower compared with children who does not have allergic symptoms. They concluded that secretory IgA and zinc levels are also important to the onset of allergic reactions.

→ we don’t have many food allergies in our country, but I was interested in the role of zinc in allergic disease since our next research program will be focusing on micronutrients and its relationship with cytokine expression and allergic disease.

Vitamin D

Currently Vit. D is a very hot topic.

1. Immunomodulatory Property of Vitamin D in Allergic Fungal Rhinosinusitis

By Dr. Yadav

Vitamin D is a potent immunomodulator in innate immunity. They hypothesized that vitamin D enhanced innate immunity against fungal growth in allergic fungal rhinosinusitis (AFRS). They used epithelial cell cultures derived from AFRS and stimulated with active vitamin D (1,25-dihydroxy-cholecalciferol) and inactive vitamin D
(25-hydroxy-cholecalciferol). After overnight incubation with Aspergillus, fungal growth was assessed and fungal activity measured. The results showed that hyphae growth was impaired on visualization but remained uninhibited.

2. A study from Korean National Health and Nutrition Examination Survey (KNHANES) focus on evaluating the association between serum vitamin D concentrations and allergic diseases in Korean children and adolescents. They studied serum vit. D concentrations from teenagers and found that serum concentration of 25(OH)D was higher in boys and subjects residing in rural area. Serum vitamin D level tended to be lower in subjects with wheezing during the recent 1 year. They concluded that Korean children and adolescents with the low serum 25(OH) D concentration have an increased likelihood of recent wheezing episodes.

Novel therapeutic approach to allergic diseases

1. A Review of Efficacy of Omalizumab
   Omalizumab is FDA approved for treatment of moderate to severe persistent allergic asthma in patients ≥12 years of age who are not controlled by inhaled corticosteroids. This study focused on the efficacy and safety of omalizumab in patients <12 years of age. The effect was evaluated at 52 weeks post-initiation of omalizumab. Their results showed an improvement of ACT scores and all subjects experienced a decrease in emergency room visits, number of hospitalizations, and number of oral steroids courses. Thus, their conclusion suggested that omalizumab dramatically improved asthma control and is well tolerated in a pediatric patient population of <12 years of age.

2. "Omalizumab for the Treatment of Chronic Rhinosinusitis: A Multi-Disciplinary Practice Review" by Dr. Kilty evaluated the clinical treatment effect of omalizumab therapy for patients with recalcitrant CRS. Their retrospective reviewed 21 patients diagnosed with CRS and having failed surgical and/or medical therapy were identified. The mean treatment duration was 17 months. The most common skin test positive environmental allergens were dust mites and cats. Many patients had CRS with polyps. The treatment from initiation to the last omalizumab treatment dose, there was an improvement in their olfaction, in facial pain, in nasal obstruction and symptom of rhinorrhea. Patients reported a mean overall improvement in their sinus symptoms of 74.1%. Thus, they
concluded that Omalizumab therapy provided a substantial improvement in the self-reported major symptom control for patients with recalcitrant CRS and asthma.

3. There are many presentations in regard to omalizumab in the treatment of severe asthma, urticarial, effect of perinatal exposure of this drug to the unborn fetus. After attending all these sessions, it looks like omalizumab is currently a promising medicine for the treatment of allergic diseases in the pediatric population. This medicine is currently not available in our hospital. But we might need to learn more about it as this would become one of the important treatment in pediatric allergic disease in the near future.

Noninvasive ventilator therapy in neonates

1. The speech about high flow nasal cannula use (vapotherm HHFNC Hudson) was very useful for my clinical practice. The following are the summaries from powerpoint slides.
   - O2/air at 2-8 L/min
   - Small thin canulae
   - < 50% of nostril diameter
   - must be heated to 37C with 100% humidity
   - all gas goes into nose so nose and mouth must no be blocked
   - Mechanism: washout nasopharyngeal deadspace, exceeds inspiratory flow (reduces inspiratory resistance on nose so reduces WOB), provides, CPAP, warm and humidified gas improves lung compliance and conductance
   - Benefits: simple, no need skill personnel, comfortable and with less nasal bridge erosion with high nasal flow cannula

2. Another study demonstrated the use of nasal interface as an alternative for providing positive ventilation for newborn infants in the delivery room to replace for facial masks → result was no better than mask in terms of requiring endotracheal intubation.
I also went to thematic poster symposium that presented topics regard to primary immunodeficiency and its management, role of viral infection in association to asthma in children, allergen extract and immunotherapy, and many other immune related topics which were interesting but not my field of interest or expertise.

2. 本院發表之論文與國外論文比較

I did not see any presentations from our hospital and therefore cannot make any comparisons.

3. 可引進之新技術與新理念概述: according to the presentations, the use of Omalizumab therapy in children with moderate to severe asthma should be promising.

4. 預定推展之工作計劃與日程表

Attending this conference, I have learned several practical knowledge for clinical caring of newborn babies in regard to asthma prevention and food allergy. I have also gotten several ideas for my research; such as new insights to allergy prevention, new biomarkers for asthma detection in early life and cytokine profiles which will be very useful for the cohort study we are current working with.

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