Anne K. Ellis, MD FRCPC, **McMaster University, Past-President, AllerGen Students and New Professionals Network, Clinical Scholar, Division of Allergy & Clinical Immunology, AllerGen Research Project 07B2.4 – *Hemopoietic Stem Cells as Biomarkers of Atopy, Airways Inflammation and Sources of Epigenetic Memory* (Supervisor: Dr. Judah Denburg):**

I am writing to give my thanks for the financial support AllerGen NCE provided for trainees to travel to, and attend the Introduction to Flow Cytometry Workshop held April 29, 2008 at the University of British Columbia in Vancouver Canada. This letter/memo will also provide feedback with regards to my personal learning outcomes that can support my own personal travel grant application.

This workshop, while brief, was a tremendous opportunity for trainees. The uniqueness of this training opportunity cannot be underscored enough. I had been periodically performing extensive searches for such a course/workshop, after successfully locating and attending a hands-on training program for Q-PCR technology. This was a similarly daunting task, and indeed, the one that my technician and I attended in Palo Alto, California last fall remains the only such course available in North America. The cost to attend this course, as an aside, was not modest – early bird and student discounts still resulted in registration fees of $850 USD each. However, given its extreme utility and educational value, I continued to look for such training opportunities in the technology of flow cytometry, an even more widely used technique in allergic and immunologic research. I was dismayed to only be able to locate an “in-house” course for technicians offered *via* Beckman Dickson, the manufacturer of the most widely utilized FACS machines. This would have only been a technical training course which would not have likely included much in the way of scientific background/rationale, and definitely would not have provided analysis education.

I was hence quite pleased when I discovered that a four-day hands-on flow cytometry course was being offered this year to the trainees of the Stem Cell Network, another NCE in Canada. As one of the Principal Investigators in the SCN (Dr. Kelly McNagny) also is a PI with AllerGen NCE, I utilized the networking opportunity of the annual scientific meeting for AllerGen (in Banff, February 2008), to discuss the course with both Drs Denburg and McNagny, and any possibilities of allowing AllerGen trainees to attend the course in addition to those trainees from the Stem Cell Network. Dr. McNagny followed up with this request in an extremely timely manner, and discovered that although the SCN course was completely full, that the course instructor was willing to run another course later in the year for AllerGen trainees. The upcoming AllerGen trainee conference in Victoria seemed an ideal timeframe to work with, as AllerGen would already be sending trainees to the West Coast for that event. Although the course attended by our group was only 1 day in length, it still provided a unique and practical approach to the use of this technology, and allowed participants to have exposure to 3 different models of FACS machines, providing experience that will be relevant to whatever equipment happens to be in use at their home institutions.

The instruction was clear and appropriately target to the audience level. I myself have no experience with this technology, and while I would not say that I could now start an experiment *de novo* without supervision, I certainly would require only minimal further instruction.

I would strongly suggest that AllerGen continue to support this educational workshop for trainees in the future. Based on my experience in the one day workshop and the

instructor's description of the 4 day workshop, I would say that a 3-day version would be the ideal, with 2 being the minimum. Due to the one-day nature, the participants did not perform any cell staining, as this is a relatively time-consuming component (about 2 hours), but it is an integral step of the process.

Once again, I would like to take this opportunity to thank AllerGen, not just for myself but on behalf of the AllerGen Students and New Professionals Network, for its financial support and the AllerGen investigators for their commitment to the education of the trainees. Were it not for the uptake and enthusiasm of Drs McNagny and Denburg upon hearing my proposal, the workshop would not have been available to the network trainees, or at least, not in such a timely manner from its first proposal.

Dr. Leandro Fritscher, University of Toronto, AllerGen Research Project 05A6 – *Allergic asthma: Air pollution and allergen interactions* (Supervisor: Dr. Frances Silverman):
As a trainee, I am pleased with the opportunities and benefits that the AllerGen NCE programme has provided. We have been able to work more collaboratively and to combine endpoints involving clinical outcomes and basic sciences.

The AllerGen workshops were particularly helpful because they gave me the opportunity to "broaden" some of my perspectives. The networking opportunities that AllerGen provides enabled me to better understand and appreciate the global role and importance of all the research that is being undertaken under AllerGen leadership.

Dr. Nivedita Khanna, University of Toronto, AllerGen Research Project 05A5 – *Cardiopulmonary consequences of air pollution in a murine model of allergic asthma* (Supervisor: Dr. Jeremy Scott)
Attending the mouse respiratory function testing workshop in Montreal in October 2006 provided me with the opportunity to gain hands-on insight into the various approaches to measure and monitor respiratory function in mice and also enabled me to gain a better understanding of the underlying principles. Overall, the October 2006 workshop covered several aspects of lung function testing in mice and fundamental principles with elaborate discussion on pulmonary function testing in mice exhibiting the asthma phenotype. The overview presentation and subsequent discussion of the measurement of lung function were very useful in ensuring a more solid understanding of the basics of respiratory mechanics. Another presentation covering the oscillation mechanics of the respiratory system and their applications was very helpful in giving me a fuller understanding of the principles of mechanical impedance as a response of respiratory system to external perturbations and its relationship to respiratory mechanics. In addition, there were also important discussions concerning the development of immune response following experimental asthma and association with clinical situations. On each of these occasions, there was ample opportunity for participants to exchange ideas. For my part, I found this to be a valuable opportunity to discuss my experimental data with other participants, and these exchanges helped me make improvisations in our experimental protocol.

Mary Speck, University of Toronto, AllerGen Research Project 05A6 - *Allergic asthma: Air pollution and allergen interactions* (Supervisor: Dr. Frances Silverman):
As a part of the technical team involved in an AllerGen research project, I attended a workshop on Exposure Assessment for Population Studies. What was unique about this networking opportunity was that it allowed me to access resources and expertise in my own country. Most conferences and workshops in this area are American, sometimes with little Canadian content or chance for utilization of Canadian resources.

Bruce Urch, University of Toronto, AllerGen Research Project 05A6 – *Allergic asthma: Air pollution and allergen interactions* (Supervisor: Dr. Frances Silverman):
AllerGen has been a valuable learning and networking opportunity for me as a student trainee and researcher. The range and diversity of the Network's Trainee meetings, Workshops and Research Conferences have offered a unique learning experience. In addition, I took part in meetings of the Birth Cohort (CHILD), and was very excited to contribute to the development of a dust sample (and Endotoxin) collector, the prototype currently in use in the pilot study in British Columbia. I am currently in the final stages of completing my PhD on air pollution human health effects, and the newly formed connections with and through AllerGen have advanced my studies and career. In a broader context, I feel that AllerGen has made the health effects of air pollution a priority concern, and the knowledge gained about asthma, the developing newborn and environmental health effects will make a real difference to society.

Michelle North, University of Toronto, AllerGen Research Project (Supervisor: Dr Jeremy Scott):
As an AllerGen trainee I had the opportunity to attend a workshop on Flow Cytometry on April 29, 2008 in Vancouver, BC. This workshop was extremely helpful to me as a beginner in flow cytometry analysis. The event provided me with an introduction to the technique and relevant key concepts. The proper controls for flow cytometry were detailed and an introduction to setting up the experiment following the running of the control samples were explained.

The seminar leader was extremely knowledgeable and was able to share example problems that come up in flow cytometry analysis from his many years of experience. He explained common mistakes, and ways that scientists he knows have lost their data, interpreted it incorrectly or were not able to get publication-quality figures because of these common mistakes. The facilitator explained how to interpret the data correctly and maximize the information provided by the data.

During the hands-on portion of the workshop we practiced using flow cytometry for four-color acquisition of data. The cells were prepared for us but we had to perform the calibration experiments, run the control samples, and use the software that is built into the instrument to acquire data. We worked on compensation techniques and got to see the value of the control samples through examples of what would happen to the data if the compensation steps were not performed correctly. Analysis was performed with FlowJo software. Each participant received some hands-on time with the processing of the data.

This course certainly aided in my professional development by providing me with a general understanding of what flow cytometry is and how it works. I now have a better

understanding of the controls that need to be run in order to validate this type of experiment. This experience also made me better able to read research papers employing this technique and critically evaluate their experiment and their data. This has been important for reviewing the literature on asthma and allergy and discovering how this technique has been employed.

In my supervisor's laboratory we are considering looking at different activation states of macrophages. This would make a good flow cytometry experiment. If I begin working with flow cytometry in my own research, having taken this course will have added benefits. I would still need training on the specific equipment available at U of T, but I will have a better basic understanding of flow cytometry before beginning.

It was also beneficial to see the facility at the University of British Columbia. The flow cytometry facility they have is very advanced, with dedicated staff and space. It is a state of the art equipment set-up. I found it amazing that there is one central flow cytometry facility for the university, where all of the labs can go to run their samples. I could see that this has many benefits because the staff is specialized and dedicated to getting the best data possible out of the precious samples.

This workshop was interactive and allowed me to network with other AllerGen trainees who are interested in using, or are already using flow cytometry. It is very beneficial to have contact with others who are using the same technique to discuss experiments or ask for suggestions about potential problems that may come up.