

March 31, 2015.

Dear Veterinary Immunology Committee at the IUIS,

Thank you for awarding me with the IUIS VIC PhD/DVM Student Travel Award to attend the Keystone Symposium on "Immunity to Veterinary Pathogens: Informing Vaccine Development". I was sincerely honored to know that based on our research I was selected as a recipient of this bursary. Your generosity has improved my professional career by giving me the opportunity to participate in a meeting that focused on high-level science in the fields of veterinary immunology and pathology. Moreover, I had the opportunity to meet important researchers and present our work to colleagues.

My first contact with veterinary immunology was during the second year as a Veterinary Medicine student at the Federal University of Goiás, Goiás – Brazil. Immunology being a complex subject, I could not properly appreciate its importance until I took more advanced and applied classes during my fourth year. On the following year, I had the opportunity to work with dairy cattle research as a visitor scholar at the Department of Animal Sciences at the University of Florida. I discovered my interest in research with this opportunity. Then, in 2012, after obtaining a DVM degree, I was pleased to be accepted into the graduate program at the Department of Animal Sciences at the University of Florida to work with Dr. John Driver. During the following two years we developed a swine model to study how natural killer T (NKT) cells can be harnessed for vaccine adjuvants against infectious diseases.

At first, our project characterized the frequency and function of NKT cells in different tissues from mixed breed pigs. Following, we could show the adjuvant effects of NKT cell therapy using a vaccine model that co-injected the foreign antigen hen egg lysozyme (HEL) with one of the three well-known NKT cell superagonists, alpha-galactosylceramide (α GC), OCH and C-glycoside, or vehicle. Together, our results demonstrate the promise of using a pig model to study and understand

NKT cell biology and the therapeutics that activate these cells to treat and protect pigs and possibly other domestic animal species from dangerous pathogens.

In my PhD program, we propose to translate the results obtained using the swine influenza virus (SIV) as antigen. Studies in mice suggest that the immunoregulatory function of NKT cells is critically important for resistance against SIV and decrease severity of established infections. NKT cell stimulation can improve vaccine results by refining the recruitment of immune cells against this highly mutant antigen. SIV is considered a major threat to swine and human health and was greatly discussed during the conference.

So far, we conducted a vaccination study similar to the HEL antigen trial to test whether α GC could be used to enhance vaccination against SIV. Piglets were vaccinated twice, with a mock solution, UV-killed SIV or a combination of α GC and UV-killed SIV. Following the vaccination period twelve piglets were challenged with live SIV. NKT cell activation with α GC induced a dramatic increase in the frequency of virus-specific cells in various tissues, it also significantly reduced viral titers in nasal swabs and airway tissues compared to pigs treated with vaccine alone.

I was honored to have the opportunity to present the research we conducted during my Master's of Science program and the first semester of my PhD program in both a short-talk and a poster. We reported important information about pig adjuvant responses to different varieties and dosage levels of NKT cell antigens. Additionally, we demonstrated that NKT cells could be harnessed to protect swine from a dangerous pathogen. My presentation stimulated helpful discussions and received interesting comments and suggestions from the colleagues present. And we consider several possibilities of beginning collaborations with others swine immunologists. Many presentations in this meeting were related to our research and several assays could be applied to and benefit our work.

On the third day of the conference, I was invited to participate in the "Meet the Scientist Workshop Luncheon". This workshop included the three meeting organizers, Dr. William Golde, Dr. Wendy Brown and Dr. Ivan Morrison, and the graduate students and post-doctoral fellows who have received scholarship funding to attend this meeting. The senior scientists talked about their careers and research from when they were graduate students until now. We also discussed professional career and scientific opportunities that are available to current graduate students and post-doctoral fellows. They provided us meaningfully career advices that only their personal experience could teach. This workshop offered us a better point of view to be exercised while seeking our professional career.

The focus of this meeting was presentations on immune responses to infectious diseases in animals and the development of more efficient and applicable vaccines. Different infectious diseases were discussed, with emphasis on zoonotic pathogens such as influenza and Mycobacterium, and analysis of numerous technologies were reported for vaccination and diagnostic. I particularly enjoyed the sections entitled “Mucosal immune responses to infection”, “Immune responses to swine and avian influenza” and “Veterinary vaccines for the 21st century”. Subjects addressed during these sections are closely related to my research. I learned about the potential advantages of mucosal vaccines, differences in antigen processing for vaccines and the outcomes to the immune system, influence of production systems and management on immunoprophylaxis and differences in T cell subsets and cytokine production after infection. Others topics were more focused on antigen characteristics, such as the different subtypes of influenza A virus and cross-protective immunity and how influenza A virus can cross the species barrier. The discussions about vaccine technology were particularly interesting, many of the experimental technics and assays developed by the speakers might be possible to be transferred to my research on vaccines harnessing NKT cell superagonists.

Attending the meeting, “Immunity to Veterinary Pathogens: Informing Vaccine Development” was a highly valuable experience for the development of my professional career. Especially because several of the topics discussed were particularly related to the studies we perform. The meeting exceeded my expectations in both the scientific level of the presentations and overall organization. My professional goal is to become an independent researcher, therefore, attending this conference was a great experience to be exposed to senior scientists and discuss our research with important names in the area.

Sincerely,

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