

Mucosal Immunology: the next generation

It is a great honour to have been elected President of the Society of Mucosal Immunology (SMI) for the 2009–2011 term. Many of my predecessors have been giants in the field of immunology, and it is important to remember that mucosal immunology has much to offer the discipline of immunology as a whole and that it is increasingly being recognized as such. Among its important contributions have been elucidation of the ways in which different types of gut microbes regulate T-cell cytokine responses and the determination that mucosal and systemic secondary lymphoid tissues atrophy in germ-free animals.

In the past 18 months, under the leadership of Rick Blumberg, SMI has gone from strength to strength. We now have more than 700 members, more than 800 scientists attended the fourteenth International Congress of Mucosal Immunology (ICMI) in Boston last July, and we have the journal *Mucosal*



James Canavan (third from right)

Immunology, beautifully presented and organized by Nature Publishing Group, with stellar content. My primary aim as president is therefore to maintain this momentum, ensure that we retain and recruit more members, maintain the success of the journal, have SMI SMI-sponsored sessions at major national and international meetings, and continue to raise the profile of the subspecialty.

It was ever thus—when immunologists reach a certain age, they have a tendency to look back and pontificate. Some things have worked out well in mucosal immunology, such as understanding the immune basis for inflammatory bowel disease, the role of regulatory T cells (Tregs) in maintaining gut homeostasis, the molecular basis for immunoglobulin transport across epithelia, and many others. At the same time there have been disappointments: effective mucosal vaccines are still a long way off, oral tolerance has not really reached the clinic, and a role for $\gamma\delta$ cells in gut epithelium is still a bit of a mystery. However, looking through the retrospectroscope is not very productive, and for an area to progress, it needs new ideas and young investigators. Accordingly, I have asked a completely nonrandom, but highly heterogeneous, group of young investigators who attended last year's ICMI in Boston what they consider to be exciting about mucosal immunology.

Joanne Neves is a Portuguese PhD student cospervised by Dan Pennington from Barts and the London and Bruno Silva-Santos from

Oporto Medical School. Her project aims to clarify the T-cell-receptor requirements of $\gamma\delta$ cells during their thymic development and how these relate to functional potential and location of the $\gamma\delta$ cells in the body. She said, "My interest in mucosal immunology goes beyond my project since the host–microbe interaction is my pet subject. Dan Littman, Alex Chervovsky, and Jorge Galan's talks really supported my interest in this area. Littman's work shows that the differentiation of Th17 cells is dependent on the microbiota composition, and Alex Chervovsky and Jorge Galan's talks highlighted the importance of switching from a "host-centric" view of the intestine–microbe interactions to a more "pathogenic-centric" view. From this perspective, for me, the most thrilling train of thought in the mucosal immunology milieu at the moment is how commensal microbes influence the development of important components of the immune system."

Paolo Biancheri, an Italian gastroenterologist from Pavia doing full-time research training in the MacDonald lab at Barts and the London, said, "I find it extremely fascinating to study the mechanisms by which the immune system faces the environment at the front line of mucosal surfaces. From this standpoint, I really enjoyed Laurie Glimcher's talk in Boston showing that in the gut of mice



Joanne Neves and Juliette Mahtani-Patching



Paolo Biancheri

lacking T-bet and an adaptive immune system, colitogenic bacteria grow and induce a spontaneous, aggressive, and communicable colitis.”

Juliette Mahtani-Patching, a PhD student from Barts and the London, said, “Having been brought up in Zambia in Africa, witnessing the devastation of the AIDS pandemic on that nation, I have always paid particular interest to the progress of research into HIV infection. At ICMI, Danny Douek gave an exceptional talk on the role of the intestinal barrier in HIV pathogenesis. HIV replication and substantial CD4 T cell-depletion occur in the gut of HIV-infected

individuals. Progression to AIDS is associated with enteropathy, as damage to the intestinal wall results in microbial translocation and subsequent systemic immune activation. These findings provide insight into the cause of rapid progression to AIDS in developing countries like Zambia and provide hope for the therapeutic control of HIV and AIDS.”

James Canavan, an Irish gastroenterologist who has just been awarded a clinical fellowship to develop immunoregulatory T-cell therapies for inflammatory bowel disease (IBD) in patients in Graham Lord’s laboratory at King’s College London, said, “As someone who is interested in trying to

use Tregs to treat IBD, I was both interested and a bit worried by Yasmine Belkaid’s data showing that in a highly polarized Th1 environment, mucosal Foxp3⁺ Tregs could coexpress T-bet and acquire a Th-1 effector phenotype by secreting IFN- γ .”

I think it is clear from these comments that young researchers were galvanized by the high quality of the presentations at ICMI and see mucosal immunology as a very exciting area in which to develop a career. It can only be good for SMI, and immunology in general, for this to happen.

Thomas T MacDonald, President, SMI

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