In vivo characterization: Combine anatomical and molecular imaging modalities to accelerate your research

Live Webinar: 28 June 2016

Session 1: 10 AM UTC+2 (Paris) - 5 PM CST (Beijing)
Session 2: 5 PM UTC+2 (Paris) - 11 AM EDT (New York) - 8 AM PDT (Los Angeles)

In vivo imaging of antigen presenting cells in non-human primates after vaccination against HIV

Dr Catherine Chapon, Associate Professor, Université Paris-Sud, France

Noninvasive and longitudinal imaging strategies are required to study the behavior of antigen presenting cells (APCs) in order to better understand the mechanisms leading to the induction of cellular and humoral immune responses to vaccination. Here we describe in vivo fluorescence imaging approaches to track APCs and their behavior after an intradermal injection of an anti-HIV vaccine. The following methods were used to image skin APCs in NHP: Monoclonal fluorescent labelled anti-HLA-DR antibody (mAb) was injected intradermally in order to specifically target skin APCs in nonhuman primates (NHP) [1]. Epidermal APCs were monitored at cellular level with noninvasive *in vivo* fibered confocal fluorescence microscopy (Cellvizio® Dual Band, Mauna Kea Technologies) at various time points post vaccination. In addition, confocal fast laser scanning microscopy (Nikon Corporation, Tokyo, Japan) was performed on whole skin biopsies to monitor the behavior of fluorescent-labelled APCs in both dermis and epidermis after vaccination. To conclude, *in vivo* fluorescence imaging approaches allow us to track the skin immune cells non invasively in their native environment, and to characterize early cellular events in different experimental settings such as vaccination and immune therapeutic interventions.

1. Salabert, N., et al., Intradermal injection of an anti-Langerin-HIVGag fusion vaccine targets epidermal Langerhans cells in nonhuman primates and can be tracked in vivo. Eur J Immunol, 2016. 46(3): p. 689-700.

Short CV:

Dr Catherine Chapon is Associate Professor in Biophysics at the University of Paris-Sud 11. She is in charge of the Imaging of Infection and Immunity core lab (L3i) in the IDMIT Infrastructure at the CEA at Fontenay-aux-Roses (http://www.idmitcenter.fr/). The national infrastructure for Infectious Disease Models and Innovative Therapies (IDMIT) is coordinated by CEA and is dedicated to preclinical evaluation of immune interventions, vaccines and preventive approaches of human infectious diseases.

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Taking a macro-to-micro intravital multimodal imaging approach to track fungal infections through the four dimensions of mouse space and time

Dr Greetje Vande Velde, Biomedical MRI/MoSAIC, Department of Imaging and Pathology, KU Leuven, Belgium

Non-invasive imaging is increasingly embraced in preclinical research, because it provides longitudinal information on dynamic disease processes in a field where ex vivo assessment of experimental disease models, such as lung diseases and infections, is nevertheless still the gold standard. Histology and microscopy will always remain essential to investigate molecular and cellular interactions, but are limited to one observation per animal. Imaging techniques are therefore indispensable to monitor dynamic processes in vivo and to deliver the necessary context for interpretation of post mortem assessment results. It is therefore our goal to develop and to use novel, complementary imaging techniques to follow-up different infectious disease processes in lung and brain, inflammatory response and therapy in a dynamic and non-invasive way in individual animals. We aim to unravel the interplay between these dynamic pathogenic processes, to identify key factors and novel biomarkers and to optimize preclinical research, which will ultimately result in improved clinical translation and patient care.

Short CV:

The amazing organization of biological processes in nature as well as the wonders of man-made technology have always fascinated Prof. Greetje Vande Velde. Throughout her Medicine and Bio-engineering studies, PhD (KU Leuven, 2010) and postdocs (KU Leuven, CRG, Institut Pasteur), she was able to combine her interests in neurophysiology, lung and brain infections with those in genetic engineering and imaging technologies. The laboratory takes part in the Molecular Small Imaging Center at KU Leuven (Belgium), a cutting-edge facility combining multiple imaging modalities for biomedical research. We are developing in vivo imaging protocols, aiming to unravel the enigmatic aspects in the pathogenesis of infectious diseases as a main research goal. By tracking cells and monitoring the overall disease process with complementary imaging technologies, we aim to yield better insight in pathogenic processes that are dynamic in time and space.

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