Magdalena Tary-Lehmann, J Clin Cell Immunol 2016, 7:5(Suppl)
http://dx.doi.org/10.4172/2155-9899.C1.033



# Challenges and successes of measuring antigen-specific T cell responses

**Magdalena Tary-Lehmann**[1, 2]
[1]Cellular Technology Limited, USA
[2]Case Western Reserve University School of Medicine, USA

Assessing immunogenicity is a challenge in the biopharmaceutical industry, as an increasing number of new drugs and vaccines aim to elicit a response from the cellular components (e.g., T cells) of the immune system. Measurements of antibodies in bodily fluids (e.g., by ELISA) have provided robust and reproducible results for decades and such assays have been validated for monitoring of B-cell immunity. In contrast, measuring T-cell immunity has proven to be more of a challenge, due to the need to test live cells in functional assays *ex vivo*. While T cells play a critical role in tumor rejection, reliable measurements of antigen-specific T cell responses *ex-vivo* remain seemingly problematic as typically, T cells occur in very low frequencies in test samples, such as peripheral blood. Therefore, monitoring antigen-specific T cells and their effector functions is critical for the understanding of diseases and for proper assessments of the efficacies of specific cancer immune therapies. In addition, for an assay to reliably measure T-cell functions, it needs to be warranted that the test conditions are such that the function of T cells *in vitro* remains unimpaired relative to *ex vivo*. In theory, several techniques are available, including the use of HLA/peptide tetramers, intra-cellular cytokine staining, ELISA and ELISPOT. In praxis, however, only ELISPOT assays might meet this need, because of the requirement for very high sensitivity to detect the rare antigen specific T cells, the limited number of cells obtainable from patients, the assay's independence of the HLA genotype of the test subjects, and the ease of performing the assay. Divergent expression profiles of tumor antigens, even within the tumor of a single patient, make it difficult to come up with a general tumor vaccine or to customize immune therapy for an individual patient. Most tumor antigens correspond to normal self-proteins, against which T cell tolerance has been established, either in the thymus or in the immune periphery. However, this negative selection of the auto-antigen- (tumor antigen) specific T cell repertoire is inherently incomplete, being defined by the T cell activation threshold with the density of the nominal antigen and of co-stimulatory molecules exerting synergistic effects. Tumor antigens typically are cryptic auto-antigens and determinant spreading can render cryptic tumor antigens immunogenic, thereby leading to tumor rejection and resulting in protective anti-tumor immunity. Examples of such successful T cell monitoring in tumor models will be presented.

## Biography

Magdalena Tary-Lehmann is an Adjunct Associate Professor of Case Western Reserve University (CASE), Department of Pathology, Co-Founding Scientist and Chief Scientific Officer for Cellular Technology Limited (CTL). She has published more than 75 papers in peer-reviewed journals. She provides guidance and oversight for technical operations in the CTL contract laboratory, ensuring the ongoing scientific excellence of CTL. Over the past decade, she has worked with clients to develop and validate reference samples and controls for use in regulated immune monitoring assays.

magda.tary-lehmann@immunospot.com

**Notes:**