ELISPOT in Vaccine Development

Developing vaccines for the prevention of human infection by different viruses, bacteria or parasites is an urgent task, and relies on a variety of measurements to monitor vaccine efficacy. Primary measurements may be antibody titers to vaccine antigens or the determination of antibody function such as anti-viral neutralizing activity. Additionally, in the last decades the measurement of T cell function can be used to assess vaccine efficacy. The ELISPOT assay is an ideal tool to determine the impact of vaccines on immune mediators such as interleukins, interferons and pro-inflammatory mediators.

One major advantage of the ELISPOT assay is the ability to cost-effectively screen in a relatively short period a wide array of peptide antigens, allowing the detection of T cell responses to an entire pathogen proteome. The assay is capable of distinguishing T cell responses to any epitope of 11 amino acids or even less. Furthermore, responses can be monitored through time in a follow-up, to estimate the induction of a substantial memory response in the vaccine recipients.

So far, ELISPOT assays have helped us remarkably in our understanding of immune responses against different pathogens in the past and still forms a routine basis for many additional investigations and methods, such as flow cytometric analysis or antigen-specific tetramer assays. In the end, the ELISPOT can help us to generate information that can eventually lead to the discovery of more effective vaccines providing protective immunity against different infectious diseases.

Examples of studies using our ELISPOT assay:

Primming-boosting vaccination with recombinant Mycobacterium bovis bacillus Calmette-Guerin and a nonreplicating vaccinia virus recombinant leads to long-lasting and effective immunity.
U-CyTech products used in this study:
Monkey IFN-γ ELISPOT kit
Monkey species: Macaca fascicularis

Chiriva-Internati M., Yu Y., Mirandola L., Jenkins M.R., Chapman C., Cannon M., Cobos E., and Kast W.M.
Cancer testis antigen vaccination affords long-term protection in a murine model of ovarian cancer.
U-CyTech products used in this study:
Mouse IFN-γ ELISPOT kit
Mouse TNF-α ELISPOT kit
Hu H., Huang X., Tao L., Huang Y., Cui B.A. and Wang H.
Comparative analysis of the immunogenicity of SARS-CoV nucleocapsid DNA vaccine administrated with different routes in mouse model.
U-CyTech products used in this study:
Mouse IFN-γ ELISPOT kit
Mouse IL-4 ELISPOT kit

Mucosal and systemic immunization with targeted fusion anti-caries DNA plasmid in young rats.
Vaccine 27:2940-7 (2009). Abstract
U-CyTech products used in this study:
Rat IFN-γ ELISPOT kit
Rat IL-4 ELISPOT kit

Safety, immunogenicity, and efficacy of the ML29 reassortant vaccine for Lassa fever in small non-human primates.
U-CyTech products used in this study:
Monkey TNF-α ELISPOT kit
Monkey species: Callithrix jacchus

Reduced IL-4 associated antibody responses to vaccine in early pre-diabetes.
U-CyTech products used in this study:
Human IFN-γ ELISPOT kit
Human IL-4 ELISPOT kit
Human IL-13 ELISPOT kit

Skowera A., de Jong E.C., Schuitemaker J.H., Allen J.S., Wessely S.C., Griffiths G., Kapsenberg M. and Peakman M.
Analysis of anthrax and plague biowarfare vaccine interactions with human monocyte-derived dendritic cells.
U-CyTech products used in this study:
Human IFN-γ ELISPOT kit
Human IL-2 ELISPOT kit
Human IL-4 ELISPOT kit
Human IL-13 ELISPOT kit

Improved HIV-1 specific T-cell responses by short-interval DNA tattooing as compared to intramuscular immunization in non-human primates.
U-CyTech products used in this study:
Monkey IFN-γ ELISPOT kit
Monkey IL-2 ELISPOT kit
Monkey IL-4 ELISPOT kit
Monkey species: Macaca mulatta