



## 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:

**Ami Y., Izumi Y., Matsuo K., Someya K., Kanekiyo M., Horibata S., Yoshino N., Sakai K., Shinohara K., Matsumoto S., Yamada T., Yamazaki S., Yamamoto N., and Honda M.**

Priming-boosting vaccination with recombinant Mycobacterium bovis bacillus Calmette-Guerin and a nonreplicating vaccinia virus recombinant leads to long-lasting and effective immunity.

J. Virol. 79:12871-9 (2005). [Abstract](#)

**U-CyTech products used in this study:**

**Monkey IFN- $\gamma$  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.

PLoS One 5:e10471 (2010). [Abstract](#)

**U-CyTech products used in this study:**

**Mouse IFN- $\gamma$  ELISPOT kit**

**Mouse TNF- $\alpha$  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 administered with different routes in mouse model.

Vaccine 27:1758-63 (2009). [Abstract](#)

**U-CyTech products used in this study:**

Mouse IFN- $\gamma$  ELISPOT kit

Mouse IL-4 ELISPOT kit

**Liu G.X., Xu Q.A., Jin J., Li Y.H., Jia R., Guo J.H. and Fan M.W.**

Mucosal and systemic immunization with targeted fusion anti-carries DNA plasmid in young rats.

Vaccine 27:2940-7 (2009). [Abstract](#)

**U-CyTech products used in this study:**

Rat IFN- $\gamma$  ELISPOT kit

Rat IL-4 ELISPOT kit

**Lukashevich I.S., Carrion R., Jr. Salvato M.S., Mansfield K., Brasky K., Zapata J., Cairo C., Goicochea M., Hoosien G. E., Ticer A., Bryant, J., Davis, H., Hammamieh, R., Mayda, M., Jett, M., and Patterson, J.**

Safety, immunogenicity, and efficacy of the ML29 reassortant vaccine for Lassa fever in small non-human primates.

Vaccine 26:5246-54 (2008). [Abstract](#)

**U-CyTech products used in this study:**

Monkey TNF- $\alpha$  ELISPOT kit

Monkey species: Callithrix jacchus

**Schmid S., Molteni A., Fuchtenbusch M., Naserke H.E., Ziegler A.G., and Bonifacio E.**

Reduced IL-4 associated antibody responses to vaccine in early pre-diabetes.

Diabetologia 45:677-85 (2002). [Abstract](#)

**U-CyTech products used in this study:**

Human IFN- $\gamma$  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 bio warfare vaccine interactions with human monocyte-derived dendritic cells.

J. Immunol. 175:7235-43 (2005). [Abstract](#)

**U-CyTech products used in this study:**

Human IFN- $\gamma$  ELISPOT kit

Human IL-2 ELISPOT kit

Human IL-4 ELISPOT kit

Human IL-13 ELISPOT kit

**Verstrepen B.E., Bins A.D., Rollier C.S., Mooij P., Koopman G., Sheppard N.C., Sattentau Q., Wagner R., Wolf H., Schumacher T.N., Heeney J.L. and Haanen J.B.**

Improved HIV-1 specific T-cell responses by short-interval DNA tattooing as compared to intramuscular immunization in non-human primates.

Vaccine 26:3346-51 (2008). [Abstract](#)

**U-CyTech products used in this study:**

Monkey IFN- $\gamma$  ELISPOT kit

Monkey IL-2 ELISPOT kit

Monkey IL-4 ELISPOT kit

Monkey species: Macaca mulatta