ImmunoTools *special* Award 2015

Jose Herrera-Rodriguez, PhD-student

Supervisor: Dr. Anke L.W Huckriede

Dep of Medical Microbiology, University Medical Center Groningen,
Hanzeplein 1, PO box 30.001, 9700 RB Groningen, The Netherlands

How playing with glycosylation can lead to the improvement of influenza vaccines.

I am a PhD student from Mexico doing my research in the Netherlands with the help of a grant from the Mexican Government. My aim is to develop tools that will improve the way influenza vaccines work in order to be ready for the next pandemic.

Influenza A virus (IAV) infections are associated with acute respiratory illness and are responsible for millions of deaths annually. Due to its RNA genome IAV is subject of high genetic variation resulting in escape of the virus from pre-existing host immunity through antigenic drift. For this reason, influenza vaccines have to be adjusted each year and do not provide protection against newly emerging virus strains.

IAV expresses two membrane-bound surface glycoproteins, the hemagglutinin (HA) and the neuraminidase (NA). These glycoproteins are the main target for activation of the immune response against the virus and therefore an important area to study in the design of vaccines.

In biology glycosylation mainly refers to the enzymatic process that attaches carbohydrates (glycans) to proteins. Glycosylation is known to happen only at specific sequences of amino acids. Accordingly, changes in the amino acid sequence may cause changes in the glycosylation pattern. For this reason glycosylation can be a major contributor of antigenic drift. In addition, glycosylation patterns determine the interaction of the IAV with innate receptors on antigen presenting cells.

Recently a lot of research has been done in order to understand how glycosylation of the HA affects the virulence and immune response in the human body. These studies have shown that one of the major ways to enhance the immune response towards an IAV vaccine could be by modifying the type of glycan present on the HA. In my PhD project we will exploit this knowledge and try to improve the immunogenicity of IAV vaccines by differential glycosylation.

In order to optimize vaccine immunogenicity we will study the interaction of the vaccines with antigen-presenting cells with PBMC or DC cultures in vitro and will measure the response of these cells in terms of differential gene regulation and T cell activation. Subsequently the influenza vaccines will be manipulated by various means (de- glycosylation, de- phosphorylation etc.) and the effects of the manipulation will be studied in immunization experiments with mice.

This project thus aims to dissect the role of glycosylation for influenza vaccine immunogenicity and will provide clues how to generate highly immunogenic influenza vaccines strains even from low immunogenic parent virus strains.

The diverse cell surface markers for mice and human immune cells and recombinant cytokines from ImmunoTools would be a huge benefit for our in vitro and in vivo studies.

ImmunoTools *special* AWARD for **Jose Herrera-Rodriguez**

includes 25 reagents

FITC - conjugated anti-human CD4, Control-IgG1, Control-IgG2a,

PE - conjugated anti-human CD8, IFN-gamma, TNFa, Control-IgG2a,

APC - conjugated anti-human CD4, CD8, Control-IgG1,

FITC - conjugated anti-mouse CD4, CD11b, CD45, CD45R, NK-cells, isotype control IgG2b,

PE - conjugated anti-mouse CD8a, CD25, CD62L, Gr-1, isotype control IgG2b

APC - conjugated anti-mouse CD3e, CD4, CD8a, CD19

DETAILS more AWARDS