ImmunoTools *special* Award 2014

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Towards the improvement of Dendritic Cell Vaccines through glycan-engineering

Dendritic cells (DCs) are key players of the immune system, because they bridge the innate and the adaptive immune responses. They show remarkable antigen uptake, processing functions and enhanced presentation features to the adaptive immune effector cells taking advantage of unique functional cell structures.

Deriving from these features, they ultimately set themselves as skewers in the very fine balance between inflammation and tolerance.

DCs have a unique capacity to induce immune responses against tumor cells. They phagocyte tumor antigens, maturate and present them to T cells, triggering activation. They also induce long-lasting immunological memory, and therefore, become an attractive strategy as cellular vaccines for the treatment and/or prevention of cancer relapses. However, the therapeutic results obtained in clinical trials with DCs are scarce and only few patients effectively respond to the DCs vaccines. The reason for it is the difficulty to generate ex vivo high stimulatory DCs with capacity of overcoming the tolerance induced by the tumor environments. Therefore, the use of appropriate protocols for culture and maturation of ex vivo generated DCs is of deep importance for the triggering of efficient anti-tumor responses.

Our team is dedicated to the immunomodulation of the function of ex-vivo generated DCs towards an improvement of their immunopotency, ,i.e, their ability to active T cells and induce higher stimulation of anti-cancer immune responses. We have been unravelling the role of sialic acid, which decorates DCs glycans and proved that it confers immunomodulatory properties to DCs. A unique discovery was that changes on DC surface sialic acid mimic an infection process and induces an extraordinary higher immunological potency on DCs, when compared to DCs matured by standard vaccine maturation protocols.

ImmunoTools provides a large set of reagents that are essential for our work: fluorescently-labelled mAbs for flow cytometry for the cell phenotyping to evaluate ex-vivo monocyte cell differentiation into dendritic cells and subsequent maturation (using antibodies against cell markers as CD11b, HLA-DR, CD40, CD80/86). To determine the of activation states and proliferation rates in mixed lymphocyte cultures where antibodies against T and B cells markers (i.e. CD3, CD4/8, CD25, CD19, CD154, CD45RO, CD69) are essential to determine T cell polarization and activation.

The proper differentiation and maturation protocols depend on the use of good and reliable ImmunoTools cytokines such as GMCSF and IL-4 (for differentiation) and IFNγ, TNFα, TGFβ, IL-6 (for maturation).

T cell survival depends on the use of cytokines, for i.e. IL-2 which is used to allow long incubation periods and plays a pivotal role in regulating the adaptive immune system by controlling the survival and proliferation of T cells.

IL-12 production of the ex-vivo generated DC provides information on their functional maturity that will skew T cell differentiation towards a Th1 dominant response, therefore monitoring IL-12 production by DCs requires ImmunoTools IL-12 ELISA quantification kit.
Our work is expected to bring translatable results into the clinical practice by unravelling the way to produce DC vaccines with high anti-tumour efficacy through glycan engineering.

ImmunoTools *special* AWARD for **Zélia Silva** includes 25 reagents

FITC - conjugated anti-human CD4, CD11a, CD14, CD19, CD69, CD86, HLA-DR

PE - conjugated anti-human CD8, CD11b, CD25, CD80,

APC -conjugated anti-human CD3, Annexin V,

recombinant human cytokines rh GM-CSF, rh IFN-gamma, rh IL-2, rh IL-4, rh IL-12, rh TNF-alpha,

human IL12p40 ELISA-set,

FITC - conjugated anti-mouse CD44,

APC -conjugated anti-mouse CD11b, CD62L,

recombinant mouse cytokines rm GM-CSF

DETAILS