ImmunoTools IT-Box-139 Award 2012

Gordon Heidkamp

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Taking a more colorful view on human Dendritic cells

Dendritic cells (DCs) are key players of the human immune system. First described in 1973 by Steinman and Cohn, DCs are critical for the induction of adaptive immune responses. As so-called "professional" antigen-presenting cells DCs capture invading pathogens, which leads to an MHC-restricted antigen-peptide presentation to pathogen-specific T-cells. This whole process, antigen-recognition and internalization, DC maturation and migration, and finally the interaction with specific T-cells requires a huge variety of cell surface molecules. Murine DCs have been thoroughly investigated. Different DC subpopulations have been described, phenotypically varying in their tissue distribution, quantity and cell surface marker expression. In addition, also functional differences were described between subsets of mouse DCs. In contrast, the knowledge about human DC subpopulations is rather incomplete. Today, human DCs are subdivided into a myeloid (mDCs) and a plasmacytoid subtype (pDCs). The latter one is characterized by the expression of HLA-DR, BDCA2, and CD123, and by the absence of CD11c. Myeloid DCs consist of HLA-DR$^+$, CD11c$^+$, BDCA-1$^+$ mDC1, and HLA-DR$^+$, CD11c^{int}, BDCA-3$^+$ mDC2 DCs. Recently, several groups suggested that mDC2 cells might be the human counterpart of murine CD11c$^+$CD8$^+$DEC205$^+$ DCs, which are highly competent in the presentation and cross-presentation of antigen on MHC-I and thereby in the activation of cytotoxic CD8$^+$ T cells.
The aim of my PhD thesis is to gain profound phenotypic and functional knowledge about human blood and lymphoid tissue DCs. Therefore, I developed various protocols for the production of single-cell suspensions from human blood, spleen, thymus, and other tissues. Further, 8-10 color FACS analyses were applied to identify and quantify DC subpopulations among the different organs. For an in-depth investigation of the functional properties we have sorted mDC1 DCs, mDC2 DCs, and pDCs from blood, spleen and thymus for whole genome microarray analyses. The evaluation revealed several very interesting differences between blood DCs and tissue-resident DCs. Many important follow-up experiments include the validation of our findings on protein level using 6 color confocal immunofluorescence analysis, MELC-technology (Multi-epitope ligand cartography), and 8-10 color flow cytometry. Therefore, the IT-Box-139 would be an ideal support of my PhD work since this box includes many needed antibodies. In addition, the antibodies of the IT-Box-139 will support me to refine my staining panel composition for a more detailed separation of DC subpopulations.

ImmunoTools IT-Box-139 for Gordon Heidkamp includes 100 antibodies

FITC - conjugated anti-human CD1a, CD3, CD4, CD5, CD6, CD7, CD8, CD14, CD15, CD16, CD19, CD21, CD25, CD29, CD35, CD36, CD41a, CD42b, CD45, CD45RA, CD45RB, CD45RO, CD49d, CD53, CD57, CD61, CD63, CD80, CD86, HLA-DR, IL-6, Control-IgG1, Control-IgG2a, Control-IgG2b, Annexin V

PE - conjugated anti-human CD3, CD4, CD8, CD11b, CD15, CD14, CD18, CD19, CD20, CD21, CD22, CD31, CD33, CD38, CD40, CD45, CD45RB, CD50, CD52, CD56, CD58, CD62p, CD72, CD95, CD105, CD147, CD177, CD235a, HLA-ABC, IL-6, Control-IgG1, Control-IgG2a, Control-IgG2b, Annexin V

PE/Dy647 -tandem conjugated anti-human CD3, CD4, CD8, CD14, CD19, CD20, CD25, CD54

APC -conjugated anti-human CD2, CD3, CD4, CD8, CD10, CD11a, CD11c, CD14, CD16, CD27, CD37, CD42b, CD44, CD45, CD59, CD62L, CD69, CD71, IL-6, Control-IgG1, Control-IgG2a, Control-IgG2b, Annexin V

DETAILS