IN BRIEF

T CELL ACTIVATION

Dynamic regulation of functionally distinct virus-specific T cells

Ndhlovu, Z. M. *et al. Proc. Natl Acad. Sci. USA* **107,** 3669–3674 (2010)

Multifunctional antigen-specific T cells are important for immune protection; this study shows that bead-based artificial antigen-presenting cells (aAPCs) are more effective than monocyte-derived dendritic cells (moDCs) in generating these T cells. Populations of influenza virus-specific $CD8^+$ T cells were expanded from human peripheral blood mononuclear cells following culture with virus peptide-loaded aAPCs or moDCs. Similar frequencies of virus-specific $CD8^+$ T cells were expanded by aAPCs and moDCs, but aAPC-generated $CD8^+$ T cells produced more inflammatory cytokines and showed increased cytotoxic potential. These phenotypes were not fixed: $CD8^+$ T cells originally expanded by moDCs increased their production of interferon-γ and tumour necrosis factor when restimulated with aAPCs, but restimulation of aAPC-expanded $CD8^+$ T cells with moDCs decreased their production of these inflammatory cytokines. These results may be due to the fact that whereas the aAPCs were engineered to provide only positive co-stimulatory molecules, the moDCs probably delivered both positive and negative regulatory signals to antigen-specific $CD8^+$ T cells.

REGULATORY T CELLS

Activated regulatory T cells are the major T cell type emigrating from the skin during a cutaneous immune response in mice

Tomura, M. *et al. J. Clin. Invest.* **120**, 883–893 (2010)

In this study, transgenic mice that express the photoconvertible green fluorescent protein kaede, which changes to red when exposed to violet light, were used to analyse cell migration from the skin. The authors found that most of the T cells that migrated from the skin to the draining lymph nodes, identified as kaede-red^+ cells, in the steady state had a memory phenotype. During a cutaneous immune response, a high proportion of memory regulatory T (T_{Reg}) cells migrated to the draining lymph nodes, where they suppressed T cell proliferation more strongly than did lymph node-resident T_{Reg} cells. Furthermore, skin-derived T_{Reg} cells could migrate back to the skin following secondary challenge with antigen and suppress cutaneous immune responses. Depletion of T_{Reg} cells resulted in prolonged contact hypersensitivity responses.

HIV

Programmed death-1-induced interleukin-10 production by monocytes impairs $CD4^+$ T cell activation during HIV infection

Said, E. A. *et al. Nature Med.* 7 Mar 2010 (doi:10.1038/nm.2106)

The expression of programmed cell death 1 (PD1) and interleukin-10 (IL-10) by monocytes is increased in patients with HIV infection. However, the mechanisms involved are not known. In this study, PD1 expression on monocytes was shown to be higher in HIV-infected patients than antiretroviral-treated patients and healthy controls. PD1 upregulation was induced by bacterial Toll-like receptor ligands and inflammatory cytokines, both of which are increased in the blood. The expression levels of PD1 correlated with IL-10 concentrations in the blood of HIV-infected patients, and activation of PD1 induced IL-10 production by monocytes. PD1-induced IL-10 inhibited $CD4^+$ T cell proliferation and cytokine production. So, this study describes a direct link between PD1 upregulation and increased IL-10 production, resulting in $CD4^+$ T cell dysfunction, during HIV infection.