IN BRIEF

TECHNIQUE

New strategies for boosting immunity to pathogens and cancer

There is a continued need to develop better vaccines or alternative immune-stimulating therapies. Three recent studies focus on new strategies for boosting host immunity. In the setting of cancer, although potential target antigens are known, there is a requirement for a delivery strategy that enables antigen persistence and presentation in an inflammatory context. To achieve this, Junqueira et al. infected mice with Trypanosoma cruzi parasites that were engineered to express a testicular cancer-associated antigen. Importantly, infection with these parasites induced CD8⁺ T cells that protected mice from cancer in a prophylactic model and delayed tumour progression in a therapeutic model. The study by Avci et al. suggests that, in order to develop more effective vaccines against encapsulated bacteria, we should reconsider the dogma that only the peptide component of a glycoconjugate is presented on MHC molecules to T cells. The authors found that in mice infected with group B Streptococcus (GBS), antigen-presenting cells stimulate carbohydrate-specific CD4⁺ T cells. Notably, a vaccine constructed to maximize the presentation of GBS-derived carbohydrates to T cells was more effective than a traditional vaccine containing glycoconjugate components in inducing immunity to GBS. Finally, Balazs et al. describe an alternative approach to vaccination - vectored immunoprophylaxis. They used an adeno-associated virus vector encoding a full-length, HIV-specific neutralizing antibody to induce the production of these antibodies by mouse muscle tissue. Remarkably, in humanized mice, a single intramuscular injection of the vector induced the life-long production of HIV-specific neutralizing antibodies and fully protected these animals from HIV infection.

ORIGINAL RESEARCH PAPERS Junqueira, C. et al. Trypanosoma cruzi as an effective cancer antigen delivery vector. Proc. Natl Acad. Sci. USA 108, 19695–19700 (2011) | Avci, F. Y. et al. A mechanism for glycoconjugate vaccine activation of the adaptive immune system and its implications for vaccine design. Nature Med. 17, 1602–1609 (2011) | Balazs, A. B. et al. Antibody-based protection against HIV infection by vectored immunoprophylaxis. Nature 30 Nov 2011 (doi:10.1038/nature10660)

IMMUNOTHERAPY

Low-dose IL-2 therapy expands human regulatory T cell populations

Interleukin-2 (IL-2) promotes both effector T and regulatory T (T_{Reg}) cell responses, but it is believed that T_{Reg} cells may be more sensitive to IL-2. Two recent studies found that low-dose IL-2 therapy preferentially expands T_{Reg} cell populations in humans. Koreth *et al.* administered low-dose IL-2 to 29 patients with chronic graft-versus-host disease (GVHD). This increased T_{Reg} cell numbers in all patients without altering effector T cell numbers. Around half of the subjects showed clinical improvement; some patients even showed an improvement in GVHD manifestations that had been considered irreversible. Importantly, IL-2 therapy did not impair other immune functions. Saadoun et al. studied low-dose IL-2 therapy in 10 patients with autoimmune vasculitis induced by hepatitis C virus infection. All patients showed increased proportions of functional T_{Reg} cells, with 9 patients showing clinical improvement. Notably, the authors did not report any adverse effects of IL-2 therapy. Although not all patients showed clinical improvement in the studies, these results are promising. **ORIGINAL RESEARCH PAPERS** Koreth, I. et al. Interleukin-2 and regulatory T cells in

graft-versus-host disease. N. Engl. J. Med. **365**, 2055–2066 (2011) | Saadoun, D. et al. Regulatory T-cell responses to low-dose interleukin-2 in HCV-induced vasculitis. N. Engl. J. Med. **365**, 2067–2077 (2011)