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, J. *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)