IN BRIEF

T CELL MEMORY

Memory T cells persisting within the brain after local infection show functional adaptations to their tissue of residence

Wakim, L. M., Woodward-Davis, A. & Bevan, M. J. *Proc. Natl Acad. Sci. USA* 5 Oct 2010 (doi:10.1073/pnas.1010201107)

The brain is classically thought of as an immune-privileged site in which routine immune surveillance is restricted. But several lines of evidence have recently challenged this assumption. This study shows that infection with vesicular stomatitis virus results in the generation of $CD103^+$ resident memory T cells in the brain parenchyma of mice through local antigen presentation by professional antigen-presenting cells. The population is self-sustaining without replenishment from the circulating T cell pool and persists in the absence of persisting antigen. Expression of the integrin CD103 was necessary for the retention and survival of these memory cells in the brain. $CD103^+$ resident memory T cells removed from the brain did not mount a recall response to secondary challenge in the periphery after adoptive transfer, showing that the function of these cells depends on their local milieu.

INFLAMMATION

Effects of AIN457, a fully human antibody to interleukin-17A, on psoriasis, rheumatoid arthritis, and uveitis

Hueber, W. *et al. Sci. Transl. Med.* **2**, 52ra72 (2010)

Animal models of autoimmunity have shown that interleukin-17A (referred to here as IL-17), which is produced mainly by T helper 17 (T_H17) cells, has a crucial role in driving inflammation. Three proof-of-concept clinical trials analysed the safety and potential efficacy of the human IL-17-specific IgG1κ monoclonal antibody AIN457 in a cohort of 104 patients with chronic plaque-type psoriasis, rheumatoid arthritis or chronic non-infectious uveitis, of whom 60 patients received AIN457. One or two doses of AIN457 induced variable, but clinically relevant, responses in each of the patient groups, with no significant increase in the rate of adverse events over placebo groups. AIN457 had a broad anti-inflammatory effect, as shown by the downregulation of expression of many inflammatory mediators and decreased T cell numbers in psoriatic plaques. These results support further development of IL-17-targeted inhibition for the therapy of autoimmune inflammation.

TRANSPLANTATION

The innate immune system in host mice targets cells with allogenic mitochondrial DNA

Ishikawa, K. *et al. J. Exp. Med.* 11 Oct 2010 (doi:10.1084/jem.20092296)

Nuclear transfer embryonic stem cells (ntESCs) and induced pluripotent stem cells (iPSCs) have attracted great interest as a source of stem cells for cell replacement therapy; because they have the same nuclear DNA as the potential recipient, these cells will not (in theory) be rejected after transplantation. However, the cells are not complete clones of the recipient cells with respect to mitochondrial DNA, which is derived from the oocyte donor in the case of ntESCs or can have accumulated somatic mutations in the case of iPSCs. This study shows that tumour cells with the same nuclear DNA as recipient mice but allogeneic mitochondrial DNA were delayed or inhibited from forming tumours in recipient mice as a result of an innate immune response to the tumour cells involving natural killer cells and Toll-like receptor signalling. Similar results were obtained for transplantation of ESCs with allogeneic mitochondrial DNA, which has important implications for obtaining tolerance to stem cell transplants.