IN BRIEF

T CELLS

Embryonic thymus required for IL-17-producing γδ T cells

Mice with reversible RAG1 deficiency (controlled by conditional Cre-recombinase expression) were crossed with *TcrdH2BeGFP* reporter mice (which allow the tracking of γδ T cells by green fluorescence) to monitor the *de novo* thymic development of γδ T cells. The authors found that interleukin-17 (IL-17)-producing γδ T cells are only generated in the embryonic thymus between E15.5 and E18.5 and that this process might be independent of T cell receptor rearrangement. IL-17-producing γδ T cells could not be reconstituted in lethally irradiated IL-17-deficient adult mice by transplantation of IL-17-sufficient bone marrow, and the authors showed that the development of these cells requires an embryonic thymic environment. These cells then persist as a long-lived, self-renewing population in adult mice. The development of IL-17-producing γδ T cells in adult thymi might be negatively regulated by IL-17 (produced by T helper 17 cells, γδ T cells and innate lymphoid cells).

ORIGINAL RESEARCH PAPER Haas, J. D. *et al.* Development of interleukin-17-producing γδ T cells is restricted to a functional embryonic wave. *Immunity* 5 Jul 2012 (doi:10.1016/j.immuni.2012.06.003)

THYMOCYTES

Self-renewing thymocytes

It has long been believed that all thymocytes are short-lived and that the thymocyte population is maintained by the continuous input of bone marrow-derived progenitor cells. Now, two studies published in the *Journal of Experimental Medicine* show that neonatal thymi contain thymocytes with a self-renewing capacity that can maintain the thymocyte population in the absence of any input from the bone marrow.

Martins *et al.* transplanted thymus lobes from newborn wild-type mice into mice deficient for RAG2, KIT and the common cytokine receptor γ-chain (which is required for interleukin-7 (IL-7) signalling). These mutant mice lack competitive haematopoietic stem cells and thus endogenous T cell development. They found that the number of double-positive ($CD4^+CD8^+$) thymocytes in these transplanted mice was similar to that in wild-type mice and that $CD4^+$ and $CD8^+$ T cells were released from the thymic graft. Furthermore, the T cell receptors (TCRs) underwent clonal rearrangement, and the authors also observed TCR clonal dominance, which may suggest that the thymocytes in these transplanted mice arose from the division of a limited number of cells. Finally, the authors showed that IL-7 receptor (IL-7R) signalling has a key role in the competition between thymus-resident and bone marrow-derived progenitors.

Peaudecerf *et al.* also reported thymus-autonomous T cell development in IL-7R-deficient mice transplanted with neonatal thymi. They identified a population of thymus-resident progenitors that expressed all the molecular markers of T cell progenitors and showed that the progenitors reconstitute a diverse peripheral T cell repertoire. These T cells were functional, as they cleared *Listeria monocytogenes* infection with similar kinetics to the T cells in normal mice, and they could function across histocompatibility barriers. Furthermore, T cells from allogeneic transplanted thymi did not induce graft-versus-host disease, suggesting that the neonatal T cells can become tolerant to host MHC molecules.

ORIGINAL RESEARCH PAPERS Martins, V. C. *et al.* Thymus-autonomous T cell development in the absence of progenitor import. *J. Exp. Med.* 9 Jul 2012 (doi:10.1084/jem.20120846) | Peaudecerf, L. *et al.* Thymocytes may persist and differentiate without any input from bone marrow progenitors. *J. Exp. Med.* 9 Jul 2012 (doi:10.1084/jem.20120845)