IN BRIEF

MACROPHAGES

Recruiting neutrophils to skin infection

Neutrophils are crucial for clearing bacterial infections but the mechanisms that regulate their migration to the site of infection are not well understood. Weninger and colleagues now show that perivascular macrophages are important for the recruitment of neutrophils to mouse skin infected with *Staphylococcus aureus*. Using multiphoton intravital microscopy they showed that the production of neutrophil chemoattractants by perivascular macrophages is responsible for neutrophil migration. Furthermore, the number of neutrophils was higher in mouse skin infected with *S. aureus* strains lacking the virulence factor α-haemolysin than in mouse skin infected with wild-type *S. aureus*. This phenomenon was due to α-haemolysin-induced destruction of perivascular macrophages, and indicates another immune evasion strategy of *S. aureus*. The study describes a previously unknown role for perivascular macrophages in the recruitment of neutrophils.

ORIGINAL RESEARCH PAPER Abtin, A. *et al.* Perivascular macrophages mediate neutrophil recruitment during bacterial skin infection. *Nature Immunol.* http://dx.doi.org/10.1038/ni.2769 (2013)

T CELL MEMORY

The effect of ageing on CD8$^+$ T cells

Ageing, in both mice and humans, results in the replacement of naive T cells by memory T cells. Chiu *et al.* now show that virtual memory CD8$^+$ T cells, which are unprimed memory-like CD8$^+$ T cells, develop in the absence of antigenic stimulation and constitute the majority of memory CD8$^+$ T cells in aged mice. Using unimmunized aged mice, Renkema *et al.* found that, in addition to the maintenance of naive T cells, T cell receptor (TCR) signals are crucial for the emergence of virtual memory CD8$^+$ T cells. Furthermore, the authors found that both a reduction in the number of naive T cell precursors and an impaired ability of virtual memory T cells to proliferate contributed to reduced T cell responses with ageing. These studies highlight a central role for virtual memory CD8$^+$ T cells and TCR signalling in ageing-related changes in CD8$^+$ T cells.

ORIGINAL RESEARCH PAPERS Chiu, B.-C. *et al.* Central memory CD8 T cells in aged mice are virtual memory cells. *J. Immunol.* **191**, 5793–5796 (2013) | Renkema, K. R. *et al.* Two separate defects affecting true naive or virtual memory T cell precursors combine to reduce naive T cell responses. *J. Immunol.* http://dx.doi.org/10.4049/jimmunol.1301453 (2013)

REGULATORY T CELLS

Make friends with the fungi

Regulatory T (T_{Reg}) cells prevent inappropriate immune responses that can be damaging to host tissues. However, it remains unclear which antigens they respond to, particularly in humans. In this study, Bacher *et al.* assessed human CD4$^+$ T cell responses to two ubiquitous mucosal fungi, *Aspergillus fumigatus* and *Candida albicans*. They found that high frequencies of T_{Reg} cells in adult blood are specific for these fungi; indeed, T_{Reg} cells specific for *A. fumigatus* exceeded in number and functionally suppressed memory T cells specific for *A. fumigatus*. By contrast, human blood contained similar numbers of memory T cells and T_{Reg} cells specific for *C. albicans*. The authors propose that the expansion of fungus-specific T_{Reg} cell populations is important for avoiding pathological immune responses. In support of this, they found that, in patients with severe allergic reactions against *A. fumigatus*, the antigen-specific T cell response to the fungus is dominated by memory T cells as opposed to T_{Reg} cells.

ORIGINAL RESEARCH PAPER Bacher, P. *et al.* Antigen-specific expansion of human regulatory T cells as a major tolerance mechanism against mucosal fungi. *Mucosal Immunol.* http://dx.doi.org/10.1038/mi.2013.107 (2013)