IN BRIEF

MONOCYTES

Pre-emptive regulation

The current paradigm suggests that monocyte fate and function are dictated by local signals at the site of infection. However, new data indicate that monocyte education begins in the bone marrow. Askenase *et al.* noted that as early as 4 days after an acute gastrointestinal infection, LY6C^{hi} monocytes with the potential to mount regulatory responses were detected in the bone marrow and blood. Acquisition of this regulatory phenotype preceded monocyte recruitment to the gut, systemic inflammation and intestinal pathology, and it was shown to depend on interferon-γ (IFNγ). Early production of interleukin-12 by *Batf3*-dependent dendritic cells in the mucosal-associated lymphoid tissue was shown to activate natural killer cells in the bone marrow and induce their production of IFNγ, which primes bone marrow-resident monocytes for regulatory function.

ORIGINAL RESEARCH PAPER Askenase, M. H. *et al.* Bone-marrow-resident NK cells prime monocytes for regulatory function during infection. *Immunity* **42**, 1130–1142 (2015)

NEUROIMMUNOLOGY

Bugs on the brain

A complex gut microbiota is required for proper immune cell development and homeostasis. But what about the homeostasis of microglia — the macrophages resident in the brain? Prinz and colleagues found marked defects in the microglia from germ-free mice compared with specific pathogen free (SPF) mice: they were present in higher numbers, had an immature phenotype and morphology, and showed diminished responses to pathogen-derived products or viral infection. Temporary depletion of the intestinal microbiota of SPF mice by antibiotic treatment also impaired microglia homeostasis, and recolonization with a complex microbiota normalized microglia phenotype and function. Strikingly, exposure of germ-free mice to bacteria-derived short-chain fatty acids largely rescued the defects in microglia number and maturation. Thus, ongoing input from microbial metabolites maintains microglia homeostasis.

ORIGINAL RESEARCH PAPER Erny, D. *et al.* Host microbiota constantly control maturation and function of microglia in the CNS. *Nat. Neurosci.* http://dx.doi.org/10.1038/nn.4030 (2015)

IMMUNOLOGICAL MEMORY

γδ T cells reach out

In this study, Cyster and colleagues investigated whether a population of migratory mouse dermal γδ T cells that produce interleukin-17 (IL-17) and express the T cell receptor Vγ4 can develop immune memory. Following local imiquimod treatment — which induces skin inflammation — the authors found that this population of γδ T cells expands in draining lymph nodes and migrates through the blood to distant skin sites and peripheral lymph nodes, where they can persist for months. After secondary challenge at a distant skin site, memory-like γδ T cells expanded more rapidly and produced more IL-17 than after primary challenge and thereby enabled a faster skin inflammatory response. This memory feature enhances protection against repeated exposure to pathogens, but it might also exaggerate chronic skin diseases such as psoriasis.

ORIGINAL RESEARCH PAPER Ramírez-Vallea, F., Gray, E. E. & Cyster, J. G. Inflammation induces dermal Vγ4^{+} γδT17 memory-like cells that travel to distant skin and accelerate secondary IL-17-driven responses . *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1508990112 (2015)