IN BRIEF

MACROPHAGES

Microglia maintain optimal synapse density

Microglia, which are the resident macrophages of the brain, have an important role in the elimination of synapses during brain maturation, a process known as 'synaptic pruning'. This study proposes that a deficiency in microglia can contribute to defective neurodevelopment and neuropsychiatric disorders. Mice lacking the receptor for the neuron-derived CX_3C-chemokine ligand 1 (also known as fractalkine) exhibited a transient reduction in microglial cell numbers during the early postnatal period. This resulted in an early reduction in synaptic pruning, which persisted into adulthood, and was associated with an increased number of synapses but reduced synaptic transmission, as well as with anti-social behaviour. This suggests that microglia are important for brain homeostasis as they maintain optimal synapse density and have a role in brain wiring and behaviour.

ORIGINAL RESEARCH PAPER Zhan, Y. *et al.* Deficient neuron-microglia signaling results in impaired functional brain connectivity and social behavior. *Nature Neurosci.* http://dx.doi.org/10.1038/nn.3641 (2014)

CYTOKINES

IFNγ as sun protection?

This study shows that the pro-inflammatory cytokine interferon-γ (IFNγ) regulates skin pigmentation by inhibiting the maturation of melanosomes, which are the organelles that control melanin synthesis and storage. Using an oscillatory model of skin pigmentation and depigmentation, the authors identified a role for IFNγ in hypopigmentation. Transmission electron microscopy of cultured primary human melanocytes indicated that IFNγ signalling decreases the trafficking of proteins to early melanosomes. When the skin of mice lacking IFNγ was exposed to ultraviolet light, they developed a hyperpigmentation phenotype. Interestingly, the hypopigmented lesions in skin samples from patients with leprosy had a strong IFNγ signature, compared with matched unaffected skin. Together, these results suggest that IFNγ is important in maintaining skin pigmentation homeostasis.

ORIGINAL RESEARCH PAPER Natarajan, V. T. *et al.* IFN-γ signaling maintains skin pigmentation homeostasis through regulation of melanosome maturation. *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1304988111 (2014)

NEONATAL IMMUNITY

Long-term benefits of keeping mum

Breast milk contains maternal secretory IgA (sIgA) antibodies that provide immune protection and other health benefits to suckling infants. However, it has been unclear whether the beneficial effects of maternal sIgA persist after weaning. Rogier *et al.* developed a system to assess the benefits of maternally derived sIgA in mice. They found that maternal sIgA was needed to prevent the translocation of aerobic bacteria from the neonatal gut to the mesenteric lymph nodes. In addition, mice that received maternal sIgA had an altered intestinal microbiota compared with mice that did not receive maternal sIgA; these differences were seen at the time of weaning and persisted into adulthood. Adult mice that had received maternal sIgA as neonates also showed altered epithelial gene expression and barrier function in the intestine compared with mice that did not receive maternal sIgA, and they were less susceptible to epithelial disruption caused by dextran sulphate sodium. Therefore, sIgA antibodies in breast milk not only provide early protection to the neonate, but also seem to be important for the maintenance of intestinal homeostasis into adulthood.

ORIGINAL RESEARCH PAPER Rogier, E. W. *et al.* Secretory antibodies in breast milk promote long-term intestinal homeostasis by regulating the gut microbiota and host gene expression. *Proc. Natl Acad. Sci. USA* http://dx.doi.org/10.1073/pnas.1315792111 (2014)