■ INNATE IMMUNITY

Immune cells muscle up

The innate immune system is activated after injury and helps repair damaged tissue. By studying mice with skeletal muscle injury, Ajay Chawla and his colleagues now provide a road map for how innate immune cells contribute to muscle repair (*Cell*, **153**, 376–388). Eosinophils, which turn out to be the crucial immune cell type in this process, produce the cytokine interleukin-4 (IL-4), which acts not directly on muscle cells but rather on fibro/adipocyte progenitor cells (FAPs) present in the regenerating muscle fibers.

IL-4–activated FAPs repair muscle in a number of ways. IL-4 stimulates FAP proliferation and the production of factors that enhance the differentiation of muscle progenitor cells. IL-4 also inhibits FAP differentiation into adipocytes and decreases fatty degeneration of injured muscle. Lastly, the researchers found that FAPs can efficiently phagocytose necrotic cells and that IL-4 signaling in FAPs is needed for the clearance of necrotic debris in injured muscle, despite the large numbers of macrophages present. —*MB*

■ CYTOKINES

Dual functions for interferons

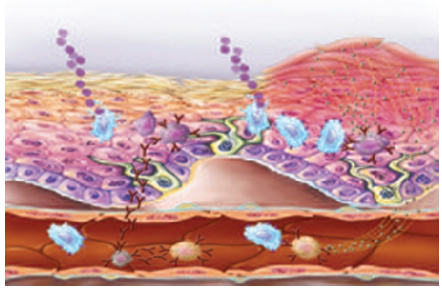
Type 1 interferons (IFN-α and IFN-β) are key players in the host response to viral infection. Yet induction of type 1 IFN signaling is no guarantee that the virus will be eliminated, as seen in the case of chronic viral infections. Two reports now reveal that IFN-α and IFN-β also suppress the immune system, thereby limiting the efficacy of the effector responses they promote (*Science* **340**, 202–207 and *Science* **340**, 207–211).

Elizabeth Wilson *et al.* and John Teijaro *et al.* blocked type 1 IFN signaling in a mouse model of chronic lymphocytic choriomeningitis virus infection and uncovered some surprising results. They treated mice before infection with an IFN-α and IFN-β receptor–blocking antibody and found that although viral replication initially increased and the amounts of some proinflammatory cytokines decreased, the virus was eventually cleared, which the researchers attributed to enhanced virus-specific $CD4^+$ T cell responses. The authors found that blocking of type 1 IFN signaling during chronic infection was associated with a normalized splenic architecture and reduced expression of immunosuppressive molecules such as interleukin-10 and programmed cell death 1 ligand 1 on dendritic cells, which may also have contributed to viral clearance. Unlike in the setting of an acute viral infection, in which IFN-α and IFN-β were needed to eliminate the virus, type 1 IFN signaling during chronic infection contributed to viral persistence Although the precise mechanisms underlying the distinct interaction of IFN-α and IFN-β signaling with acutely versus chronically infecting viruses remain to be elucidated, these findings suggest that blocking, rather than harnessing, this pathway may prove beneficial for treating chronic viral infections. —*AF*

■ ALLERGY

Basophils meet monocytes

Circulating monocytes are recruited to sites of inflammation, where they can acquire distinct phenotypes depending on the cytokines present within the lesion. A recent study shows that in allergic skin lesions, inflammatory monocytes interact with basophils and adopt an M2-like phenotype, which is associated with anti-inflammatory functions (*Immunity* **38**, 570–580, 2013).



Michel Gilles / Science Source

Hajime Karasuyama and his colleagues report that in a mouse model of allergic skin inflammation, inflammatory monocytes expressing chemokine receptor 2 (CCR2) infiltrate the skin. When compared to wild-type mice, allergic inflammation is worsened and monocyte recruitment is impaired in mice deficient in CCR2, suggesting that these cells are anti-inflammatory. Once recruited to the skin, CCR2-expressing monocytes adopt an M2-like phenotype. In particular, interleukin-4 (IL-4) secreted from basophils promotes this differentiation, as IL-4R–deficient monocytes failed to upregulate M2 markers and did not suppress allergic inflammation. Although the mechanism whereby M2-type macrophages suppress allergic inflammation remains unclear, this study highlights a previously uncharacterized means whereby monocytes can differentiate into an M2-like phenotype in tissues. —*KDS*

Written by Michael Basson, Benjamin Boettner, Kevin Da Silva, Alison Farrell, Juan Carlos López, Carolina Pola and Meera Swami

New from NPG

Co-evolution of a broadly neutralizing HIV-1 antibody and founder virus
Liao, H.-X. *et al. Nature* http://dx.doi.org/10.1038/nature12053 (3 April).
The authors track the coevolution of a broadly neutralizing antibody and the HIV-1 virus in one patient over the course of infection. This study provides new information about how broadly neutralizing antibodies to HIV-1 evolve, which might be useful for understanding how to elicit similar antibodies through vaccination strategies.

Transcription factor–mediated reprogramming of fibroblasts to expandable, myelinogenic oligodendrocyte progenitor cells
Najm, F.J. *et al. Nat. Biotechnol.* http://dx.doi.org/10.1038/nbt.2561 (14 April).

Generation of oligodendroglial cells by direct lineage conversion
Yang, N. *et al. Nat. Biotechnol.* http://dx.doi.org/10.1038/nbt.2564 (14 April).
Mouse and rat fibroblasts are directly converted to oligodendrocyte progenitor cells (OPCs) through transcription factor–mediated reprogramming. These progenitors can generate mature myelinating oligodendrocytes in both *in vitro* and *in vivo* settings. Direct lineage conversion may therefore be a potential alternative to reprogramming embryonic stem cells for the production of OPCs.

Whole-genome sequencing identifies genetic alterations in pediatric low-grade gliomas
Zhang, J. *et al. Nat. Genet.* http://dx.doi.org/10.1038/ng.2611 (14 April).
The authors use whole-genome sequencing to identify a number of new genetic alterations in 39 low-grade pediatric gliomas and glioneuronal tumors. Of these changes, there were recurrent duplications of *FGFR1* and rearrangements of *MYB*, which were mutually exclusive in tumors.

A combinatorial F box protein directed pathway controls TRAF adaptor stability to regulate inflammation
Chen, B.B. *et al. Nat. Immunol.* http://dx.doi.org/10.1038/ni.2565 (31 March).
The authors show that interactions between two F box proteins, Fbxl2 and Fbxo3, regulate proinflammatory signaling by degrading TRAF adaptor proteins. They identify a positive correlation between the amounts of Fbxo3 and TRAF in the circulation and cytokine responses in people with sepsis.