IN BRIEF

INFLAMMATION

The histone H3 lysine-27 demethylase Jmjd3 links inflammation to inhibition of polycomb-mediated gene silencing.

De Santa, F. *et al. Cell* **130**, 1083–1094 (2007)

The ability of differentiated cells to change their gene-expression programmes in response to environmental cues and to transdifferentiate is restricted by epigenetic chromatin marks, such as DNA methylation and histone modifications. Gene regulation by polycomb group (PcG) proteins, which are epigenetic gene silencers, is dependent on histone H3 lysine 27 (H3K27) trimethylation. Macrophages that migrate into sites of inflammation can transdifferentiate, but whether PcG-dependent silencing is altered by inflammation is unknown. Here, the authors show that JMJD3, an active hydroxylase, is rapidly and strongly induced in macrophages in response to bacterial products and inflammatory cytokines. JMJD3 binds PcG target genes and regulates their levels of H3K27 trimethylation and transcriptional activity. So, inflammation and epigenetic reprogramming have been linked by an inducible hydroxylase that erases a histone mark that controls differentiation and cell identity.

MUCOSAL IMMUNOLOGY

Ulcerative colitis and autoimmunity induced by loss of myeloid αv integrins.

Lacy-Hulbert, A. *et al. Proc. Natl Acad. Sci. USA* **104**, 15823–15828 (2007)

Maintaining the regulatory networks that are responsible for retaining immunological quiescence in the gut is of crucial importance in preventing inflammatory bowel disease, but it is unclear how these networks are established. In this article, Lacy-Hulbert *et al.* established a new model of inflammatory bowel disease, and showed that mice deficient in α_v-integrins develop spontaneous colitis, wasting, autoimmunity and cancer. In the absence of α_v-integrins, gut-associated macrophages and dendritic cells failed to remove apoptotic cells efficiently and induce regulatory T cells. Myeloid cells, including macrophages, dendritic cells and/or neutrophils, were shown to be the key α_v-integrin-expressing cells. Therefore, the α_v-integrins have important roles in regulating immune responses in the intestine.

IMMUNE REGULATION

Malaria impairs T cell clustering and immune priming despite normal signal 1 from dendritic cells.

Millington, O. R. *et al. PLoS Pathog.* **3**, e143 (2007)

The functional outcome of an immune response can be affected by the quality of the interaction between T cells and dendritic cells (DCs). During infection with malarial parasites, DCs are modified such that their function is compromised and immune responses against the parasites and heterologous antigens are reduced. So is this reduced immunity the result of the modulation of T-cell–DC interactions by the parasite? Millington *et al.* visualized these interactions in the context of malarial infection and showed that, *in vitro* and *in vivo*, T-cell–DC interactions are inhibited despite the antigen-specific signal (signal 1) remaining intact. DC co-stimulatory activity and functional T-cell responses were suppressed, which might explain how parasites suppress immunity. This study also highlights the importance of the early interactions between cells in the immune response.