IN BRIEF

INFLAMMATION

A pro-inflammatory role for succinate

Following the activation of several types of immune cells, cellular metabolism switches from oxidative phosphorylation to glycolysis. Now, Tannahill *et al.* report that in macrophages, stimulation of Toll-like receptor 4 by lipopolysaccharide (LPS) promotes such a metabolic switch and leads to the accumulation of succinate downstream of glutamine metabolism and the GABA (γ-aminobutyric acid) shunt. Succinate stabilized hypoxia-inducible factor 1α, which, in turn, promoted transcription of interleukin-1β (IL-1β). Notably, knockdown of a glutamine transporter or inhibition of the GABA shunt decreased the levels of LPS-induced IL-1β *in vitro*. Moreover, the GABA shunt inhibitor vigabatrin was protective in a mouse model of sepsis. Thus, metabolic signals such as succinate can promote inflammation.

ORIGINAL RESEARCH PAPER Tannahill, G. M. *et al.* Succinate is an inflammatory signal that induces IL-1β through HIF-1α. *Nature* **496**, 238–242 (2013)

IMMUNOMETABOLISM

A role for T-bet in metabolic regulation

Obesity is often associated with low-grade inflammation and insulin resistance, which can lead to the development of type 2 diabetes. Now, Stolarczyk *et al.* report that mice lacking expression of the immune cell-specific transcriptional regulator T-bet are prone to obesity, but are also more sensitive to insulin than wild-type mice. Increased insulin sensitivity appeared early in life and depended on the adaptive immune system. Notably, the numbers of $CD4^+$ and $CD8^+$ T cells and the levels of several cytokines were decreased, whereas the frequency of $FOXP3^+$ regulatory T cells was increased in the visceral (but not subcutaneous) adipose tissue depots of T-bet-deficient mice. Future studies will clarify the mechanisms through which T-bet expression in adaptive immune cells decouples obesity from insulin resistance.

ORIGINAL RESEARCH PAPER Stolarczyk, E. *et al.* Improved insulin sensitivity despite increased visceral adiposity in mice deficient for the immune cell transcription factor T-bet. *Cell Metab.* **17**, 520–533 (2013)

INFLAMMATION

BLIMP1 cools keratinocytes

B lymphocyte-induced maturation protein 1 (BLIMP1) is a transcriptional repressor that controls the differentiation and function of many immune cell populations. This study describes an anti-inflammatory role for BLIMP1 in the adult epidermis. Mice specifically lacking BLIMP1 in keratinocytes spontaneously developed skin inflammation, which was characterized by alopecia, ulceration and inflammatory cell infiltrates. Keratinocytes lacking BLIMP1 showed increased expression of pro-inflammatory cytokines and chemokines, including interleukin-1α, CXC-chemokine ligand 1 and granulocyte colony-stimulating factor (G-CSF). Further analyses suggested that BLIMP1 does not directly repress these pro-inflammatory factors, but instead regulates their expression indirectly by repressing the AP-1 family members *Fos* and *Fosl1*. Notably, the authors found that BLIMP1 is expressed in healthy human skin, but its expression is reduced in the skin of patients with eczema.

ORIGINAL RESEARCH PAPER Chiang, M.-F. *et al.* Inducible deletion of the Blimp-1 gene in adult epidermis causes granulocyte-dominated chronic skin inflammation in mice. *Proc. Natl Acad. Sci. USA* 1 Apr 2013 (doi:10.1073/pnas.1219462110)