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IN BRIEF

REGULATORY T CELLS

The role of PTPN22 in T cell homeostasis

Mutations of the gene encoding the cytoplasmic phosphatase PTPN22 confer an increased risk of autoimmunity in humans and mice, and this is associated with increased numbers of B and T cells. However *Ptpn22*$^{-/-}$ mice do not spontaneously develop autoimmunity. This study shows that such mice have an increased number of regulatory T (T_{Reg}) cells with increased immunosuppressive activity, which can prevent autoimmunity caused by *Ptpn22*$^{-/-}$ effector T cells in a mouse colitis model. *Ptpn22*$^{-/-}$ T_{Reg} cells secreted higher levels of interleukin-10 (IL-10) than wild-type T_{Reg} cells and had increased integrin-mediated adhesion downstream of T cell receptor signalling, both of which are crucial for T_{Reg} cell function. Therefore, PTPN22 regulates both effector and regulatory T cell populations to maintain homeostasis.

ORIGINAL RESEARCH PAPER Brownlie, R. J. *et al.* Lack of the phosphatase PTPN22 increases adhesion of murine regulatory T cells to improve their immunosuppressive function. *Sci. Signal.* **5**, ra87 (2012)

T CELL RESPONSES

A colitis-associated glycome on CD4$^+$ T cells

The repertoire of glycan structures on a cell surface (known as the glycome) is determined by glycan-modifying enzymes. Here, the authors show that memory CD4$^+$ T cells in the inflamed intestines of mice with colitis have a unique colitis-associated glycome, characterized by the binding of galectin 4, that is associated with downregulation of the enzyme C2GNT (core 2 GlcNAc transferase). CD4$^+$ T cells from the inflamed colon of patients with ulcerative colitis also had increased galectin 4 binding and decreased C2GNT expression. CD4$^+$ T cells with restored expression of C2GNT were less able to induce colitis, consistent with their lack of the colitis-associated glycome. The colitis-associated glycome was shown to increase the proliferation of memory CD4$^+$ T cells through galectin 4-mediated stabilization of lipid rafts, which resulted in sustained PKCθ activation downstream of immune synapses.

ORIGINAL RESEARCH PAPER Nishida, A. *et al.* Inducible colitis-associated glycome capable of stimulating the proliferation of memory CD4$^+$ T cells. *J. Exp. Med.* 3 Dec 2012 (doi:10.1084/jem.20112631)

IMMUNOMETABOLISM

Adipose tissue inflammation

Two recent studies add to our understanding of inflammatory signalling in adipose tissue and thus of the link between obesity and chronic inflammation. Toubal *et al.* showed that the expression of GPS2 and SMRT (also known as NCOR2) — which are transcriptional corepressor complex subunits — is decreased in obese adipose tissue, which results in increased transcription of inflammatory genes such as interleukin-6 (*IL6*). Weight loss resulting from gastric bypass surgery was associated with increased expression of GPS2 and SMRT, and decreased expression of IL-6. Kim *et al.* showed that the G protein-coupled receptor GPRC5B — which has been associated with body mass index in humans — is a lipid raft-associated protein that promotes the kinase activity of FYN. FYN positively regulates IKKε–NF-κB signalling, which leads to pro-inflammatory cytokine production by adipocytes. *Gprc5b*$^{-/-}$ mice were resistant to diet-induced obesity and insulin resistance as a result of decreased inflammatory signalling in adipose tissue.

ORIGINAL RESEARCH PAPERS Toubal, A. *et al.* SMRT-GPS2 corepressor pathway dysregulation coincides with obesity-linked adipocyte inflammation. *J. Clin. Invest.* 10 Dec 2012 (doi:10.1172/JCI64052) | Kim, Y.-J. *et al.* GPRC5B activates obesity-associated inflammatory signaling in adipocytes. *Sci. Signal.* **5**, ra85 (2012)