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IMMUNOLOGY

ILC2s regulate obesity and drive beiging of white adipose tissue

A new function of group 2 innate lymphoid cells (ILC2s) in limiting obesity via the beiging of white adipose tissue (WAT) has been published in *Nature*.

A growing body of evidence from studies in animal models support a role for immune cells in regulating metabolic homeostasis; however, a similar role has not been demonstrated in humans. Now, researchers at Cornell University, USA, have shown that ILC2s are present in WAT in both humans and mice. Furthermore, the number of these cells is reduced in abdominal fat of individuals with obesity compared with that of non-obese individuals, and is lower in epididymal WAT of mice fed a high-fat diet than mice fed a control diet.

Studies in genetically modified mice revealed that lack of IL-33 resulted in reduced numbers and function of ILC2s in epididymal and inguinal WAT, with a concomitant increase in adiposity and deregulated glucose homeostasis. By contrast, treatment of mice fed a control diet with recombinant IL-33 led to increases in lean mass, energy expenditure and the number of WAT-associated ILC2s.

IL-33 was also found to drive adipocyte beiging via elevated *Ucp1* expression in WAT in an ILC2-dependent manner. Gene expression analysis and *in vitro* experiments with isolated ILC2s revealed that stimulation with IL-33 led to increased production of methionine-enkephalin peptides, which, when delivered to wild-type mice, promoted differentiation of $UCP1^+$ beige adipocytes and decreased WAT mass. Together these findings demonstrate a novel function for the IL-33–ILC2 axis in regulating energy homeostasis through the production of enkephalin peptides and the beiging of WAT.

Jennifer Sargent

Original article Brestoff, J. R. *et al.* Group 2 innate lymphoid cells promote beiging of adipose and limit obesity. *Nature* doi:1038/nature14115