Immune cells may help fight against obesity

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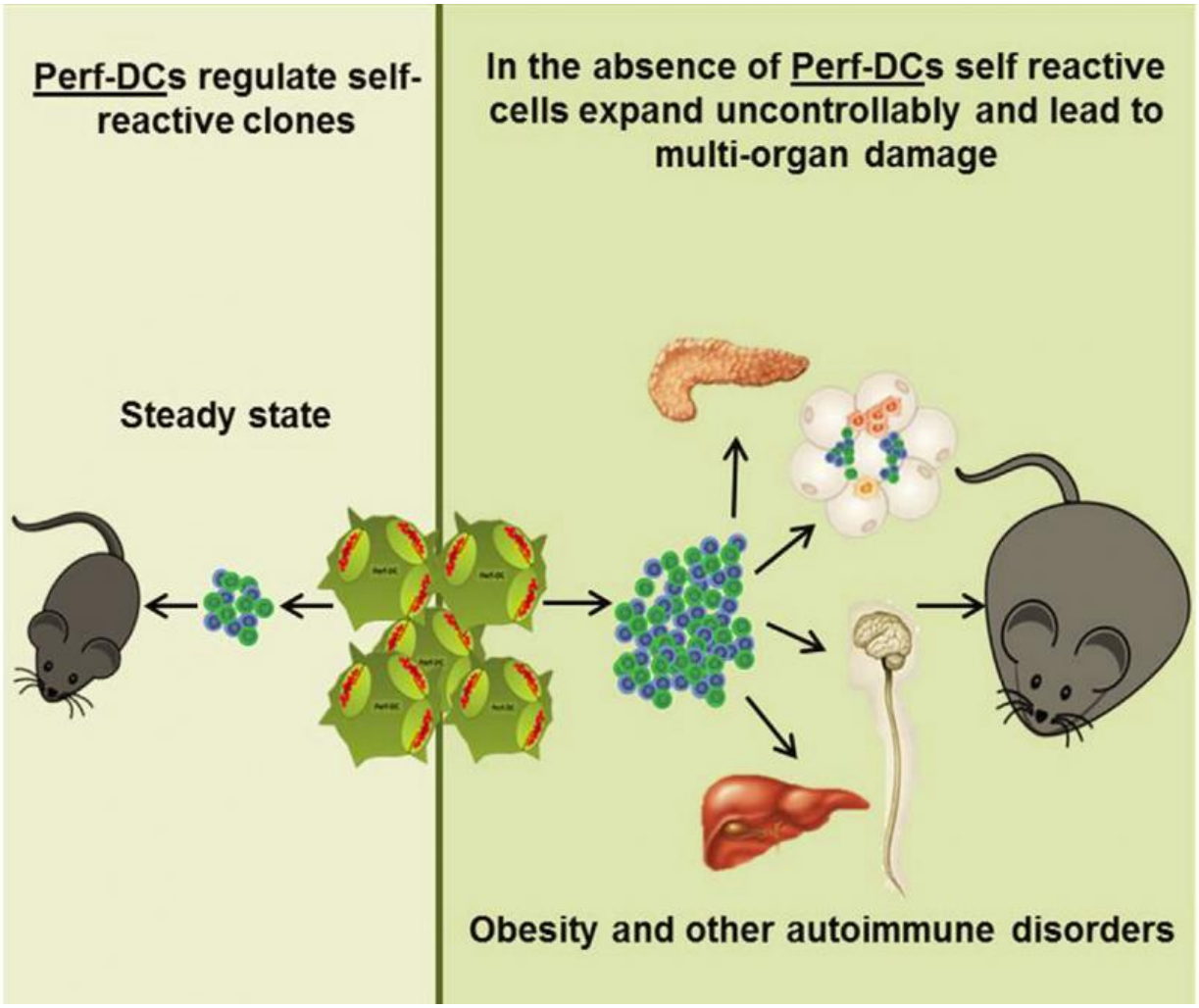

Perforin-positive dendritic cells (perf-DCs) represent a minor subpopulation ofmyeloid DCs. Based on selective ablationof perf-DCs in radiation chimera, Reisnerand colleagues demonstrate that thesecells control inflammatory T cells insteady state and play a regulatory role inmetabolic syndrome and in experimentalautoimmune encephalomyelitis. Credit: Reisner et al./*Immunity* 2015

While a healthy lifestyle and "good genes" are known to help prevent obesity, new research published on September 15 in *Immunity* indicates that certain aspects of the immune system may also play an important role. In the new study, scientists observed that mice lacking a particular type of immune cell gained excess weight and developed metabolic abnormalities even when they consumed a standard diet.

The relationship between metabolism and the immune system has received increasing attention over the past few years. Previous studies have found that certain immune cells help to control fat tissue's release or storage of energy. Moreover, fat cells produce various inflammatory molecules that can disrupt the balance established by a normal immune system. Because of this, some experts consider obesity to be an autoimmune, inflammatory disorder.

In studying the immunological mechanisms that underlie metabolic control of fat tissue, Yair Reisner, of the Weizmann Institute of Science in Israel, and his colleagues discovered that mice that lacked certain dendritic immune cells that release a toxic molecule called perforin progressively gained weight and exhibited features of the metabolic syndrome.

The animals also had an altered collection of T immune cells residing in their fat tissue. Depleting these T cells prevented the mice that lacked the perforin-expressing dendritic cells from gaining weight or developing metabolic abnormalities. "Notably, mice lacking these regulatory dendritic cells were also found to be more prone to develop another form of autoimmunity with symptoms similar to those found in multiple sclerosis," Reisner adds.

These combined observations suggest that one function of these perforin-

expressing dendritic cells is to remove potentially autoimmune T cells, and in so doing, decrease inflammation. While the connection between fat cells and inflammation has already been shown in mice fed a high-fat diet, this is the first time that researchers have demonstrated the connection in animals on a regular diet, simply by eliminating perforin-expressing dendritic cells.

The findings indicate that perforin-expressing dendritic cells are critical for protecting against metabolic syndrome and autoimmunity, and shifting the abundance of these cells in relation to other immune cell populations may help prevent or treat such conditions.

"It is hard to predict how this might impact patient care, but we should initially try to find if the absence of this rare subpopulation of cells is associated with obesity, metabolic syndrome, or any autoimmune or other immune abnormalities," Reisner says.

More information: *Immunity*, Zlotnikov-Klionsky and Nathansohn-Levi et al.: "Perforin-Positive Dendritic Cells Exhibit an Immuno-regulatory Role in Metabolic Syndrome and Autoimmunity" dx.doi.org/10.1016/j.immuni.2015.08.015

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