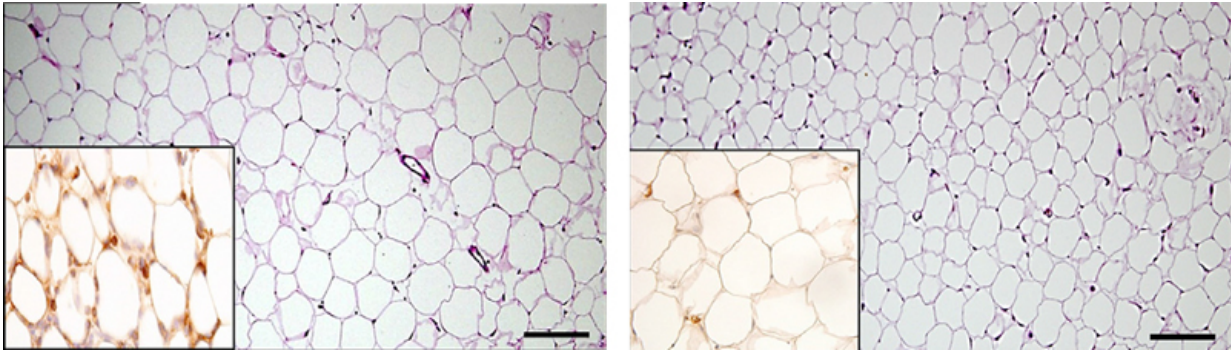


Immune cells that fight obesity

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Fat tissue cells are enlarged and more loosely packed in mice lacking perforin-rich dendritic cells (left) compared with the fat tissue of regular mice (right). Inset: crown-like structures within the fat tissue (left, dark brown) are associated with increased inflammation. Credit: Weizmann Institute of Science

We tend to think of the immune system as guarding us against bacteria, viruses and assorted foreign invaders, but this system has some other surprising roles. Weizmann Institute researchers have now identified a small subtype of immune cells that appears to prevent metabolic syndrome: obesity, high blood pressure, and high levels of blood sugar and cholesterol.

Past studies have shown that the immune system plays a role in obesity, but those studies were performed on mice deliberately fed a high-fat diet. The new Weizmann study, published recently in *Immunity*, was performed on mice fed a regular diet. It showed that immunological

mechanisms can play a role in obesity and the other components of metabolic syndrome without any connection to dietary fat.

The study originally focused on dendritic [cells](#), cells that serve as the immune system's sentinels, alerting other immune mechanisms to various dangers. The emphasis was on a rare subtype of dendritic cells possessing a killing protein called perforin that enables them to eliminate other cells on demand. To reveal the function of these cells in the body, researchers headed by Prof. Yair Reisner of the Immunology Department created mice that lacked perforin-rich dendritic cells. To their surprise, the scientists discovered that these mice became overweight and then developed symptoms of metabolic syndrome.

Investigating these mice further, the researchers found that their fat tissue had abnormally high levels of inflammation-causing immune T cells. When these cells were removed from the fat tissue of the mice lacking perforin-rich dendritic cells, the mice did not grow obese. These findings suggest that perforin-rich dendritic cells regulate the levels of certain T cells, and by keeping these T cells in check, they apparently prevent metabolic syndrome.

In addition to providing new insights into [metabolic syndrome](#), the study may also shed new light on autoimmunity: the [mice](#) lacking perforin-rich dendritic cells were more prone than usual to develop an autoimmune disease equivalent to multiple sclerosis in humans. It now remains to be investigated whether patients with autoimmune disease lack these [regulatory cells](#).

More information: *Immunity*, [www.cell.com/immunity/abstract ... 1074-7613\(15\)00347-7](http://www.cell.com/immunity/abstract/S0950-2688(15)00347-7)

Provided by Weizmann Institute of Science

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