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Study reveals therapeutic targets to alter inflammation, type 2 diabetes

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New research from Boston University School of Medicine (BUSM) reveals that B cells regulate obesity-associated inflammation and type 2 diabetes through two specific mechanisms. The study, published in the *Proceedings of the National Academies of Sciences*, indicates the importance of continuing to explore B cells as a therapeutic target to treat these diseases. Barbara Nikolajczyk, PhD, associate professor of microbiology at BUSM, is the study's senior author.

The incidence of diabetes continues to rise at alarming rates. According to the National Institute of Diabetes and Digestive and Kidney Diseases, the disease now affects approximately 25.8 million Americans. In 2007, the National Institutes of Health estimated that the direct and indirect costs of diabetes were a staggering $174 billion.

Type 2 diabetes, which is a common result of obesity, occurs when the body produces insulin but cannot use it properly (insulin resistance) or the body does not produce enough insulin. The body needs insulin to absorb glucose and generate energy. If the body does not produce and respond to insulin appropriately, it can, over time, lead to various complications such as cardiovascular disease, nerve damage, kidney disease and blindness.

Previous research has shown that B cells, which are white blood cells of the immune system, promote inflammation and can lead to the development of type 2 diabetes, but the mechanisms underlying B cell function were unclear.

The results of this study shed light on that question and indicate that B cells secrete a pro-inflammatory ratio of proteins called cytokines, which directly promote the insulin resistance that characterizes type 2 diabetes. The researchers also demonstrated that B cells directly regulate inflammatory T cells, an immune cell type known to cause insulin resistance in animal models of disease.

"Now that we have identified the specific mechanisms by which B cells promote inflammation, we can help develop novel, targeted approaches to treat type 2 diabetes," said Nikolajczyk. "Our study supports the continued exploration of FDA-approved B cell depletion drugs, which are known to be generally safe and effective, as novel agents to prevent obesity-associated inflammation and type 2 diabetes."

Provided by Boston University Medical Center