Immune cells from the spleen found to control chronic high blood pressure

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High blood pressure is a leading cause of death around the world, and its prevalence continues to rise. A study published by Cell Press on November 20th in the journal *Immunity* shows that a protein in the spleen called placental growth factor (PlGF) plays a critical role in activating a harmful immune response that leads to the onset of high blood pressure in mice. The findings pave the way for the development of more effective treatments for this common and deadly condition.

High blood pressure, also known as hypertension, affects more than 1 billion people worldwide and is a major risk factor for stroke, heart failure, and kidney diseases. Mounting evidence suggests that immune cells such as T cells contribute to the development of hypertension, but the underlying mechanisms have not been clear. Senior study author Giuseppe Lembo of IRCCS Neuromed and his team suspected that PlGF could be the missing link because it plays important roles in both the cardiovascular system and the immune system.

The researchers found support for this idea in the new study. Mice that were genetically engineered to lack PlGF did not develop hypertension after they were infused with angiotensin II—a hormone that normally increases blood pressure. These mice were also protected from hypertension-related heart and kidney damage, unlike genetically normal mice. Moreover, PlGF deficiency prevented T cells from leaving the spleen, entering the blood stream, and infiltrating the vessels and kidneys where hypertension was manifested. Additional experiments revealed that the nervous system controls levels of PlGF in the spleen, and PlGF in the spleen in turn is essential for the activation of T cells and the onset of hypertension.

"In recent years, anti-PlGF monoclonal antibodies have been developed as a strategy to slow tumor growth and for age-related macular degeneration," says lead study author Daniela Carnevale. "The ongoing clinical trials testing humanized monoclonal antibodies directed to PlGF opens up the possibility of targeting it in hypertension too."

"There is a pressing need for new treatments to control and better target resistant hypertension," says Lembo. "PlGF is an appealing molecular therapeutic target because clinical tools to target this pathway already exist."

More information: *Immunity*, Carnevale et al.: "The angiogenic factor PlGF mediates a neuroimmune interaction in the spleen to allow the onset of hypertension"

Provided by Cell Press