Discovery could help to develop new drugs to treat organ transplant and cancer patients

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(Medical Xpress) -- Loyola researchers are reporting surprising findings about a molecule that helps ramp up the immune system in some cases and suppress it in others.

The finding eventually could lead to new drugs to regulate the immune system by, for example, revving it up to attack tumor cells or tamping it down to prevent the rejection of transplanted organs.

The study is published online ahead of print in the *Journal of Immunology*. Senior author is Makio Iwashima, PhD, an associate professor in the Department of Microbiology & Immunology of Loyola University Chicago Stritch School of Medicine. Co-authors are Robert Love, MD, a professor in the Departments of Thoracic & Cardiovascular Surgery and Microbiology & Immunology and one of the world's leading lung transplant surgeons, and first author Mariko Takami, PhD, of the Department of Microbiology & Immunology.

The immune system relies on a balancing act between two types of cells. Effector cells attack tumor cells and cells infected by viruses or bacteria. Regulatory cells suppress the immune system so that it does not attack healthy tissue. If effector cells are too active, an individual can suffer autoimmune disorders such as lupus, Type 1 diabetes and multiple sclerosis. But if regulatory cells are too active, the immune system will not be aggressive enough to protect the individual from germs and cancer.

The study involved an immune system molecule called transforming growth factor beta (TGF-ÿ). TGF-ÿ is known to be a powerful regulator of the immune response -- generally suppressing the strength of the response. In this study, however, Loyola researchers demonstrated that TGF-ÿ can amplify the immune response and result in a more effective targeted response under specific conditions.

"TGF-ÿ is a double-edged sword," Iwashima said. "It augments immune system reactions but does not determine what direction they will take. Depending on conditions, these reactions can either activate or suppress the immune system."

The study involved mouse cells grown ex vivo in laboratory dishes. The next steps will be to study TGF-ÿ in human cells and in animal models. Understanding the dual role of TGF-ÿ could help in the development of drugs to either activate or suppress the immune system, as needed, Iwashima said.

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Provided by Loyola University Health System