Newly discovered protein may protect kidney cells from injury

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A new discovery by Boston University School of Medicine (BUSM) researchers may change how kidney disease is treated in the future.

The previously unknown protein transmembrane and immunoglobulin containing 1 (TMIGD1) involved in protecting kidney epithelial cells (cells critical to normal kidney function) from injury, could be a novel target for restoring kidney function from various forms of kidney disease. The findings are published online in the *American Journal of Pathology*.

Kidneys have several roles, of which filtering blood of waste products to generate urine is the primary function. Kidneys can fail over days, known as acute kidney injury (AKI), or can develop over years, known as chronic kidney disease (CKD), an irreversible form of kidney failure. Both forms of kidney failure are common and represent a tremendous health care burden. Kidney failure among inpatients not only lengthens hospital stays but also indicates overall poor prognosis. Nearly 20 million people, or 10 percent, of the U.S. population suffers from CKD primarily from diabetes and hypertension, consuming approximately $32.8 billion of Medicare budget.

Researchers reduced expression of TMIGD1 in kidney epithelial cells and demonstrated that they become susceptible to cell injury, whereas increasing TMIGD1 expression protected these cells from injury. "This study demonstrates that by altering the function of TMIGD1, it is possible to reduce kidney epithelial cell death and possibly avoid the

high incidence of kidney failure and morbidity associated with kidney injury," explained corresponding author Nader Rahimi, PhD, associate professor of pathology and laboratory medicine at BUSM.

TMIGD1 belongs to a new class of proteins involved in cell-cell recognition. The first member of TMIGD1 called IGPR-1, was identified by the same group of researchers in early 2012. IGPR-1 is involved in tumor angiogenesis, or the development of new blood vessels.

"While dialysis and transplantation are considered the cornerstone of therapy for both forms of renal failure, none of these strategies directly targets the kidney proximal epithelial cells. Therapeutic agents that could protect these cells from death can prevent and retard renal damage, thus postponing dialysis or need for transplantation," added study co-author Vipul Chitalia, MD, PhD, assistant professor of medicine at BUSM and a nephrologist at Boston Medical Center.

Provided by Boston University Medical Center