

Research aims to prevent diabetic kidney failure

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The enzyme arginase-2 plays a major role in kidney failure, and blocking the action of this enzyme might lead to protection against renal disease in diabetes, according to researchers.

"We believe these arginase inhibitors may be one of the new targets that can slow down the progression of, or even prevent the development of, end-stage renal disease," said Alaa S. Awad, assistant professor of [nephrology](#), Penn State College of Medicine.

In the United States diabetes is the leading cause of end-stage renal disease -- kidney failure -- causing nearly 45 percent of all cases. Currently the treatment for [diabetic patients](#) likely to develop end-stage [renal disease](#) includes blood pressure and [glucose control](#) therapy and life-style changes.

The researchers tested two different sets of [diabetic mice](#) to try to prevent kidney failure. They gave one set of mice -- genetically diabetic -- a potent arginase inhibitor; the other set of mice -- induced to be diabetic -- were genetically unable to produce arginase-2. Both sets of mice showed no signs of kidney failure during the test period.

The body naturally produces varieties of arginase. The liver produces arginase-1, while the kidneys produce arginase-2, which leads to kidney failure. The researchers did not detect arginase-1 in the kidneys of the mice, and they have not yet developed an arginase inhibitor that can differentiate between the two forms of the enzyme.

"These findings indicate that arginase-2 plays a major role in induction of diabetic renal injury and that blocking arginase-2 activity or expression could be a novel [therapeutic approach](#) for treatment of diabetic nephropathy," the researchers report in the current issue of *Diabetes*.

One of the symptoms of diabetic nephropathy is albuminuria -- losing protein in the urine. The researchers found that the mice protected from arginase-2 were also protected from albuminuria.

People with diabetes and diabetic nephropathy often experience low levels of nitric oxide -- an important compound in cardiovascular function -- because arginase steals the common precursor, L-arginine, that the nitric oxide needs. This causes cardiovascular problems. Arginases have been implicated in heart disease, but had not been connected to [diabetic nephropathy](#) before this research.

Provided by Pennsylvania State University

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