# Mutation in renin gene linked to inherited kidney disease

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A mutation in a gene that helps regulate high blood pressure is a cause of inherited kidney disease, according to a new study by researchers at Wake Forest University School of Medicine, Charles University in Prague and colleagues.

The discovery provides insight into a protein, renin, that is important in blood pressure regulation, and reveals the cause of one type of inherited kidney disease occurring in adults and children, said co-investigator Anthony Bleyer, M.D., professor of internal medicine-nephrology at the School of Medicine.

The study is now available online and in the Aug. 14 issue of *American Journal of Human Genetics*. While more than 25,000 articles have been written about renin, this is the first article to identify a mutation in the renin gene as a cause of kidney disease.

Renin is a key component of blood pressure regulation. When blood pressure drops, kidney cells detect the change and release renin into the blood stream, where it converts inactive forms of the hormone angiotensin into angiotensin I. With the help of a molecule in the lungs called angiotensin-converting enzyme (ACE), angiotensin I is then converted to a much more powerful hormone, called angiotensin II, which acts directly on blood vessels to cause blood pressure increases.

Because of the significant role renin plays, an entire class of medications used to treat high blood pressure, called ACE inhibitors, are dedicated to

preventing blood pressure from rising by blocking the renin from activating angiotensin.

A genetic mutation in the gene that encodes renin was first identified as the cause of an hereditary kidney disease by a research group led by Stanislav Kmoch, Ph.D., at Charles University in Prague. Working with Kmoch and Suzanne Hart, Ph.D., at the National Institutes of Health, Bleyer identified the condition among American families in his study group of families with rare, inherited kidney disease. Bleyer works with about 100 families throughout the world to identify the causes of inherited kidney disease that run in their families.

Families identified with the specific genetic mutation investigated in this study suffer from anemia in childhood and progressive kidney disease resulting in the need for dialysis, a mechanical way to cleanse the blood. Children typically have relatively low blood pressure. Adults suffer from gout and worsening kidney disease.

"There are many families with inherited kidney disease that do not know the cause and may suffer from this condition," Bleyer said. "We are interested in helping these families identify the cause of kidney disease that runs in their family."

The investigators have identified a potential treatment for the disease, and a clinical trial is under way at Wake Forest University School of Medicine, Bleyer said.

Understanding how the mutation in the renin gene affects these families also provides insight into how renin works in healthy individuals. For example, the low levels of renin in children with this condition appear to cause anemia. The importance of renin in maintaining a normal blood count and preventing anemia in childhood was not previously known. The researchers plan to continue researching renin with hopes of better

understanding how the protein functions in health and disease.

The research was conducted by physicians and researchers from the Czech Republic, Belgium, France, Germany and the United States.

Source: Wake Forest University Baptist Medical Center (news : web)