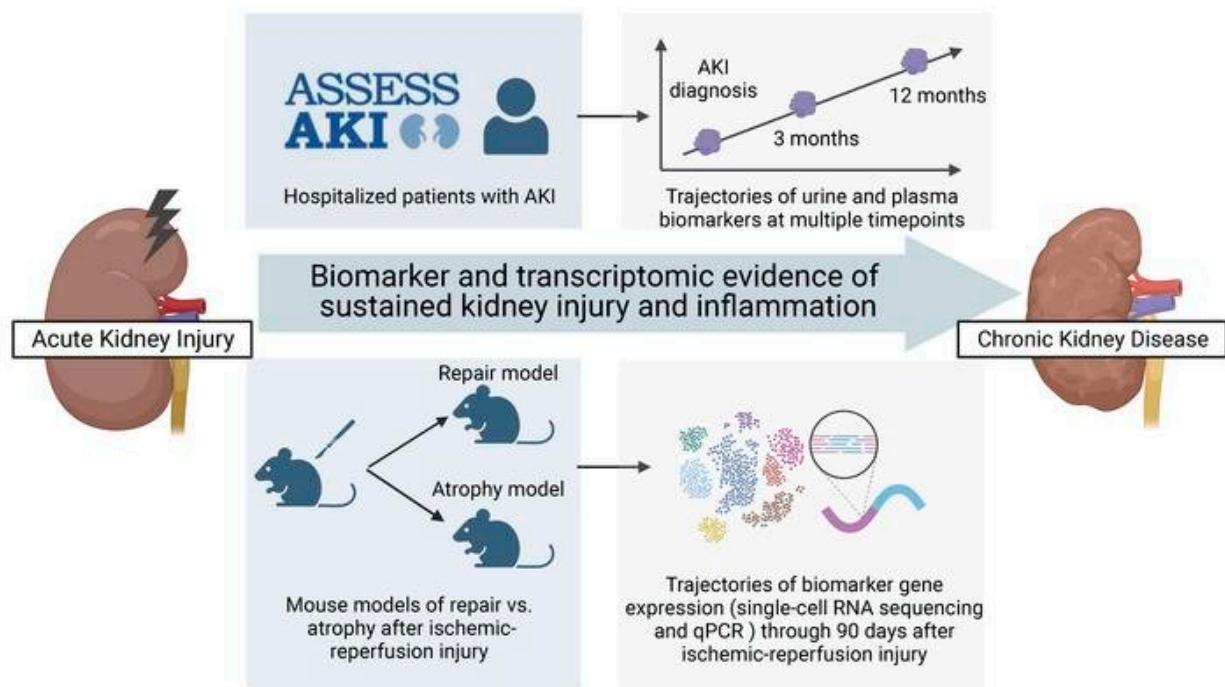


Study finds certain substances in urine, blood can predict kidney disease progression

April 3 2023



Graphical abstract. Credit: *JCI Insight* (2023). DOI: 10.1172/jci.insight.167731

In a new study looking at the long-term effects of hospitalized patients who have acute kidney injury (AKI), a sudden but temporary loss of kidney function, Johns Hopkins Medicine researchers found that higher

levels of certain biomarkers in urine and blood can predict a patient's risk of developing chronic kidney disease (CKD).

The findings, published on March 23, in the *JCI Insight*, could help doctors better understand whether or not the body is healing properly, after someone sustains [kidney damage](#), and potentially prevent the progression of AKI to CKD.

The kidneys are a pair of bean-shaped organs that help clean your blood and remove waste from the body. AKI occurs when your kidneys stop working properly, which can cause waste to build up in your blood, making it hard for the body to balance fluids. Although treatable, AKI could lead to CKD, a much more severe and potentially fatal condition, and other heart problems.

AKI is most commonly seen in hospitalized [patients](#) whose kidneys are affected by medical and surgical stress and complications, potentially resulting in a longer recovery process and prolonged harm to the kidneys.

"About 20% of hospitalized patients develop AKI and have a three- to eight-fold increased risk of developing [chronic kidney disease](#) later on in life," says Chirag Parikh, director of the Division of Nephrology at the Johns Hopkins University School of Medicine and the study's corresponding author. "AKI incidence in the hospital continues to rise, so we set out to understand how and why AKI progresses to CKD, and if monitoring these patients over time can give us clues to kidney disease progression."

According to the United States Centers for Disease Control and Prevention, an estimated 37 million people are living with CKD in the U.S., making it the 8th leading cause of death in the country.

In a cohort of 656 hospitalized patients with AKI, researchers measured seven urine and two plasma biomarkers of kidney injury, inflammation and tubular health at multiple timepoints over the course of a year after diagnosis. The goal was to determine the associations of longitudinal changes in these biomarkers with progression of kidney disease after AKI.

The researchers found that for each deviation increase in change of the biomarker KIM-1, MCP-1 in urine and TNFRI in plasma from baseline to 12 months was associated with a two- to three-fold increased risk for CKD.

Parikh says these findings suggest that sustained tissue injury and inflammation, as well as slower restoration of tubular health, are associated with higher risk of [kidney](#) disease progression. However, they also observed that the increase in the urine biomarker UMOD was associated with a 40% reduced risk for CKD.

"Longitudinal measurement of some of these proteins have the potential to guide management of patients with AKI after discharge, which includes follow-up with a nephrologist; optimizing diabetes and cardiac medications; and accurate dosing of all medications with reduced [kidney function](#)," says Parikh. He underscores the need for more research into these ongoing biological processes to help better understand the transition from AKI to CKD.

More information: Yumeng Wen et al, Longitudinal biomarkers and kidney disease progression after acute kidney injury, *JCI Insight* (2023). [DOI: 10.1172/jci.insight.167731](https://doi.org/10.1172/jci.insight.167731)

Provided by Johns Hopkins University School of Medicine

Citation: Study finds certain substances in urine, blood can predict kidney disease progression (2023, April 3) retrieved 25 April 2024 from <https://medicalxpress.com/news/2023-04-substances-urine-blood-kidney-disease.html>

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