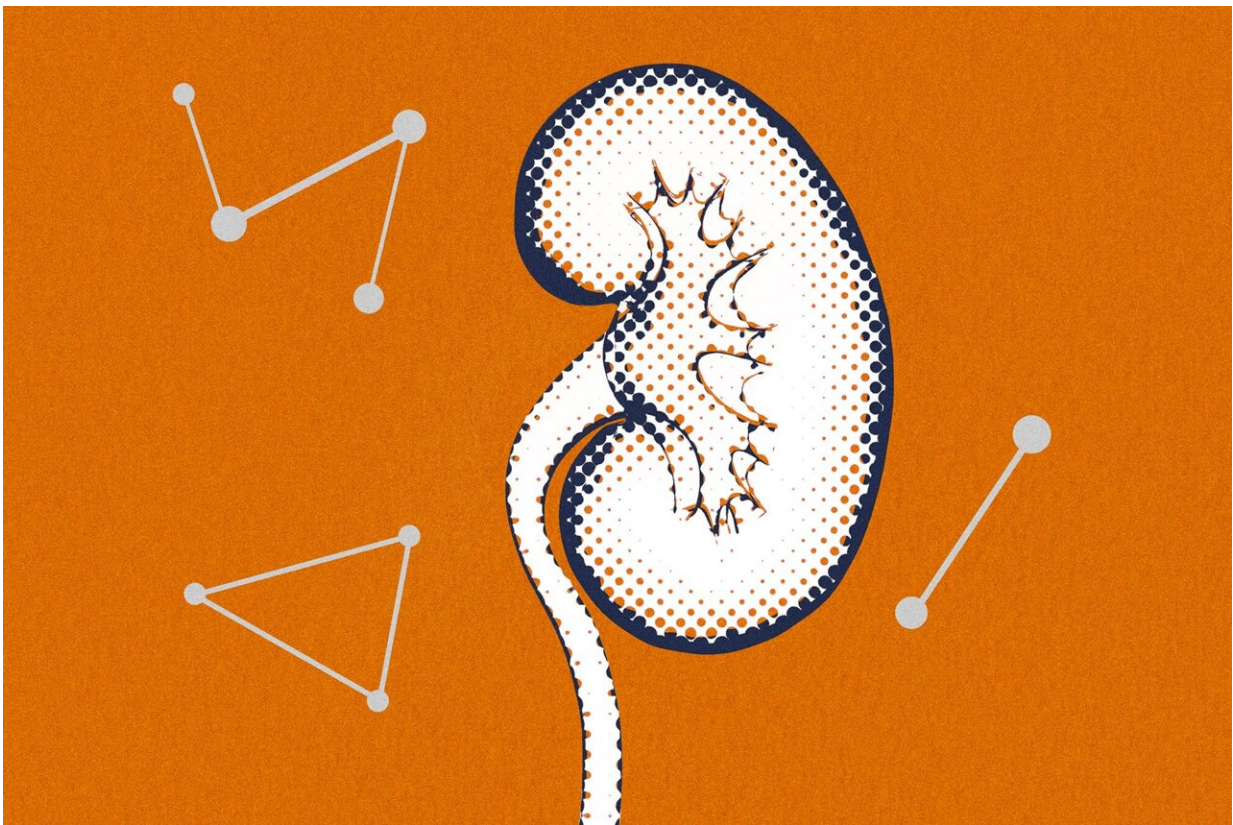


Long-term use of blood pressure drugs may cause kidney damage, study suggests

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Credit: Ziniu Chen, UVA Communications

New kidney research from the University of Virginia School of Medicine is raising concerns that long-term use of drugs commonly prescribed to treat high-blood pressure and heart failure could be

contributing to kidney damage.

Patients should continue taking the medications, which include the well-known and widely used ACE inhibitors, the researchers say. But the scientists are urging studies to better understand the drugs' long-term effects.

"Our studies show that renin-producing cells are responsible for the damage. We are now focusing on understanding how these cells, which are so important to defend us from drops in blood pressure and maintain our well-being, undergo such transformation and induce [kidney damage](#)," said Dr. Maria Luisa Sequeira Lopez of UVA's Department of Pediatrics and Child Health Research Center. "What is needed is to identify what substances these cells make that lead to uncontrolled vessel growth" in the kidney.

Understanding kidney damage

Chronic high blood pressure affects a billion people around the world. The UVA researchers wanted to better understand why severe forms of the condition are often accompanied by thickening of the arteries and small blood vessels in the kidney, leading to organ damage.

They found that specialized kidney cells called renin cells play an important role. These cells normally produce renin, a vital hormone that helps the body regulate blood pressure. But harmful changes in the renin cells can cause the cells to invade the walls of the kidney's [blood vessels](#). The renin cells then trigger a buildup of another cell type, smooth muscle cells, that cause the vessels to thicken and stiffen. The result: Blood can't flow through the kidney as it should.

Further, the researchers found, long-term use of drugs that inhibit the [renin](#)-angiotensin system, such as ACE inhibitors, or angiotensin

receptor blockers, have a similar effect. These drugs are widely used for many purposes, including treating high [blood](#) pressure, congestive heart failure and heart attacks, as well as to prevent major heart problems. But long-term use of the drugs was associated with hardened kidney vessels in both lab mice and humans, the scientists found.

The researchers note that the medications can be lifesaving for patients, so they stress the importance of continuing to take them. But they say additional studies are needed to better understand the drugs' long-term effects on the kidneys.

"It would be important to conduct prospective, randomized controlled studies to determine the extent of functional and tissue damage in patients taking medications for [blood pressure](#) control," said Dr. Ariel Gomez of UVA's Department of Pediatrics and Child Health Research Center. "It is imperative to find out what molecules these [cells](#) make so that we can counteract them to prevent the damage while the hypertension is treated with the current drugs available today."

The researchers have published their findings in the scientific journal *JCI Insight*. The article was selected as a cover story. The research team consisted of Hirofumi Watanabe, Alexandre G. Martini, Evan A. Brown, Xiuyin Liang, Silvia Medrano, Shin Goto, Ichiei Narita, Lois J. Arend, Sequeira Lopez and Gomez.

More information: Hirofumi Watanabe et al, Inhibition of the renin-angiotensin system causes concentric hypertrophy of renal arterioles in mice and humans, *JCI Insight* (2021). [DOI: 10.1172/jci.insight.154337](https://doi.org/10.1172/jci.insight.154337)

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