Take charge of your health — understand how your kidneys work

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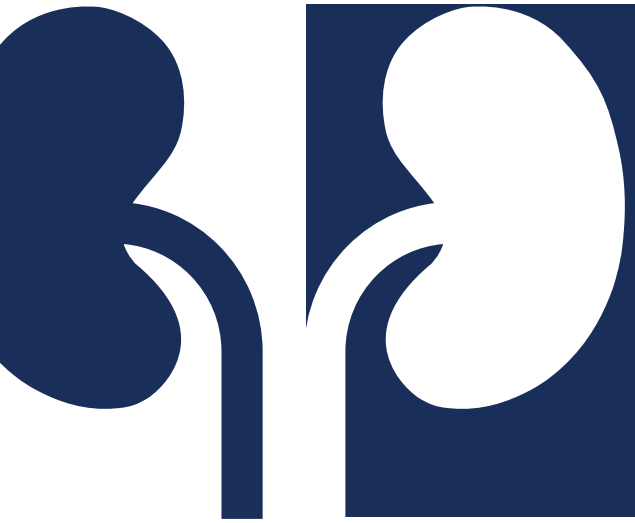
Not many people know how their kidneys work, or even much else about them. Did you know that the right kidney is slightly smaller than the left?[1] Or that healthy kidneys filter all your body's blood in just 30 minutes?[2]

There are many things to know about your kidneys. Knowing how your kidneys work can help you better understand chronic kidney disease (CKD) and be prepared for conversations with your doctor.

The basics

Most people have two kidneys, although it's possible to be born with one or even three. Your kidneys are located on either side of your spine, just below your rib cage. A kidney is shaped like a kidney bean and is usually about five inches long (roughly the size of your fist). The reason your right kidney is just a little bit smaller is to make room for your liver.

Did you know that the right kidney is slightly smaller than the left?[1]



Five functions of healthy kidneys

Kidneys play an important role in keeping you healthy. Their main jobs are:

- Produce vitamin D to keep your bones strong
- Activate the production of red blood cells
- Remove waste and extra fluid from your body
- Balance levels of acid, salt and minerals (such as potassium, phosphorus and calcium)
- Release hormones that help control blood pressure

How kidneys remove waste

When you eat and drink, your body keeps the nutrients it needs and discards the rest as waste. Some of the waste ends up in your blood, and it's your kidneys' job to filter it out. Healthy kidneys are always filtering blood — they clean about half a cup of blood every minute![3]

Here's a breakdown of the key parts in the process and what each one does:[3]

- **Renal arteries** — before blood can be filtered, it needs a way to get into the kidneys. There are two renal arteries that carry blood from your heart to each kidney.
- **Nephrons** — once your blood is inside your kidney, it gets filtered by millions of tiny nephrons. Each nephron has two parts: a glomerulus and a tubule. They work together to clean your blood.
- **Glomerulus** — the glomerulus is a cluster of tiny blood vessels that separates small waste particles and water from your blood.
- **Tubule** — after the glomerulus does its job, the filtered fluid moves along to the tubule. The tubule balances the fluid by adding or removing water and other chemicals. The end result is urine. It travels from your kidneys to your bladder and eventually flows out of your body. In an average day, kidneys remove about 2 quarts of fluid as urine. Almost 150 additional quarts of fluid are cycled back through your body.

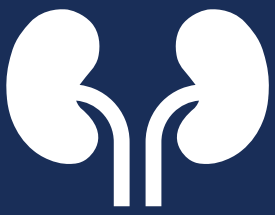
What happens when kidneys are damaged?

In healthy kidneys, the nephrons are able to remove creatinine (a waste product from your muscles). But when you have kidney disease, your kidneys are damaged and slowly lose the ability to perform this function over time.

This is why your doctor looks at what's called the estimated glomerular filtration rate (eGFR) to understand what stage of CKD you're in. eGFR measures how well your blood is being filtered by your kidneys. This is reflected by the amount of creatinine in your blood. As the disease progresses, the level of creatinine rises and your eGFR declines.

What can cause kidney damage?

Kidney damage can happen for many reasons. People who have diabetes also have high blood sugar, which harms their kidneys' filters. In the United States, diabetes is the leading cause of CKD.[4] High blood pressure (another common cause of CKD),[4] also damages kidneys by damaging the arteries feeding them so they can't deliver enough blood to the kidneys. *Glomerulonephritis,* a disease that can be inherited or caused by an infection, affects the kidneys' filters and can lead to CKD.



Your kidneys work hard and do an important job to keep you healthy. When you know how they work and what happens when they don't, you can be ready and confident to talk to your doctor

[1] Healthline. What Is Atrophic Kidney and How Is It Treated? May 25, 2018. Available at: **Healthline.com/health/atrophic-kidney#prevention.** Accessed December 3, 2020.

[2] The U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. Chronic Kidney Disease Initiative: What You Should Know About Chronic Kidney Disease. CDC.gov. March 3, 2020. Available at: **CDC.gov/kidneydisease/publications-resources/what-to- know-about-ckd.html#:~:text=Your%20kidneys%20work%20hard.,important%20for%20 maintaining%20good%20health.** Accessed January 7, 2021.

[3] The National Institute of Diabetes and Digestive and Kidney Diseases Health Information Center. Your Kidneys & How They Work. June 2018. Available at: **NIDDK.NIH.gov/health- information/kidney-disease/kidneys-how-they-work.** Accessed December 3, 2020.

[4] The National Kidney Foundation. High Blood Pressure and Chronic Kidney Disease. January 2016. Available at: **Kidney.org/news/newsroom/factsheets/High-Blood-Pressure-and-CKD.** Accessed December 28, 2020.

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