



The “How”: Systems of the Human Body: A Series

Part 1. The Kidneys: A Filter for Life

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By Mark Schauss, DBA

Our human bodies are truly elegant in keeping us healthy, when we do our part by providing proper care. You can take control of your health and your life by learning about how the organs work together to create the delicately balanced system of your body.

An essential piece of staying in balance is your kidneys. They are essentially filters that separate useful elements in your blood from waste. They are two vital, bean-shaped organs that lie on either side of the spine, just below the rib cage. They filter about $\frac{1}{2}$ cup (4 ounces or 118 milliliters) of blood per minute, creating urine that flows into the bladder for storage until emptied. Your kidneys will filter about 150 quarts (142 liters) of blood during an average day. The kidneys also make hormones that help control blood pressure, make red blood cells, and help keep your bones strong and healthy.¹



The kidneys are shown in red.

It is essential to maintain efficient kidneys to stay healthy, as you can see. So, what can you do to make sure your kidneys are operating at their peak? Controlling blood pressure and blood sugar is critical. The higher your blood pressure, the more pressure is exerted on the kidneys. Excessive alcohol intake is one of the leading causes of high blood pressure (hypertension), as is high sodium and low potassium intake. While the kidneys produce hormones that help regulate blood pressure, they cannot overcome poor dietary habits. The recommended safe alcohol intake level is one drink for females and two for males per day.

With sodium intake, it is recommended that you limit yourself to 2,300 milligrams per day. This is becoming increasingly difficult to achieve, given the high levels found in processed and fast foods. For example, many canned soups contain over 700 milligrams of sodium. A 3-ounce serving of ham will have upwards of 1,100 milligrams.²

While public health officials focus almost exclusively on excessive sodium intake, they rarely mention the growing problem of low potassium ingestion. This is as important, if not more so, than the high sodium dilemma.

Current recommendation for potassium intake is 3,400 milligrams a day. Getting enough potassium each day goes a long way in keeping your kidneys healthy as well as controlling high blood pressure. In addition, many fruits and vegetables such as avocados, artichokes, sweet potatoes, spinach, bananas, and low-sodium vegetable juices are high in potassium.³

Another way to keep your kidneys healthy is by reducing or at least controlling stress. Meditation, yoga, and tai chi have been shown to lower blood pressure and help maintain and improve kidney health. Physical activities such as walking, running, riding a bicycle, and weight training are other means of controlling stress and supporting kidney health.⁴

Now that we have established means of supporting kidney health, we have to point out those things that will cause poor functioning of this vital organ, sometimes leading to kidney failure, which may require a painful and ongoing procedure known as dialysis to filter and cleanse the blood, or in a worst-case scenario, needing a kidney transplant.⁵ Aside from the previously mentioned reduction in sodium and alcohol intake, what else that we ingest may cause mal-health in our kidneys?

Chronic (regular) intake of NSAIDs (non-steroidal anti-inflammatory drugs that are used to relieve pain, reduce inflammation, and bring down a high temperature) and or analgesics (ibuprofen, naproxen, and in particular, acetaminophen used for reducing pain) can damage your kidneys. In addition, other drugs like statins (used to lower cholesterol levels), antibiotics, diuretics, antivirals, laxatives, and some blood pressure medications can damage kidneys, especially if used over a long period of time.^{6,7}

Kidney damage due to medications and vaccines is a serious issue. With vaccines, while reports are relatively rare, they do come up, especially with influenza, pneumococcal, and hepatitis B vaccines.⁸ With medications, we are learning more and more about their effect on kidney function. Ace inhibitors, angiotensin receptor blockers, protease inhibitors, and a number of ulcer medications are just some of the prescription and over-the-counter drugs that have been shown to have negative effects on kidney function.⁹

Toxic metals such as arsenic, mercury, lead, and cadmium can cause kidney disease. Also, ironically, overly aggressive chelation therapy (toxic heavy metal removal) may damage the glomerulus (filters) in the kidneys.^{10,11}

While chelation therapy to remove toxic heavy metals can be highly beneficial in promoting optimal health, it must be done carefully. A case I dealt with a few years ago showcased this very issue. A physician friend had received a call from a local emergency room about a patient of hers. He came in urinating blood, but the attending physician added that the blood was shimmering. It turns out that his physician had him on a carefully planned chelation therapy regimen for mercury toxicity that he doubled, assuming it would speed the process up. Because of his decision, too much mercury went through his kidneys, cutting into the tissue, which was causing the bleeding, and of course, the shimmering quality was caused by the mercury. Kidney damage of this kind is very difficult to reverse.

One way to monitor your kidney function is through a blood test. A Comprehensive Blood Chemistry typically includes three markers of kidney function: glomerular filtration rate (GFR), blood urea nitrogen (BUN), and creatinine, giving you a picture of kidney health. GFR, in particular, is an important monitoring tool. Those of African descent will typically have higher GFR levels than others due to higher muscle mass. This is generally reflected in the reference ranges used by laboratories.

Human kidneys are part of a network of organs that work together to keep us healthy. An example would be how the heart pumps blood and oxygen to the kidneys which cleans the blood and balances the electrolytes which in turn helps the heart beat more efficiently. All of the organs have similar connections so it is essential that all of them are kept in peak health.

Fortunately, this is within our control and easy to do. The more you know, the more empowered you are to take control of your kidney health, and overall health as well.

¹ <https://www.niddk.nih.gov/health-information/kidney-disease/kidneys-how-they-work>

² <https://www.healthline.com/nutrition/foods-high-in-sodium>

³ <https://ods.od.nih.gov/factsheets/Potassium-HealthProfessional/>

⁴ Bruce MA, Griffith DM, Thorpe RJ Jr. Stress and the Kidney. *Adv Chronic Kidney Dis*. 2015 Jan;22(1):46-53. doi: 10.1053/j.ackd.2014.06.008. PMID: 25573512; PMCID: PMC4871619.

⁵ <https://www.kidney.org/patients/peers/dialysis>

⁶ Naughton CA. Drug-induced Nephrotoxicity. *Am Fam Physician*. 2008 Sep 15;78(6):743-50. PMID: 18819242.

⁷ <https://medshadow.org/6-medications-can-harm-the-kidneys/>

⁸ Patel C, Shah HH. Vaccine-associated Kidney Diseases: A Narrative Review of the Literature. *Saudi J Kidney Dis Transpl*. 2019 Sep-Oct;30(5):1002-1009. doi: 10.4103/1319-2442.270254. PMID: 31696837.

⁹ Ghane ShahrbaF, F., & Assadi, F. (2015). Drug-induced Renal Disorders. *Journal of Renal Injury Prevention*, 4(3), 57–60. <https://doi.org/10.12861/jrip.2015.12>

¹⁰ Case study – Lab Interpretation LLC.

¹¹ Fang X, Hua F, Fernando Q. Comparison of rac- and meso-2,3-dimercaptosuccinic acids for chelation of mercury and cadmium using chemical speciation models. *Chem Res Toxicol*. 1996 Jan-Feb;9(1):284-90. doi: 10.1021/tx950096o. PMID: 8924605.