

CROSSROADS



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Dear medical newsletter readers,

This month, we are excited to share the latest developments in the field of medical research. March was Kidney Awareness Month, spotlighting significant new research on kidney disease. I am the featured writer for this month's Rising Stars in Medicine, where I discuss Dr. Jake Goodman's impactful work in psychiatry. Ashby Glover provides valuable insights into kidney function, and Siri Nikku concludes with essential information about living kidney donors.

Please enjoy reading The Premed Scene's April 2025 Medical Newsletter!

Ilana Saidou

Kidney Awareness Month

By: Ilana Saidov

Chronic kidney disease affects 10% of the global population. The current treatments are only effective at slowing disease progression, which leaves patients requiring dialysis or a transplant once kidney function declines. Approximately 90,000 people are on waiting lists for a kidney transplant in the U.S., with an alarming 13 individuals dying each day while waiting for a transplant. In an attempt to solve this global issue, researchers at the Perelman School of Medicine have identified over 1,000 genes that can be used as potential treatment targets for individuals suffering from kidney disease. This detailed genetic "map" of kidney function will be crucial to treating, diagnosing, and preventing kidney disease. Co-senior author Dr. Katalin Susztak emphasized the significance of the findings, stating, "Kidney dysfunction is a major global health issue, and our findings shed new light on the specific genes and biological pathways that underlie disease risk." The research specifically focused on studying proximal tubule cells, which are crucial for kidney function. These cells are responsible for reabsorbing water and electrolytes and secreting various chemicals. Dr. Hongbo Liu noted the importance of identifying these relevant cells for disease: "By creating single-cell profiles of thousands of kidney cells, we were able to 'zoom in' and find how certain genetic variants disrupt the regulatory machinery in key kidney cell types." A critical breakthrough occurred when the research team discovered gene regions with coding and non-coding variants. This discovery was imperative to the study as more than 600 genes had these two variant types, leading the team to suspect that these genes cause kidney disease. As a whole, these findings indicate a promising future for personalized medicine, which has the potential to yield more effective treatments for severe health conditions.

Source:

University of Pennsylvania School of Medicine. "Researchers create genetic map tied to kidney disease." ScienceDaily. ScienceDaily, 11 February 2025. <www.sciencedaily.com/releases/2025/02/250211134903.htm>.



Rising Stars in Medicine: Dr. Jake Goodman

By: Ilana Saidov

In recent years, mental health has become a crucial topic of discussion within our healthcare system. One of the leading voices in this area is Dr. Jake Goodman, a psychiatry resident and mental health activist based in Miami. He began his remarkable work in mental health advocacy while completing a B.S.A from the University of Georgia and a medical degree from Thomas Jefferson University. During his undergraduate studies, he witnessed the unfortunate impact of untreated mental health when he lost a friend to suicide.

During medical school, Dr. Goodman continued to develop a deep passion for psychiatry, where he observed numerous patients benefiting from transformative mental health treatments. In particular, he noticed how these interventions significantly enhanced their overall quality of life. Dr. Goodman chose to pursue a psychiatry residency since it has the perfect blend of constantly evolving medicine.

In addition to being a psychiatry resident physician, Dr. Goodman is a mental health activist and social media content creator focused on fighting mental health stigma. He uses his social media platform to discuss the importance of speaking about mental health struggles and protecting your mental health. He urges physicians to educate their patients about mental health conditions and empowers medical professionals to seek help for their mental health issues. Dr. Goodman's significant contributions to mental health advocacy established him as one of the most influential physicians of his time.

Source:

<https://www.jakegoodmanmd.com/about>



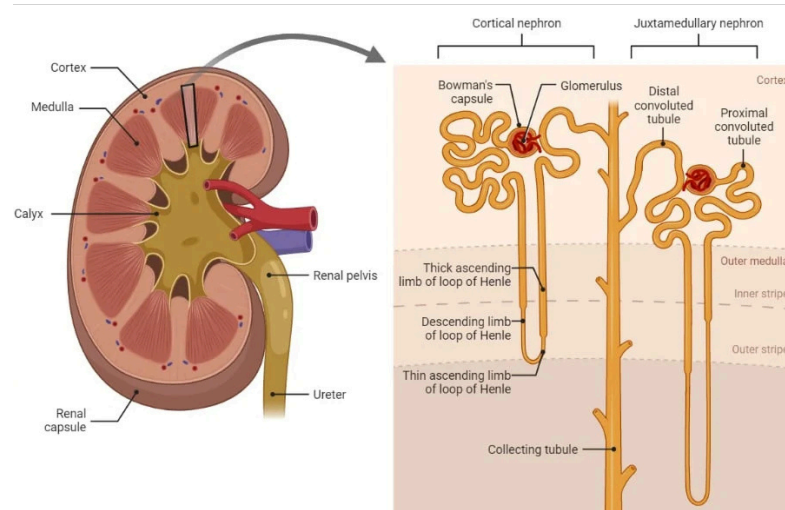
How do the Kidneys Function?

By: Ashby Glover

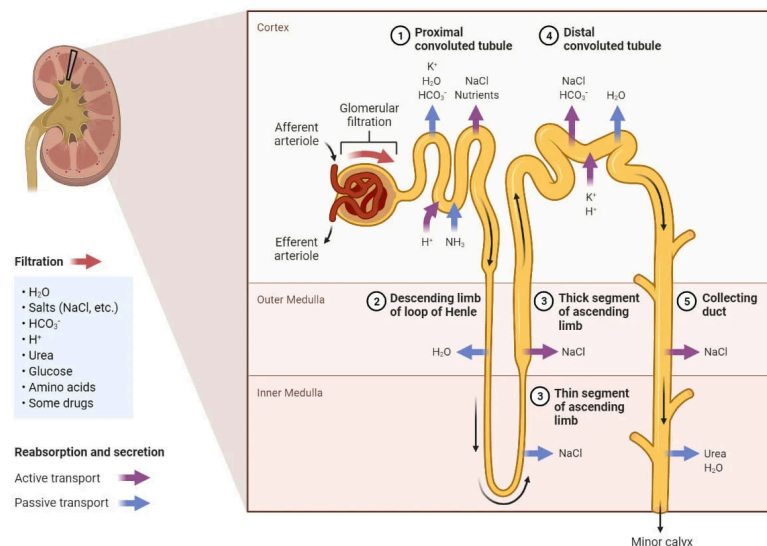
As the key organ of the urinary system, the kidney is responsible for regulating water and electrolyte balance and excreting toxic nitrogenous wastes from our bodies. The cells of the approximately one million nephrons that make up most of the kidney's mass regulate the process of creating urine through a complex and delicate balance of strong osmotic gradients. The kidney cells exert precise control over water and electrolyte retention or loss through these gradients.

Blood enters the kidneys and is filtered in the renal corpuscle. This structure forces water and solutes out of the blood, forming a filtrate that will enter the proximal tubule (1 in the second image). The filtrate consists of ions, nutrients, wastes, and water. In the proximal tubule, cells will reabsorb some nutrients, ions, and water into the bloodstream. As the filtrate passes into the loop of Henle (2), an extreme osmotic gradient is established, causing water to be passively reabsorbed as the filtrate descends. As it ascends again, salt leaves the filtrate, first passively, then actively, as the filtrate enters the distal tubule (4). More ions and water are reabsorbed in the distal tubule.

Finally, the filtrate enters the collecting duct (5), a structure that is affected by the hormones aldosterone and antidiuretic hormone (ADH). The adrenal glands produce aldosterone, which is crucial in regulating blood pressure and fluid balance as they direct salt and water retention in the distal tubule and collecting duct. ADH is produced by the hypothalamus and released from the posterior pituitary gland. It triggers the insertion of water channels called aquaporins in the membrane of the collecting duct, causing more water to be reabsorbed in the duct. If an individual is dehydrated, ADH will be released to conserve water.



Kidney Reabsorption and Secretion



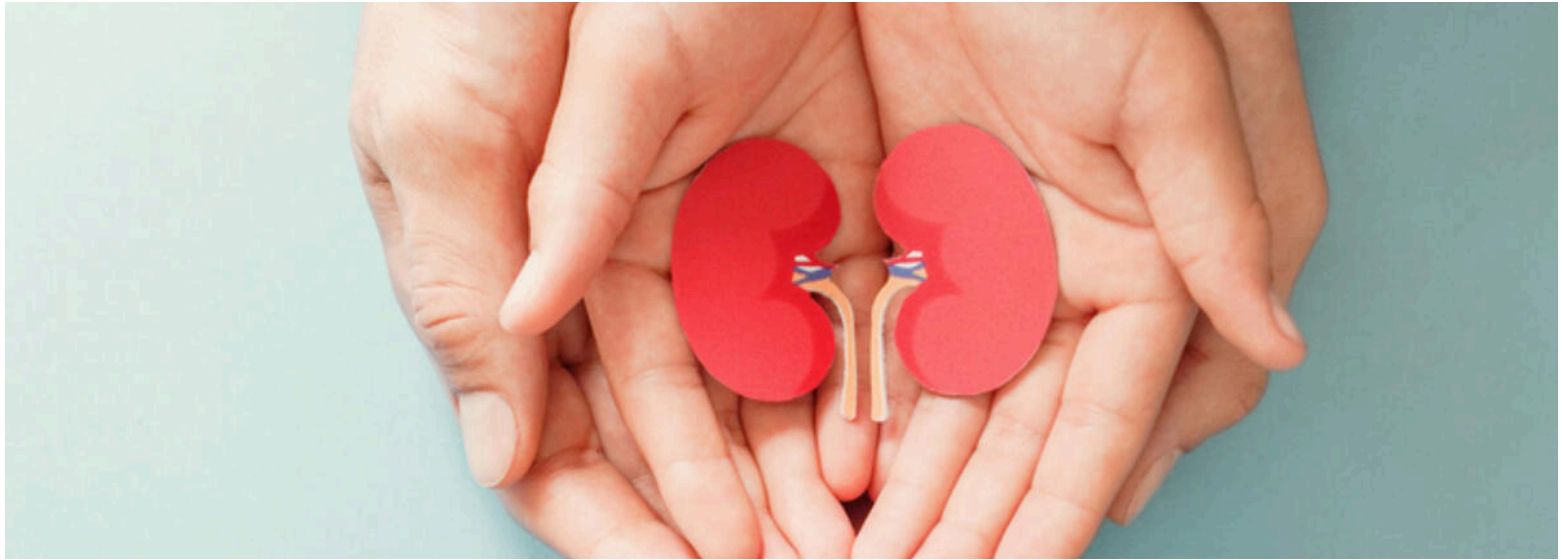
The proper function of the kidneys is an indispensable part of the excretory system. The kidneys remove excess fluid and waste that would otherwise build up in the body and impair tissue function. They also regulate the balance of water, salts, and minerals in the blood, a delicate gradient that is imperative to maintain in a healthy range. In a single day, the kidneys filter about 150 quarts of blood, reclaiming most of the fluids and producing only one to two quarts of urine. The kidneys also make hormones that control blood pressure, stimulate bone marrow to produce red blood cells, and keep bones strong and healthy. At five inches long, three inches wide, and two inches thick, the kidneys are small but mighty organs vital to our health.

Sources:

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The Psychosocial Effects of Being a Living Kidney Donor

By: Siri Nikku



Living kidney donors (LKD) are efficient in alleviating the organ shortage and helping those in need of kidneys. There are many benefits for those who receive donated kidneys, such as a shorter waiting time from a healthy donor, planned surgery, and increased chances of survival.

There has been much research on the medical and biological effects of donating kidneys but not as much about the psychosocial impact of being a living kidney donor. Educating LKD on the psychosocial and medical implications of donating kidneys provides them with a comprehensive perspective on donating their kidneys and the effects. Health-related quality of life (HRQoL) is at the intersection of biological and psychological domains as it covers both the physical and mental health parts; this is also what is measured of LKDs throughout the study. The HRQoL of LKDs is generally higher before donation, with only some individuals reporting a lower HRQoL in the first twelve months of donation.

The study reveals that certain risk factors can negatively impact the psychosocial health of LKDs, such as pre-donation and post-donation stress and fatigue. Pre-existing pain can also lead to a lower HRQoL of the donor, making it harder to integrate back into regular functions. Being diagnosed with depression and anxiety before donating also correlated with higher depression and anxiety after donating, which emphasizes the need for social support for donors. Some LKD reported feeling forgotten after the donation, dissatisfaction, and loneliness. There was a pattern of LKD wanting to be recognized for donating a kidney, which could be assuaged with ongoing access to healthcare and social support. Costs around LKD and insurance coverage were other issues that led to negative feelings in LKD as poorer LKDs reported lower HRQoL. Some solutions for these risks include follow-ups with healthcare providers and services, ensuring donors do not feel alone. Addressing financial burdens with the costs of LKDs is also essential due to the extra struggle of those who are of color or have a lower SES. Being an LKD is a complex process, and there will be positives and negatives regardless. Noting the high risks of potential donors and ensuring they have access to resources is necessary to address a lower HRQoL.

Source:

https://journals.lww.com/transplantjournal/fulltext/2025/02000/living_kidney_donation__a_narrative_review_of_mid_.15.aspx