

## Chronic kidney disease



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**E**very 30 minutes, the kidneys filter all the blood in the body. This round-the-clock removal of toxins is hard work, and over a lifetime of purification, these vital organs can falter. The result is a progressive condition that affects roughly 10% of the world's population – an astonishing 800 million people. In fact, chronic kidney disease (CKD) has become one of the leading causes of death worldwide. The stakes are high, and research is advancing on multiple fronts (see page S16).

Perhaps the greatest leaps have come in the form of therapeutics. A class of drugs originally developed to treat type 2 diabetes, known as SGLT2 inhibitors, has arrived on the scene over the past three years and have proved highly effective at slowing the loss of kidney function (S2). Multiple clinical trials have been halted early because the drugs' efficacy was so obvious.

Around 10% of adult cases of CKD can be traced to genetic mutations. Research to pin down that genetic link is changing how the disease is diagnosed and treated (S14).

Some researchers are building simplified versions of kidneys in the lab to better understand how these highly complex organs work – and how they go wrong in CKD. Such organoids, which derive from stem cells, are proving useful in modelling kidney development and disease (S10).

As with many diseases, CKD hits people without access to good health care the hardest. Most people with the condition eventually need dialysis and, ultimately, a kidney transplant – lifesaving therapies that are expensive and not always easily available (S6).

That inequity is felt especially hard for people with CKD that has developed as a result of diabetes (S8). In the United States, non-citizens are, in many cases, prohibited from receiving transplants – they are, however, permitted to donate their own organs (S5).

When drugs, conventional dialysis and transplants are out of reach, technology under development could offer a solution: portable or implantable machines that replicate the kidneys' functions (S12).

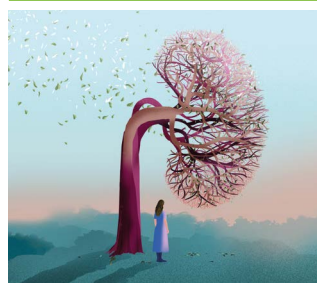
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**Herb Brody**

Chief supplements editor

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**On the cover**

Chronic kidney disease is often not detected until much of the function has been lost. Credit: Eva Vazquez

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