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Bacteria could help failing kidneys
Microbes groomed to breakdown toxic waste between dialysis sessions.
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A spoonful of microbes or a capsule of enzymes could soon lengthen the time between kidney patients' dialysis sessions, researchers told last week's annual meeting of the American Society for Artificial Internal Organs, in Washington DC.

Diabetes and chronic high blood pressure can stress the kidneys and cause toxic substances like urea, creatinine and uric acid to accumulate in the blood and diffuse into the gut. To filter these out, around 250,000 people in United States alone undergo dialysis treatment each year.

Biotechnologist Jill O'Loughlin and her colleagues at Brown University in Providence, Rhode Island, have come up with one possible alternative: a trio of enzymes in tiny capsules, about half a millimetre in diameter. They isolated the enzymes - urease, uricase and creatininase - from the jack bean plant and two types of bacteria.

"We're trying to design a therapy that would supplement dialysis by reducing the metabolites between treatments," says O'Loughlin. In a solution that mimics a patient's stomach contents, the capsules broke down all the uric acid, 97 per cent of the urea and 70 per cent of the creatinine within 24 hours. Preliminary experiments in rats are underway.

Microbiologist Beena Patel of Kibow Biotech Inc. in Philadelphia, Pennsylvania, and her colleagues are developing a different dialysis adjunct, based on the power of soil bacteria to destroy urea. They put the bacterium *Bacillus pasteurii* to the test in a human gut simulator that mimics the flora and acid environment of the digestive system, from stomach to descending colon.

In less than 24 hours, *B. pasteurii* broke down around 60 per cent of the urea in the system, without harming the natural bacterial mix. Initial studies in rats and pigs, where the bacteria are mixed into the feed, also look promising, says clinical study coordinator Pari Ranganathan.

"Dialysis is so expensive," Ranganathan says. "We are targeting people who need it and can't afford it." But there are big hurdles ahead - the bacteria or enzymes must remain in the human gut long enough to do their work, and their by-products must be harmless.

[Source: Nature Science Update]