

Universal donor kidney: Bioengineered implant one day may replace dialysis

May 22 2020, by Anivarya Kumar



Credit: CC0 Public Domain

Kidney failure affects 700,000 Americans and two million people worldwide. Treatment is severely limited by a scarcity of donor organs and the burden and expense of recurring dialysis.

Now William Fissell, MD, and colleagues have taken a major step



forward in bioengineering an implantable universal donor kidney that can clean the bloodstream without the need for <u>electrical power</u>, pumps or dialysis.

The "bioreactor" contains functional renal tubular epithelial cells that are powered by <u>chemical energy</u> and which selectively reabsorb salt, water, glucose and amino acids while blocking reabsorption of uremic toxins and concentrating wastes in the urine.

Through pharmacological manipulations—inhibiting transforming growth factor-beta (TGF-beta) and adding metformin, a key enzyme activator—the researchers were able to increase salt and <u>water transport</u> by primary renal tubular cells grown on easily manufactured cell culture materials.

The finding, reported in the journal *Tissue Engineering*, is "a breakthrough step making achieving an implantable artificial kidney device possible," the researchers concluded.

More information: Harold Dean Love et al. Metformin and Inhibition of TGF- β Stimulate In Vitro Transport in Primary Renal Tubule Cells, *Tissue Engineering Part A* (2020). DOI: 10.1089/ten.tea.2019.0294

Provided by Vanderbilt University

Citation: Universal donor kidney: Bioengineered implant one day may replace dialysis (2020, May 22) retrieved 2 May 2024 from <u>https://medicalxpress.com/news/2020-05-universal-donor-kidney-bioengineered-implant.html</u>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.