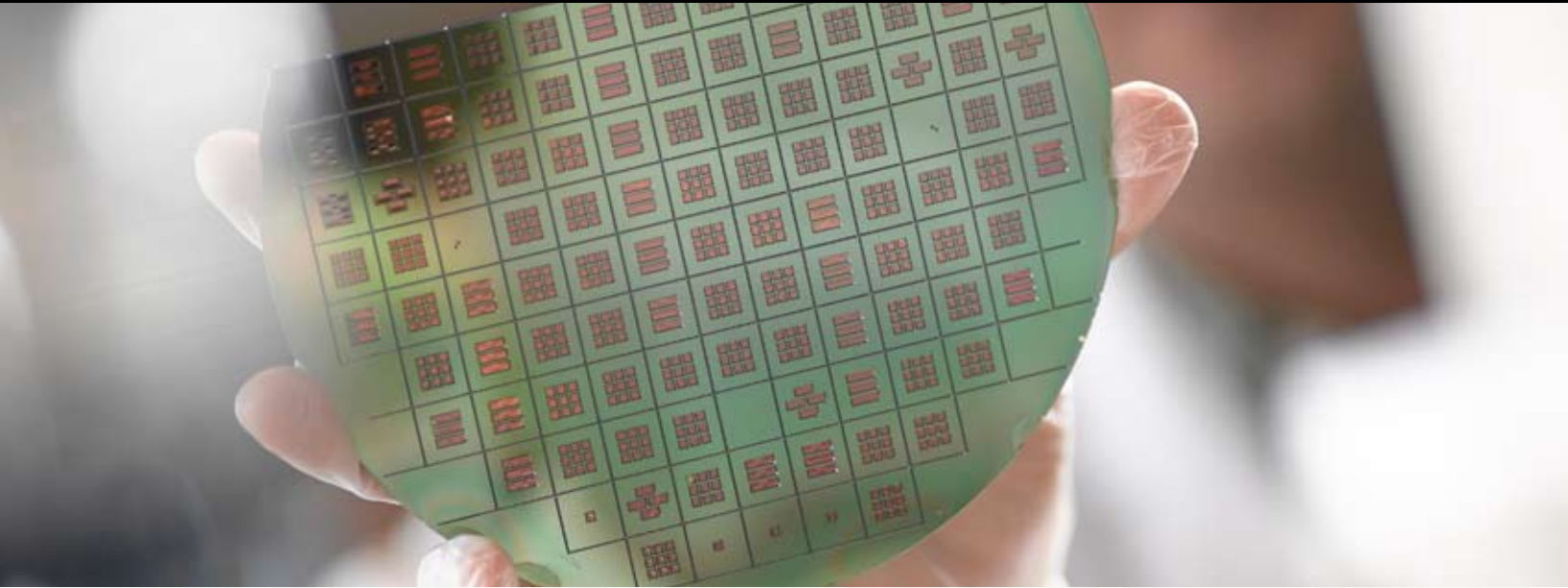


The Bioartificial Kidney:

Creating an Alternative to Dialysis



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More than 450,000 people in the United States have end-stage renal disease (ESRD) — a condition in which the kidneys fail to function at a level that is necessary for daily life. And the number is increasing at a rate of about 8 percent per year. Because of this, there is strong demand for treatment options beyond dialysis for ESRD patients.

What is dialysis?

Dialysis is the process of cleansing blood of toxins by running it through special machinery with filtering membranes – basically doing what a failed kidney cannot. This process, which Cleveland Clinic pioneered 50 years ago, has helped many patients who otherwise face kidney failure. It requires, however, that the patient go to a clinic and be connected to a dialysis machine with the oversight of a healthcare professional.

Nanotechnology provides hope for alternative to kidney dialysis.

Cleveland Clinic has received a \$3.2 million grant from the National Institutes of Health to work on an alternative option to dialysis – an implantable bioartificial kidney. This device, no larger than a soda can, has the potential to revolutionize care of patients with kidney failure.

How does it work?

The concept under development would apply nanotechnology (ultra-small technology) to mimic the kidney's natural process of filtering blood. The blood filtering would be done through ultra-thin silicon wafers. Unlike dialysis, however, no monitoring by a healthcare worker in a clinical setting would be necessary.

What are the benefits of the bioartificial kidney?

The technology offers great potential advantages to patients, including freedom from having to go to a clinic and be tethered to a dialysis machine. An implantable bioartificial kidney would markedly increase an ESRD patient's quality of life.

When will the bioartificial kidney be developed?

The existing bioartificial kidney, though large and labor intensive, has gone through complete FDA Phase I and Phase II clinical trials at Cleveland Clinic and several other medical centers. Current research is being conducted to further miniaturize the bioartificial kidney used in the trials.