

# Implantable Artificial Kidney

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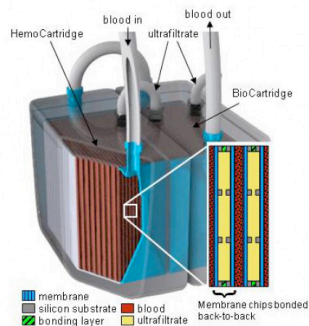
**Abstract**—The University of California-San Francisco has developed a prototype to create an implantable artificial kidney to replace the need for dialysis and kidney transplants, lowering the cost to be treated yearly and have a much higher success rate than the current treatments today.

## I. INTRODUCTION

THE University of California-San Francisco is currently in the process of creating an implantable artificial kidney to replace the need for weekly dialysis treatments and kidney transplants. The average person spends \$75,000 a year on dialysis, and the U.S. Medicare system pays roughly \$29 billion per year on kidney failure. With the costs that high, The University knew that there must be another way to deal with this dilemma. Shuvo Roy, part of the UCSF Department of Bioengineering is working with a team of 40 people to create a working implantable kidney, which is to go through clinical trials by 2017.

## II. METHODS

The current state of the implantable kidney prototype is given in the diagram below:



The artificial kidney works as a two stage system. The first compartment holds thousands of nano-scale filters remove toxins from the blood, which functions as the body's natural dialysis process. A second compartment would hold live kidney cells that perform the other biological actions of a real kidney, such as sifting out waste products from the blood in our system. Their hope is that the device would be implanted into the abdomen and would be powered by their blood pressure, removing the need for external pumps and tubes.

## III. RESULTS

The results of the implantable artificial kidney are very unclear as of right now, because there is no definite product that we know about. The project, however, has received \$3 million in funding as of October 2, 2012, and continues to be funded and researched by the university and its investors. The research process is coming along, however, and they foresee

clinical trials to start by 2017.

## IV. DISCUSSION

The idea of the implantable artificial kidney is brilliant. Although it's tough to say how well it will actually work by the end result since the trials are still up to 5 years away, I can only assume that things will get better from this point. As I had mentioned, the U.S. Medicare system pays roughly \$29 billion per year on kidney failure, and around \$24 billion each year to pay for dialysis. That's 6% of their entire budget! The idea to create the kidney is imagined to bring down the cost of dialysis from \$75,000 to \$25,000 by having patients use the artificial kidney instead of dialysis, massively decreasing the overall cost for the Medicare system. One potential problem I see immediately, however, is the body potentially rejecting the foreign object, and causing an emergency surgery. Hopefully, through the trials, in the years to come, the potential problems will be solved, and the prototype will become a reality, being fully functional, and available for the public to use.

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