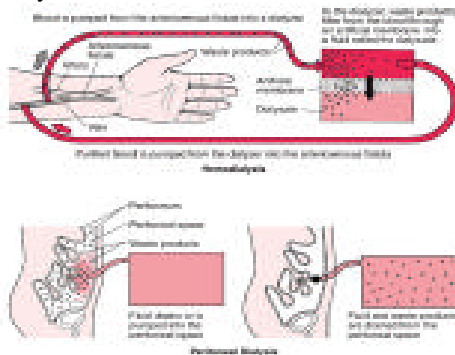


Artificial Kidney
 ELE382 BioMed Seminar
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The human kidney functions to filter the blood removing products of amino acid breakdown. This is accomplished through the formation of urine. During the formation of urine, the kidney also performs several other important tasks, such as, reclaiming and regulating body water, maintaining electrolyte balance, and ensuring the blood pH level remains between 7.35 and 7.45.

The number of deaths from nephritis, nephrotic syndrome, and nephrosis was 40,974. That ranked as high as 9th, in the United States for causes of death. If kidney failure is not cured by conventional methods, patients begin artificial kidney treatment. Once artificial kidney treatment removes all of the features of kidney failure, which is in the range of one to two months, the patient can have the kidney transplant if they have received a donor. If it is not a success, they must start over again with artificial kidney treatment. When kidney failure is permanent, as in end-stage kidney failure, patients must continue dialysis on regular bases, until they have found a compatible donor for kidney transplantation.

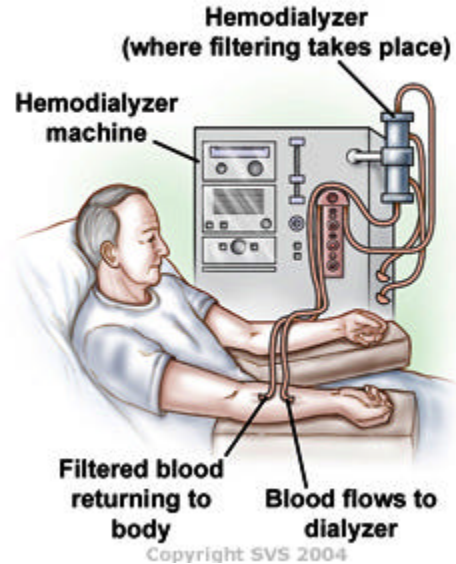
Dialysis is a treatment that cleans the blood and removes wastes and excess water from the body, which are functions done by healthy kidneys. There are two main types of dialysis: Hemodialysis and Peritoneal Dialysis.



With Hemodialysis, the patient's blood is passed through a tube into a semipermeable membrane (dialyzer) that filters out waste products. The cleansed blood returns back to the body. In Peritoneal dialysis, a special solution is run through a tube into the peritoneal cavity, which is the abdominal body cavity around the intestine. The fluid is left there for a while to absorb waste products and then removed from the body through the tube.

The patient receives artificial kidney treatment about twelve hours a day, two or three times a week. This process removes all of the features of kidney failure in one or two months, in order to be ready for a transplant. It does not cure the kidney. Patients then wait for compatible donors. This treatment causes major financial

problems to several countries because the machines are very expensive to buy and maintain. The federal government now pays 80% of all dialysis costs. Private health insurance or state medical assistance pays almost everything else.



University of Michigan's Medical Center's Dr. David Humes, who is the Chairman of the Center said, "...dialysis doesn't do all the work of the kidneys." He also stated, "The plan is to develop two devices, both of which are important for full replacement of the kidney. One will be a filter that could be implantable, so that a patient will not be tethered to a machine. Two, it not only replaces what dialysis does, but adds and optimizes care that dialysis does not provide currently."

- <http://www.pulseplanet.com/archive/Dec96/1346.html>
- <http://en.wikipedia.org/wiki/Dialysis>
- <http://www.nature.com/nm/journal/v8/n10/full/nm771.html>
- http://www.vascularweb.org/graphics/northpoint_graphics_jpg/Dialysis_Access_02_Base_250.jpg
- <http://www.kidney.ca/english/publications/brochures/hemodialysis/hemodialysis.htm>