The Artificial Kidney

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November 9, 2005
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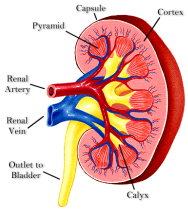
How Your Kidneys Work

The kidneys basic function is to process and clean approximately 200 quarts of blood, resulting in 2 quarts of waste product and extra water (which becomes your urine). This waste flows through your ureters to your bladder. Wastes in the blood come from the breaking down of the food you eat.



About Kidney Failure

Because the kidneys filter out waste from the human body, if the kidney stops working their can be a build up of the bacteria causing bad effects on the brain, lungs, heart, and other organs. If not treated properly or in due time, kidney failure can cause death.

Existing Treatments of Kidney Failure

- Hemodialysis
- Peritoneal Dialysis
- Kidney Transplantation

Hemodialysis

This method of treatment uses a machine to filter and clean your blood, temporarily getting rid of harmful wastes and extra salt and water.

Peritoneal Dialysis

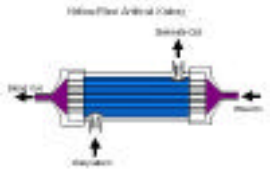
This procedure removes extra water, waste, and chemicals from your body as well but this time using the lining of your abdomen (peritoneal membrane) to filter your blood acting as an artificial kidney.

Kidney Transplantation

This is the surgical replacement of a healthy kidney into your body. The transplanted kidney does the work that both of your failed kidneys used to.

About Artificial Kidneys:

Using **[nanotechnology ←which is the use of devices that have only a size of only a few nanometers that act faster than large devices]** research has taken a step toward developing a fully functional artificial kidney. This artificial kidney would eliminate the need for dialysis or kidney transplantation all together. The device is small (paperback book size) and very portable and implantable. The device consists of two membranes operating in series within a cartridge and mimic filter structures found in the real kidney. The device is directly connected to bloodstream and allows blood to flow through the device. Work on the artificial kidney is just past the "conceptual phase" and no tests have been done on humans or animals as of yet. Computer modeling has helped engineers predict how the device should work and allowed them to begin to construct necessary membranes. It has also allowed researchers to find some advantages such that it can operate 12 hours a day, 7 days a week and can give better filtering rate than a dialysis given 3 times a week.



Future Outlook:

Researchers hope to produce a complete and operating membrane and incorporate it into the device and begin testing it on animals.

This next phase of work is expected to last between 2 and 4 years.

Clinical studies may be starting by 2010, in 5 or so years.

Works Cited…

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