Thermal heart pumps will be self-contained

United Press International

RICHLAND, Wash. — Buoyed by Dr. Barney Clark's 112-day struggle on the Jarvik-7 artificial heart, scientists are rushing to develop more advanced and more portable power sources for mechanical hearts.

"The objective is to develop a fully implantable power source, integrated with a blood pump, which can return people that have incurable heart disease to productive lives," said Maurice White, a University of Washington physicist who has spent the last 15 years working to develop a portable thermal heart pump.

"The idea is not just to prolong life, but to return people to an active life," said White, who heads a team of eight researchers working at the Joint Center for Graduate Studies in Richland.

Clark's power source was 375 pounds of gear with an external connecting line that he had to be continually attatched to for powering his heart. He couldn't go back to his dental practice."

By contrast, he said, a thermal heart pump could be implanted into a person's pelvic bone and keep an artificial heart operating for up to eight hours after one hour of recharging.

Funded by grants from the National Heart, Lung and Blood Institute, White's team is working on an adaptation of the Stirling engine, which uses molten salts as an energy source.

Melted salts are used to retain heat as a source of energy, he said.

"Once it's melted, all the energy you put in to melt the salt is stored for later use. So the recipient would have to be plugged into an external power supply for one hour a day (to remelt the salts.)"

"The idea is not just to prolong life, but to return people to an active life." — Maurice White, physicist

Two possible recharge methods are being studied.

One would employ a connector passing from the internal pump through the skin. He said "the virtually invisible connector could be plugged in to wall or an automobile cigarette lighter."

Using the other method, a small electrical coil would be implanted under the skin.

"When you are ready to recharge, you have another coil that you put over it that would transfer electrical energy across the skin," he said.

The electric motor is being studied at five other research facilities as another way to power a portable heart pump.

But, White said, "Thermal is better because the bottom line for the recipient is he has to be connected to an outside power source three hours a day (with the thermal pump) compared to 23 hours a day with an electrical system."

The drawback to the thermal pump is time; they aren't expected to be ready to drive human artificial heart for another six years. The electrical pumps are expected to be tested on humans sooner, possibly within two to four years.

John Moise, president of Nimbus Inc., a California company, said one of his company's electrically-powered devices has already been used successfully on a calf for 77 days.

Nimbus, which has received $2 million in government grants, is testing both electrical and thermal heart pumps.

Moise and other researchers say heart pumps of the future will probably be used more often to power blood pumps that assist diseased hearts, instead of complete replacement artificial hearts, such as the one tested on Clark.

"Hay there!" staff photo by Guy Hood

Kirsten Walsh throws out some coastal hay for the wet mares, keep across the street from Olsen Field. Keven Hertel, a senior animal science major from Beaumont, holds on to Silk and Satin, as they wait patiently to finish their chores. Walsh is a juinor animal science major from Chicago, Illinois. The horses and wagon are used because they don't tear up the pastures and also provide superb traction

Artificial veins now are possible

United Press International

SALT LAKE CITY — Small artificial blood vessels will soon join the man-made heart as another University of Utah contribution to replacing worn-out parts of the cardiovascular system.

The plastic veins and arteries, small enough for use in coronary bypass surgery or to help save an injured limb, are considered an important advance over the large Dacron implants used for nearly 20 years to patch big major vessels.

Doctors say the Utah veins are a new polyurethane-type material that has apparently solved the problem of blood clotting in small-diameter plastic vessels.

Dr. Donald J. Lyman, a professor of bioengineering, and Dr. Dominic Albo, an associate professor of surgery, have received permission from the U.S. Food and Drug Administration to implant the vessels in humans.

Lyman and Albo developed the vessels for the university's Biomedial Engineering Center for Polymer Implants. The center is independent of the Division of Artificial Organs, which is responsible for the Utah artificial heart program.

Albo said artificial arteries would give heart surgeons an alternative to removing a vein from a patient's leg and using it as a bypass for blocked coronary arteries.

"Some patients do not have satisfactory veins for transplants," he said. "And even when the veins are good, this procedure significantly increases operating time."

Another major application would be surgery to save a badly damaged limbs. Arms, legs, hands and fingers often must be amputated because crushed arteries cut off blood flow to the limbs. Existing plastic tubes are too big to help, but the Utah vessels could replace the small arteries needed to keep a limb alive.

Lyman said his development of a new polymer molecule is the key to the Utah vessels, which can be made in tiny diameters. The researchers have successfully tested synthetic arteries as small as 4 millimeters (about one-sixth of an inch) in diameter.

"Since the 1960s surgeons have been using Dacron implants to replace large-diameter vessels," said Albo. He said the large vessels are 8-to-30 millimeters in diameter.