

New gel helps grow transplant organs

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U scientist Glenn Prestwich has developed a gel that may help other researchers grow organs for transplant.

"The ultimate goal is to be able to replace organ donation," Prestwich said.

Prestwich's lab is part of a group of five labs that received a \$5 million grant from the National Science Foundation to work on different components of organ printing.

Organ printing involves taking cells from an organ and using them to grow living tissue that could be used to repair damaged organs.

Prestwich's lab's contribution to organ printing is the hydrogel, a jelly-like substance in which the organs will grow. To make an organ, scientists use a "printer" that is filled with "bio-ink," cells taken from an organ such as a blood vessel or heart valve.

The printer creates a mixture of cells and liquid hydrogel in a three-dimensional shape.

As layers are made, the cells fuse together into a 3-D tissue.

After the hydrogel is removed, there is a healthy tissue that can be used to repair organs.

The hydrogel is made out of two sugar chains that provide support and food for the cells as they grow. When cells are added to the hydrogel, it turns from solid to liquid.

The gel allows the cells to orient themselves the way they would in a normal human body.

Prestwich said that the researchers have already printed cylinder-shaped organs such as blood vessels because the cylinder shape is one of the easiest to print.

During the 15-year process of developing the perfect hydrogel, Prestwich discovered that different forms of his hydrogel might have other uses in the medical field.

"It's pretty impressive; it has several applications and can be used for many different things," said Darell Davis, a professor in the department of medicinal chemistry.

One form of the gel lets wounds heal without scarring. Cells are unable to penetrate the gel, so they cannot grow together to form scar tissue.

Prestwich sees that form of the gel being applied after abdominal or tendon surgery to keep a patient from painful scarring and infections.

The gel can also be used to repair damaged bones, cartilage and livers.

Prestwich did an experiment in which he removed 90 percent of a mouse's liver. He then inserted hydrogel and liver cells and was able to grow a brand new liver.

To continue his work, Prestwich has enlisted the help of Morgan Massey, a plastic surgeon at the University Hospital.

Massey will be saving fat cells from patients who get breast reductions and liposuctions.

In the future, Prestwich hopes to extract stem cells from the fat samples. He wants to implant these cells in his hydrogel and attempt to grow breast tissue.

The research is being led by Gabor Forgacs, a professor of biological physics at the University of Missouri-Columbia.