

In 1st, US surgeons transplant pig heart into human patient

January 10 2022, by Carla K. Johnson



In this photo provided by the University of Maryland School of Medicine, members of the surgical team show the pig heart for transplant into patient David Bennett in Baltimore on Friday, Jan. 7, 2022. On Monday, Jan. 10, 2022 the hospital said that he's doing well three days after the highly experimental surgery. Credit: Mark Teske/University of Maryland School of Medicine via AP

In a medical first, doctors transplanted a pig heart into a patient in a last-ditch effort to save his life and a Maryland hospital said Monday that he's doing well three days after the highly experimental surgery.

While it's too soon to know if the operation really will work, it marks a step in the decades-long quest to one day use animal organs for life-saving transplants. Doctors at the University of Maryland Medical Center say the transplant showed that a heart from a genetically modified animal can function in the human body without immediate rejection.

The patient, David Bennett, a 57-year-old Maryland handyman, knew there was no guarantee the experiment would work but he was dying, ineligible for a human heart transplant and had no other option, his son told The Associated Press.

"It was either die or do this transplant. I want to live. I know it's a shot in the dark, but it's my last choice," Bennett said a day before the surgery, according to a statement provided by the University of Maryland School of Medicine.

On Monday, Bennett was breathing on his own while still connected to a heart-lung machine to help his new heart. The next few weeks will be critical as Bennett recovers from the surgery and doctors carefully monitor how his heart is faring.



In this photo provided by the University of Maryland School of Medicine, members of the surgical team perform the transplant of a pig heart into patient David Bennett in Baltimore on Friday, Jan. 7, 2022. On Monday, Jan. 10, 2022 the hospital said that he's doing well three days after the highly experimental surgery. Credit: Mark Teske/University of Maryland School of Medicine via AP

There's a huge shortage of human organs donated for transplant, driving scientists to try to figure out how to use animal organs instead. Last year, there were just over 3,800 heart transplants in the U.S., a record number, according to the United Network for Organ Sharing, which oversees the nation's transplant system.

"If this works, there will be an endless supply of these organs for patients who are suffering," said Dr. Muhammad Mohiuddin, scientific director

of the Maryland university's animal-to-human transplant program.

But prior attempts at such transplants—or xenotransplantation—have failed, largely because patients' bodies rapidly rejected the animal organ. Notably, in 1984, Baby Fae, a dying infant, lived 21 days with a baboon heart.

The difference this time: The Maryland surgeons used a heart from a pig that had undergone gene-editing to remove a sugar in its cells that's responsible for that hyper-fast organ rejection. Several biotech companies are developing pig organs for human transplant; the one used for Friday's operation came from Revivicor, a subsidiary of United Therapeutics.

"I think you can characterize it as a watershed event," Dr. David Klassen, UNOS' chief medical officer, said of the Maryland transplant.



This photo provided by the family shows from left, David Bennett Jr., Preston Bennett, David Bennett Sr., Gillian Bennett, Nicole (Bennett) McCray, Sawyer Bennett, Kristi Bennett in 2019. In a medical first, doctors transplanted a pig heart into Bennett Sr., in a last-ditch effort to save his life and the hospital said Monday, Jan. 10, 2022 that he's doing well three days after the highly experimental surgery. Credit: Byron Dillard via AP

Still, Klassen cautioned that it's only a first tentative step into exploring whether this time around, xenotransplantation might finally work.

The Food and Drug Administration, which oversees such experiments, allowed the surgery under what's called a "compassionate use" emergency authorization, available when a patient with a life-threatening condition has no other options.

It will be crucial to share the data gathered from this transplant before extending it to more patients, said Karen Maschke, a research scholar at the Hastings Center, who is helping develop ethics and policy recommendations for the first clinical trials under a grant from the National Institutes of Health.

"Rushing into animal-to-human transplants without this information would not be advisable," Maschke said.

Over the years, scientists have turned from primates to pigs, tinkering with their genes.



In this photo provided by the University of Maryland School of Medicine, Dr. Bartley Griffith takes a selfie photo with patient David Bennett in Baltimore in January 2022. In a medical first, doctors transplanted a pig heart into Bennett in

a last-ditch effort to save his life and the hospital said Monday, Jan. 10, 2022 that he's doing well three days after the highly experimental surgery. Credit: Dr. Bartley Griffith/University of Maryland School of Medicine via AP

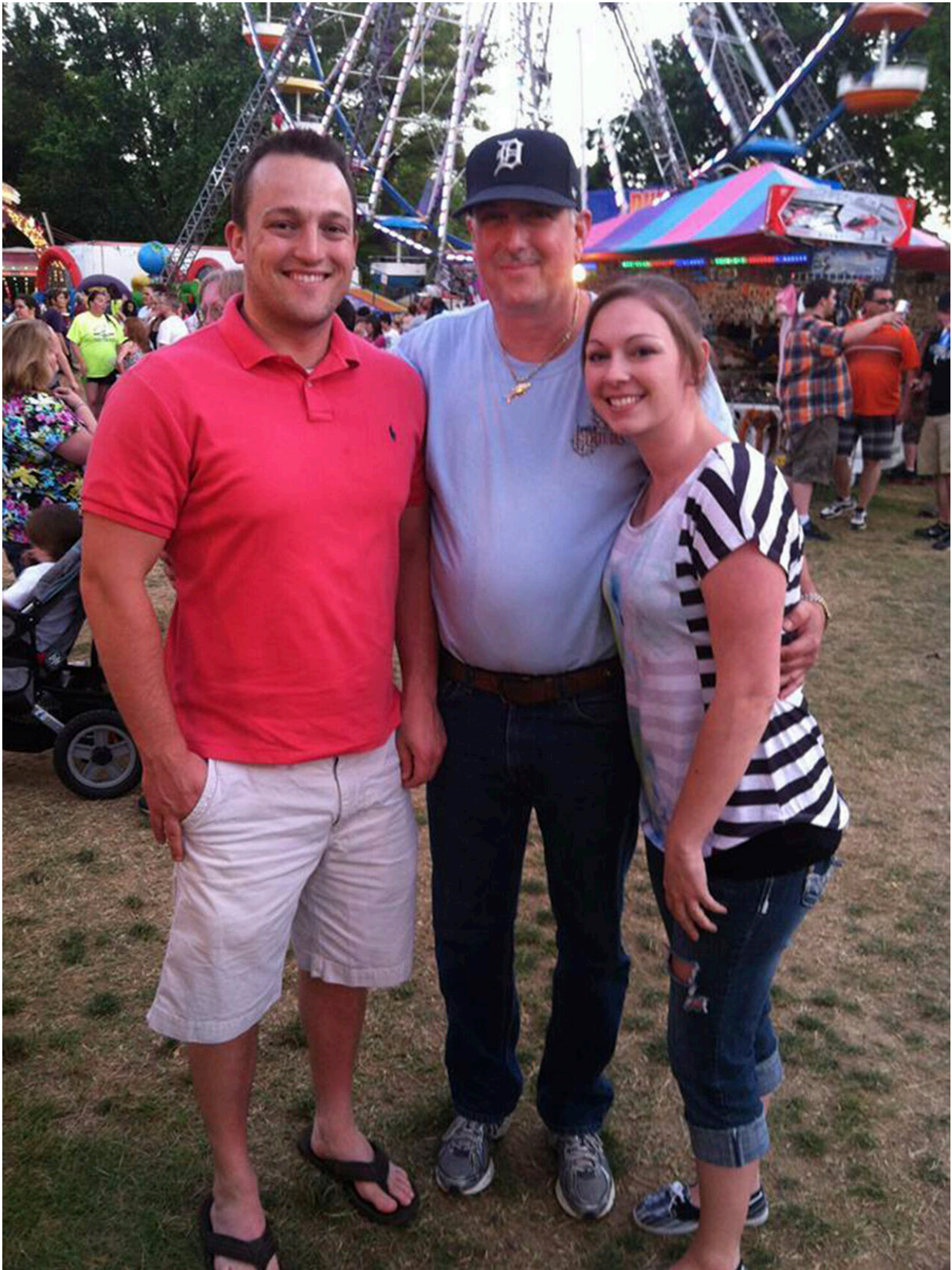
Just last September, researchers in New York performed an experiment suggesting these kinds of pigs might offer promise for animal-to-human transplants. Doctors [temporarily attached a pig's kidney to a deceased human body](#) and watched it begin to work.

The Maryland transplant takes their experiment to the next level, said Dr. Robert Montgomery, who led that work at NYU Langone Health.

"This is a truly remarkable breakthrough," he said in a statement. "As a heart transplant recipient, myself with a genetic heart disorder, I am thrilled by this news and the hope it gives to my family and other patients who will eventually be saved by this breakthrough."

The surgery last Friday took seven hours at the Baltimore hospital. Dr. Bartley Griffith, who performed the surgery, said the patient's condition—heart failure and an irregular heartbeat—made him ineligible for a human heart transplant or a heart pump.

Griffith had transplanted pig hearts into about 50 baboons over five years, before offering the option to Bennett.



This photo provided by the family shows from left, David Bennett Jr., David Bennett Sr., and Nicole (Bennett) McCray at a carnival in 2014. In a medical first, doctors transplanted a pig heart into Bennett Sr., in a last-ditch effort to save his life and the hospital said Monday, Jan. 10, 2022 that he's doing well three days after the highly experimental surgery. Credit: Courtesy David Bennett Jr. via AP

"We're learning a lot every day with this gentleman," Griffith said. "And so far, we're happy with our decision to move forward. And he is as well: Big smile on his face today."

Pig heart valves also have been used successfully for decades in humans, and Bennett's son said his father had received one about a decade ago.

As for the heart transplant, "He realizes the magnitude of what was done and he really realizes the importance of it," David Bennett Jr. said. "He could not live, or he could last a day, or he could last a couple of days. I mean, we're in the unknown at this point."

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