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HEALTH

# Scientists Revive Cells in Pigs' Organs After Death

An experimental apparatus and a special solution were used to restore some function to the organs of animals that had been dead for an hour

*By Amy Dockser Marcus* Updated Aug. 3, 2022 11:57 am ET

Scientists restored function to the organs of dead pigs, raising hopes that a similar approach might one day make more human organs available for transplantation but also sparking ethics concerns.

The research, described in a paper published Wednesday in the journal *Nature*, involved the use of an experimental system that included circulation-monitoring sensors, a filter and a pump that delivered a fluid containing multiple medications to the pigs' organs. When the bodies of pigs that had been dead for an hour were hooked up to the system, their hearts resumed beating and limited function was restored to the animals' brains, lungs,



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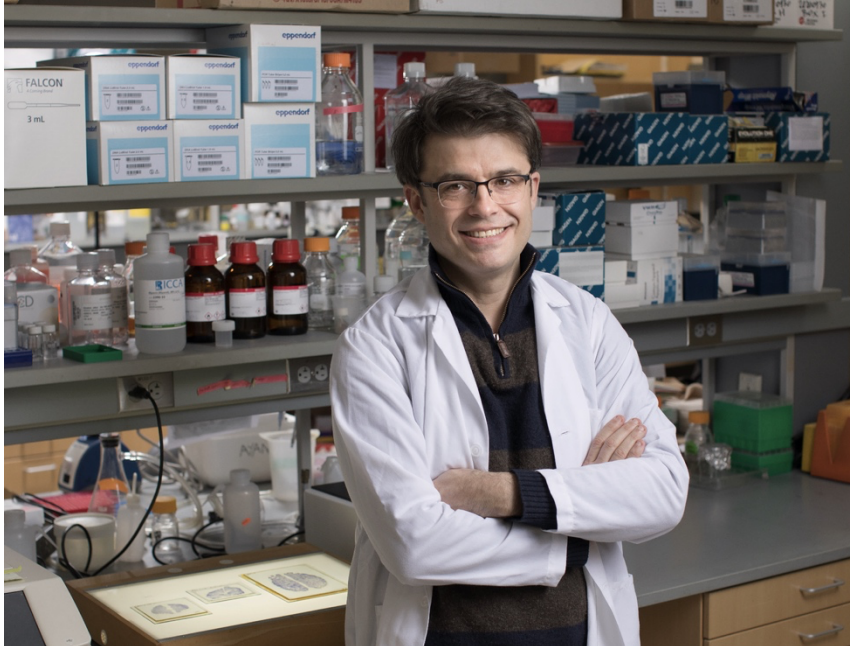
livers, kidneys and pancreases.

“These cells are functioning after they should not be,” said Nenad Sestan, a professor of neuroscience at Yale School of Medicine and one of the authors of the paper describing the system, which they dubbed OrganEx.

At a news conference Tuesday, Dr. Sestan and his collaborators said they hoped the system eventually might help expand the supply of human organs available for transplantation by making it possible to preserve and even repair organs. But they acknowledged that such a scenario remains a distant goal. It might take years just to develop the system to the point that it could be tested in humans, they said.

Scientists have been searching for decades for better ways to preserve organs. When a person’s heart stops, the resulting lack of oxygen quickly damages cells throughout the body. Unless organs are harvested quickly and preserved, transplant experts say, they are likely to be unsuitable for transplantation.

The standard way to preserve organs is to cool them rapidly and then store them in an ice- cold preservative. But damage can occur when the organs are thawed, and many must be discarded, according to transplant surgeon Dr. Francis Delmonico, chief medical officer of



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New England Donor Services, a Waltham, Mass.-based nonprofit that helps coordinate organ donation in several states.

More than 100,000 people in the U.S. are on the national waiting list for kidneys, livers, hearts and other organs, according to the United Network for Organ Sharing, a Richmond, Va.-based nonprofit that under contract with the federal government helps allocate organs. Despite efforts to increase the number of organ donors, more than 6,000 people die each year while waiting for a new organ.

Alexandra Glazier, president of New England Donor Services, said the transplant community has tried to find ways to boost the number of organs available for transplantation—including launching campaigns to raise awareness of donation and allowing people who have hepatitis and other medical conditions to serve as donors.

But she said innovations in so-called perfusion technology, such as the OrganEx system, could be “a game-changer in addressing the organ shortage.”

The OrganEx system builds on the Yale team’s previous research on a brain-perfusion system called BrainEx, which they used to restore some function in

the brains of pigs that had been slaughtered hours before. Like that research, described in a paper published in 2019 in *Nature*, experts said the new work raises ethical dilemmas—including weighing the system’s development for procuring more organs against its use by doctors to resuscitate near-death patients.

“We have an ethical duty to prioritize its development for saving lives before we consider the way it can benefit organ transplant,” Brendan Parent, director of transplant ethics and



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policy research at NYU Grossman School of Medicine, said of OrganEx. An editorial on the new research written by Mr. Parent was published in *Nature* along with the paper.

It is far too soon to think about how doctors might use the OrganEx system to resuscitate people, said Stephen Latham, director of the Interdisciplinary Center for Bioethics at Yale School of Medicine and a co-author of the new

Nature paper. While the pigs' hearts started beating, he said, the animals' circulation relied on the OrganEx machine throughout the experiment.

“Perfecting this as a whole-body rescue mechanism for people who have drowned or had heart attacks will involve a really fraught set of experiments,” Dr. Latham said. “Will you come back with a fully functioning brain? Will your heart be weak? Improving organ transplantation could save lives and you can do it faster.”

Write to Amy Dockser Marcus at [Amy.Marcus@wsj.com](mailto:Amy.Marcus@wsj.com)

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