

# Pig hearts may save human lives: researchers

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Human heart. Credit: copyright American Heart Association

One day, cardiac patients may enjoy a new lease on life with pig hearts beating in their chests, said researchers reporting a major advance Tuesday in cross-species organ transplantation.

Given the dire shortage of organ donors, the use of animal hearts, lungs or livers to save human lives has long been a holy grail of medical science.

But organ rejection has stood stubbornly in the way.

On Tuesday, scientists from the United States and Germany said they had succeeded in keeping transplanted pig hearts alive in baboons, primate cousins of humans, for a record 2.5 years.

Their method uses a combination of gene

modification and targeted immune-suppressing drugs.

"It is very significant because it brings us one step closer to using these organs in humans," said study co-author Muhammad Mohiuddin of the National Heart, Lung and Blood Institute in Maryland.

"Xenotransplants—organ transplants between different species—could potentially save thousands of lives each year that are lost due to a shortage of human organs for transplantation," he told AFP by email.

In experiments with five baboons, the hearts survived for up to 945 days, breaking previous records held by the same group of researchers.

The hearts did not replace those of the monkeys, but were connected to the circulatory system via two large blood vessels in the baboon abdomen.

The transplanted heart beat like a normal heart, but the baboon's own heart continued the function of pumping blood—a known method in studying [organ rejection](#).

Donor organs are often rejected by a recipient's immune system, which can recognise it as foreign, and thus a threat.

In this trial, the [donor organs](#) came from pigs which had been genetically modified to have high tolerance to immune response, basically making them invisible to the recipient's natural defence system.

The scientists also added a human genetic signature to the pigs that help prevent blood clotting.

The recipient baboons were given a drug that suppresses [immune response](#).

## Safe for humans?

Scientists have been experiment with the transplantation of primate kidneys, hearts and livers into humans since the 1960s. None survived beyond a few months.

Given their genetic proximity to humans, primates were initially thought to be the best donor candidates. But there is no large source of captive-bred apes—which take long to grow and mature, and some like chimpanzees are endangered.

Their genetic closeness also poses a higher danger of inter-species disease transmission, as well as ethical questions.

Pigs have since emerged as better donors. Their hearts are anatomically similar to ours, they pose less of a disease transmission risk, they grow up fast and are already widely farmed.

In these xenotransplant trials, baboons serve as human models.

The next big test will be full pig-to-baboon heart transplants, said Mohiuddin, adding that porcine [hearts](#) could make their way into human chests "in the foreseeable future".

"In our opinion, this regimen appears potentially safe for human application for patients suffering from end-stage organ failure who might be candidates for initial trials of xenotransplantation," wrote the study authors.

The work was published in the journal *Nature Communications*.

**More information:** *Nature Communications*, [DOI: 10.1038/ncomms11138](#)

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