

Lab-grown organs may be available in five years

Bioengineered lungs successfully transplanted into pigs – and humans could be next say scientists

By Sarah Knapton SCIENCE EDITOR

GROW-your-own organs could be available for desperately ill patients within five years, after scientists successfully transplanted lab-grown lungs into pigs for the first time.

The team at the University of Texas

Medical Branch (UTMB) showed that bioengineered organs were quickly accepted by the animals, and within just two weeks had developed a network of blood vessels. Previous attempts have failed within hours of transplantation because the organs did not establish the complicated web of vessels needed for oxygen and blood flow.

But the new tests showed the lungs were still functioning two months after they were implanted and the animals had 100 per cent oxygen saturation, meaning all their red blood cells were carrying oxygen through the body. The

method could help solve Britain's organ donation crisis. There are around 7,000 people on the donor waiting list of whom 350 need a lung transplant for conditions such as cystic fibrosis and emphysema.

One quarter will die before a suitable organ is found.

"Our ultimate goal is to eventually provide new options for the many people awaiting a transplant," said Joa Nichols, Professor of Internal Medicine at UTMB. "Somewhere down the line we may be able to take stem cells from a person and produce an organ that

their organ, tissue matched to them, with no immune suppression needed that would function the way their own lung originally did."

Joaquin Cortiella director of tissue engineering and organ regeneration at UTMB, said: "I would say in five to 10 years you will get someone with a bioengineered lung."

To grow the organs in the lab, scientists took the lung of a separate pig and stripped it of its blood and cells using a special mix of sugar and detergent, so that only the "skeleton" remained. They then created a cocktail of nutri-

ents and lung cells from the pig which was to receive the transplant, and put it in a tank with the organ skeleton.

The lungs were grown for 30 days and implanted into four pigs which were kept alive for 10 hours, two weeks, one month and two months to see how blood vessels were developing. All of the pigs that received a bioengineered lung stayed healthy.

As early as two weeks post-transplant, the bioengineered lung had established the network of blood vessels needed for the lung to survive. And there was no sign of too much fluid in

the lungs, known as pulmonary edema, which can cause respiratory failure.

Currently, donated lungs need to be adjusted to fit the size of the patient, and the recipient must take immunosuppressive drugs to decrease the risk of organ rejection.

But if seeded with their own cells, the organ would not be rejected.

It is likely that pig organs would be used as scaffolds to grow human tissue as they are almost identical in size.

The research was published in the journal *Science Translational Medicine*.