

# Study shows 1st time organ made in different animal useful in treatment

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TOKYO (Kyodo) -- A team led by University of Tokyo researchers has successfully created a healthy pancreas from mouse stem cells inside the body of a rat, in first such accomplishment between different species, a study published in the British science journal Nature showed Wednesday.

The pancreas, later transplanted into a mouse with diabetes, worked normally and led the disease symptoms to improve, marking the world's first case that an organ was created from a different type of animal and its transplantation proved effective in treatment, according to the researchers.

The move is a step toward creating human organs inside other animals, which will help address a shortage of donors. But technical and ethical challenges remain to realize the ultimate goal, such as the question of whether it is appropriate to use animals as organ makers.

Tomoyuki Yamaguchi, an associate professor at the University of Tokyo, said the project was able to show "the effectiveness and safety of medical transplantation using an organ made by a different animal."

Studies on regenerative medicine that use induced pluripotent stem cells, which can grow into any type of human body tissue, are conducted worldwide, but it is difficult to artificially cultivate human organs with complicated shapes.

The team, which aims to make organs by making use of the innate characteristics animals have, plans to proceed with studies to create monkey organs in pigs. The sizes of organs of pigs are close to those of humans.

In Japan, researchers are currently allowed to conduct studies to inject human iPS cells into animal fertilized eggs. But animal production by using the eggs is not permitted under laws and guidelines.

According to the researchers, mice and rats are separate species and are also different in size. They first created rats lacking a gene to make a pancreas using so-called genome-editing technology.

They injected mouse iPS cells and embryonic stem cells into the fertilized eggs of the rats with no pancreas genes. The rats then grew up to have pancreases made from mouse cells.

The study also showed that pancreatic islets, a cluster of cells located within a pancreas, released insulin to adjust blood sugar levels.

The islets were transplanted to mice with diabetes and "successfully normalized and maintained" normal blood glucose levels for over 370 days, the researchers said in its article.

The rat blood vessels remained in the islets but were replaced with mouse blood vessels following the transplantation.

The researchers said no acute rejection was seen after the transplantation because mice that produced the pancreas and those developing diabetes had similar genetic backgrounds.

The study indicates that acute rejection may not be observed even if human organs are made in animals if the iPS cells are those of the patients, they said.

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