**Activity: Ethics and pig cell transplants**

In this activity, students use role-playing to explore different stakeholders’ perspectives on the issue of using pig cells to treat type 1 diabetes. Transplanting pig cells into humans is a type of xenotransplantation.

By the end of this activity, students should be able to:

* present and justify the views of a given stakeholder group on pig cell transplants.
* use a role-playing scenario to highlight the diversity of issues raised by people for and against pig cell transplants.
* understand that ethical issues are often complex, with no right answer, but ethical deliberation can help us to make informed, justified decisions.

**Introduction**

Living Cell Technologies (LCT) is developing xenotransplantation as a treatment for diseases such as type 1 diabetes, Parkinson’s disease, stroke and hearing loss. LCT is currently trialling a treatment for type 1 diabetes that may soon become commercially available. The treatment involves transplanting patients with live insulin-producing pig cells. This technology gives diabetics better control of their blood sugar levels and can prevent or delay the occurrence of serious health complications. An overview of the project is in the article [Pig cell transplants – introduction.](https://www.sciencelearn.org.nz/resources/887-pig-cell-transplants-introduction)

In this activity, students are divided into groups and encouraged to debate the issue of using pig cells to treat type 1 diabetes. Each group will view the issue from the perspective of a different stakeholder.

**What you need**

* [Stakeholder roles](#roles)

**What to do**

1. Introduce the scenario: Scientists are transplanting live pig cells into patients with type 1 diabetes. You will represent a stakeholder group and argue your case at a meeting to determine whether or not this technology should be available to all.
2. Divide the class into small groups and give each a stakeholder role to play. The groups should read the basic information about their stakeholder’s role and views and spend some time researching and discussing these views and the underpinning values and beliefs.
3. Have each group present the views of their stakeholder role to the rest of the class (the meeting). Allow time for questions and discussion.
4. Encourage the class to identify key issues about pig cell transplants that are raised by the stakeholder groups – human health, medicine, animal welfare, environment, cultural and spiritual perspectives, regulations and monitoring, economics and individuals’ rights.
5. Students should weigh up the arguments from each group and vote to determine the outcome and/or write a short report stating their decision and justifying it. It may be helpful to use an ethical framework, such as consequentialism or multiple perspectives, to guide your discussions. Get the article: [Using ethical frameworks in the classroom](https://www.sciencelearn.org.nz/resources/1497-using-ethical-frameworks-in-the-classroom)

**STAKEHOLDER GROUP 1:** **RESEARCH SCIENTISTS**

Pig cell transplants have considerable benefits for patients with type 1 diabetes. Transplants can improve quality of life, increase life expectancy and reduce severe health complications associated with high or low blood sugar levels.

The main risk of pig cell transplants is disease transmission. However, LCT minimise this risk by using a unique disease-free pig breed and keeping them in a barrier facility to prevent them getting any new diseases.

**You might want to consider:**

* Pig cell transplants will solve the current organ shortfall.
* The benefits for type 1 diabetics are substantial, including improved quality of life, increased life expectancy and fewer health complications.
* The risk of cross-species infection is low.
* There is no evidence to date that transplant recipients will become infected with porcine endogenous retrovirus (PERV).
* LCT’s pigs have PERV in very low amounts in their DNA, and it has never become infectious.
* LCT use a disease-free breed of pigs, which originate from the Auckland Islands.
* LCT’s pigs are kept in a barrier facility to keep them free of disease.
* Pig welfare is important. Pigs are treated humanely and kept happy and healthy.
* The pig cells are encapsulated to prevent them from being rejected by the recipient’s immune system.
* The pig cell transplant recipient does not need to take toxic immune system-suppressing drugs.
* The New Zealand government has strict regulations on LCT’s research, which includes monitoring of pig donors, pig cell transplant products and transplant recipients.

**Useful links**

**Video clips**

The Pig cell transplant resources have video clips where scientists explain the risks and benefits from their perspective.

Get video clip: [Pig cell transplants and PERV](https://www.sciencelearn.org.nz/videos/484-pig-cell-transplants-and-perv)

Get video clip: [Risks and benefits of pig cell transplants](https://www.sciencelearn.org.nz/videos/487-risks-and-benefits-of-pig-cell-transplants)

**Discussion on xenotransplantation risks and benefits**

A panel of experts on xenotransplantation discusses xenotransplantation and LCT trials in New Zealand in 2009. This is an audio file available from the Science Media Centre. [www.sciencemediacentre.co.nz/2009/07/17/xenotransplantation-and-the-lct-trials-in-new-zealand](http://www.sciencemediacentre.co.nz/2009/07/17/xenotransplantation-and-the-lct-trials-in-new-zealand)

**STAKEHOLDER GROUP 2:** **PEOPLE WITH** **TYPE 1 DIABETES AND THEIR FAMILIES**

Most type 1 diabetics are keen for this research to proceed because it has the ability to reduce health complications, improve quality of life and increase life expectancy. They believe the use of piglets to provide the cells is justified by the benefits, especially as pigs are already used for food.

**You might want to consider:**

* The opinions of type 1 diabetics and their family members should be the most important when considering whether pig cell transplants should be available.
* Better treatments for type 1 diabetes are needed to reduce health complications and increase life expectancy.
* As we already eat pigs, using them for a medical treatment is justified if it reduces human suffering and saves lives.
* Using pig cells is not the same as using pig organs.
* Risk of disease transmission is low.
* Patients in the trial are provided with information about the risks and give informed consent. They also must agree to lifelong monitoring for potential infections.

**Useful links**

**Pig-cell transplants today means lollipops tomorrow**

A *New Zealand Herald* article from 22 October 2008.

[www.nzherald.co.nz/diabetes/news/article.cfm?c\_id=174&objectid=10538768](http://www.nzherald.co.nz/diabetes/news/article.cfm?c_id=174&objectid=10538768)

**Diabetes patient speaks out on pig-cell trial**

A *New Zealand Herald* article from 27 April 2010.

[www.nzherald.co.nz/nz/news/article.cfm?c\_id=1&objectid=10641161](http://www.nzherald.co.nz/nz/news/article.cfm?c_id=1&objectid=10641161)

**STAKEHOLDER GROUP 3:** **CONCERNED MEMBERS OF THE PUBLIC**

Some people are worried about the risk of pandemic or disease outbreak arising from xenotransplantation. For example, porcine endogenous retrovirus (PERV) is a virus found in the DNA of all pigs that has the potential to become active or infectious in other species. Although this has never been shown to happen, a new or unknown disease could potentially spread from transplant recipients to their close contacts and then the wider population.

**You might want to consider:**

* A ban on all xenotransplantation.
* More research into the risks of PERV disease transmission before xenotransplantation continues.
* A need for consent from the wider population, not just individual consent from transplant recipients, because the technology has the potential to impact on the wider population.
* Monitoring of transplant recipients and their close contacts for new diseases.
* An international register of transplant recipients, restrictions on travel, quarantine or sterilisation. (These actions would affect individuals’ rights.)

**STAKEHOLDER GROUP 4:** **ENVIRONMENTAL REPRESENTATIVES**

The Green Party remains committed to animal welfare: “Animals in our care must be treated humanely.”

**You might want to consider:**

* Animals in our care must be treated humanely.
* Xenotransplantation will increase the number of pigs killed for our purposes.
* Risk of disease spreading from pigs to humans – the worst-case scenario being a new disease pandemic.
* Alternative treatments, for example, type 2 diabetes incidence can be reduced by improving diet and exercise, although this will not influence incidence of type 1 diabetes.
* Increase the rate of organ donation in New Zealand.
* Exploring alternative treatments, such as stem cells, but this technique also raises ethical issues.

**Useful links**

**Green Party Animal Welfare Policy Summary**

A summary of the Green party’s animal welfare policy.

[www.greens.org.nz/page/animal-welfare-policy](http://www.greens.org.nz/page/animal-welfare-policy)

**STAKEHOLDER GROUP 5:** **ANIMAL WELFARE AGENCIES**

The New Zealand Anti-Vivisection Society (NZAVS) is against experiments on animals. They object to xenotransplantation because of the risk of cross-species infection.

Save Animals From Exploitation (SAFE) has expressed concerns that animals would be killed for their organs or cells, and they find this unacceptable.

**You might want to consider:**

* Using animals to meet human needs is morally wrong, whether it be for food or medical treatment.
* The benefits to humans of xenotransplantation are often overstated and the suffering of animals understated.
* The risk of pig cell transplants creating new diseases in animals and people.
* The AIDS pandemic began when the human immunodeficiency virus (HIV) that causes the illness crossed from monkeys into humans.
* Financial costs of pig cell transplants.

**STAKEHOLDER GROUP 6:** **NEW ZEALAND GOVERNMENT**

The New Zealand government approved the clinical trials of pig cell transplants in October 2008, after reviewing information provided by the National Health Committee. They deemed the risk of infection with porcine endogenous retrovirus (PERV) was extremely low. Also, they ensure that pig donors, pig cell products and pig cell transplant recipients are monitored for disease.

**You might want to consider:**

* Pig cell transplants will solve the current organ shortfall.
* Increasing organ donation is unlikely to provide enough donor tissue to treat type 1 diabetes.
* PERV risk can not be completely ruled out because of the nature of retroviruses and their ability to change. However, risk to individuals undergoing treatment and to public health and safety from PERV infection is extremely low.
* Pigs that are unlikely to transmit PERV are used for the pig cell transplants.
* The New Zealand government has strict regulations on LCT’s research, which includes monitoring of pig donors, pig cell transplant products and transplant recipients.
* Saving the health costs of a lifetime treatment of type 1 diabetes (currently estimated at NZ$1 million per patient).
* Benefits to the economy of patients coming to New Zealand to have treatment – xenotourists.
* Other treatments for type 1 diabetes, such as stem cells, are being investigated, but these also raise ethical issues.

**Useful links**

**Living Cell Technologies trial approved**

A press release from the New Zealand Parliament on 21 October 2008 when the New Zealand government approved LCT’s clinical trial of pig cell transplants for eight patients with type 1 diabetes.

[www.beehive.govt.nz/release/living-cell-technologies-trial-approved](http://www.beehive.govt.nz/release/living-cell-technologies-trial-approved)

**STAKEHOLDER GROUP 7:** **BIOETHICS COUNCIL\***

In 2005, the Bioethics Council gathered New Zealanders’ views on animal-to-human transplantation, focusing on cultural, ethical and spiritual considerations.

Overall, the Council concluded that there were no ethical, cultural or spiritual factors that justified a complete ban on xenotransplantation to meet a human need. However, it was clear that such procedures should not be allowed to proceed without a suitable regulatory framework. The Council recommended that decisions about xenotransplantation trials be made on a case-by-case basis.

“Thinking about xenotransplantation requires us to confront our fundamental cultural, ethical and spiritual beliefs – about what it means to be human; about our relationships with other people, nature and other species; and about the degree to which factors such as compassion and human need should influence decisions about biotechnology.”

**\*** Toi Te Taiao: the Bioethics Council was established in 2002 to review ethical issues raised by modern biological techniques. The Council was disbanded in 2009, but its documents are still available online.

**You might want to consider:**

* Animal welfare is important.
* The need to respond to the suffering of people and animals.
* Freedom of choice for individuals versus risk the wider population.
* Safety – the benefits to people must outweigh any risks.
* Viewpoints are strongly shaped by specific religions or cultures in New Zealand – mostly Christian, Māori and Pākehā.

**STAKEHOLDER GROUP 8:** **MĀORI/IWI REPRESENTATIVES**

Māori share the concerns of other groups. Māori and other indigenous peoples are increasingly raising concerns about the misappropriation of indigenous knowledge and the use of genetic resources by biotechnology companies.

**You might want to consider:**

* There is a wide diversity of Māori viewpoints.
* Some Māori are concerned about the implications of xenotransplantation for whakapapa (links to family and relationship to the natural world), mauri (the life force) and personal tapu (sacredness).
* Safety and wellbeing are central to Māori definitions of being well.
* Weighing up the needs of whānau against the cultural and spiritual objections to the technology.
* Māori viewpoints need to be considered when making decisions on xenotransplantation in New Zealand.

**STAKEHOLDER GROUP 9:** **RELIGIOUS OR CULTURAL GROUPS**

Religious groups will have many different perspectives. From the perspective of Christian beliefs, we have a role in caring for the creation that God has provided for us. Within religions, there is a broad range of views.

**You might want to consider:**

* Compassion is central to Christianity and many other religions so would permit using knowledge to relieve suffering and pain.
* Others object to mixing of species as this would distort the image of what it means to be human and made ‘in God’s image’.
* Some people accept a degree of suffering of animals if human lives are saved.
* Some people may accept cell transplants but not the use of whole organs.

**Useful links**

**Video clip**

The Pig cell transplants resources have a video clip where scientists explain the diversity of views on xenotransplantation.

Get video clip: [World views on pig cell transplants](https://www.sciencelearn.org.nz/videos/488-world-views-on-pig-cell-transplants)