Activity: Should artificial twinning in humans be allowed?
Teachers' information

This document contains all background instructions, chairperson's instructions and character sheets, as well as some additional information and hints.

Before starting:

- Print out the appropriate number of character sheets, chairperson's and background instructions.
- Students must have some knowledge of what artificial twinning is; reading about cloning generally on the ABPI website is also recommended as some of the information covered there (eg inbreeding in the Habsburgs and Chillingham Cattle) is raised in the debate.

During the activity:

- The chairperson can either be a student or a teacher.
- Be aware that some students may find some of the facts and issues raised upsetting.
- Make sure only one person speaks at a time, both during the discussions and the debate. The chairperson may find this easier to control if students have to stand to speak, and must raise their hand and gain permission from the chairperson before standing.
- Make sure the debate and discussion are balanced and aren't dominated by a few students or opinions – if a student is chairing the debate, help them monitor this.
- Encourage students who are not confident at class discussion to take part. It may help if each character is shared between a pair of students so they can discuss some of the issues first. This will allow them to rehearse part of their argument before having to present it to the whole class.
- Encourage the backing up of opinions with facts.

Suggested homework:

Ethics: Students write a letter to the Science Minister arguing for or against legalising artificial twinning in the UK, and backing up their points with facts. Students should argue the opposing side to their character in the debate.

Biology: Students prepare a small poster or leaflet explaining the differences between, and illustrating their use using examples, of reproductive cloning by nuclear transfer, artificial twinning and therapeutic cloning.

At the moment, all forms of cloning that result in the birth of a live human are illegal, except for the technique known as mitochondrial donation, or three - parent IVF. Some people think that artificial twinning is the most 'natural' form of cloning and should be allowed.

This activity is a structured debate that makes you think about some of the issues from other peoples' viewpoints. Before starting, make sure you know what artificial twinning is. You might also find it useful, but not necessary, to look over the rest of the ABPI resource on cloning.

You will need seven people: one person will be the chair and lead the discussion, and the other 6 will each be assigned a character who's point of view they will have to argue in the debate. If you have more than seven people you can have two or three people to argue one point of view; it is best to split a large group into two separate debates with a joint ending session to find out if both debates came to the same conclusion.

There are three characters arguing that artificial twinning should be allowed in humans, and three arguing that it should not. Like most complex issues, this is not black and white – and the characters opinions have been written to reflect this. Most characters arguing 'for' are actually arguing 'for, but only in some circumstances'. Similarly, some characters arguing 'against' can see the benefits of artificial twinning, but ultimately feel that these are outweighed by the possible problems.

In real life, people arguing a point of view want to make others think the same way as they do. Although all the facts on the character sheets are true, some of the other information may be slightly biased (but not untrue). The chair has been given extra information, so if you think a point is based too much on opinion and not enough on fact, stop the debate and ask the chair if it's correct.

What to do

1) As a group (lead by the chair) briefly discuss what you already know about artificial twinning. Hold a vote: how many people in the group think that artificial twinning should be allowed in humans?

2) Give one character sheet to each person. Each person to reads out the 'introduction' to their character in turn.

3) Debate, in character, whether artificial twinning should be allowed – your main point has been summed up as the 'issue'. Try to include the fact on your sheet in your argument and ask another character your question.

4) At the end of the debate, hold another vote and discuss (again lead by the chair) what you now think about artificial twinning. Is there a particular point of view that everyone agrees or disagrees with? Did peoples' opinions change through the debate, and why?

5) Your chair will let you know how your conclusions compared with those of real life government advisors. How did your conclusion compare to theirs?

Chair

1) Before the debate starts, ask the group what they think about human artificial twinning. Spend 5 minutes discussing it, making sure that only one person speaks at a time and everyone is listened to.
   Hold a vote: unless you already know everyone is either completely for or completely against human artificial twinning, you should also hold a vote on 'Under which circumstances is it acceptable?'
2) Give one character sheet to each person. Ask each person to read out the 'introduction' to their character in turn.
3) Start the debate! Make sure only one person speaks at a time (this might be easier to monitor if a person has to stand to speak) and that everyone who wants to make a point is given the opportunity.
   You also have to make sure that one character isn't talking much more than the others – perhaps make a tally-chart of the number of times each character speaks. No points should be solely opinion – they should all be backed up by facts. Here is the fuller picture of some points if anyone questions them during the discussions.

- Inbreeding (anti-cloning campaigner): The Chillingham Cattle have been inbreeding for centuries and are still healthy, so it doesn't necessarily lead to extinction (or maybe the effects depend on the species?).
- Embryo destruction (pro-life campaigner): Embryos have to be used, stored or destroyed within 14 days of fertilisation: at this point the embryo has no nervous system, can still split to form twins, can't develop further outside the womb, and isn't yet usually seen as a human being with full human rights in Judaism, Islam and liberal Christianity.
- Pre-implantation genetic screening: Only damages or destroys the embryo in such a small number of cases that it isn't seen as statistically different.

Stop the debate once everyone has argued all their (relevant) points or when you have only 10 minutes to complete the activity in. Everyone can now come out of character.

4) Hold another vote. Does everyone now agree with a particular character's opinion? Spend another 5 minutes discussing how and why peoples' opinions have changed.

5) And finally, how do this group's opinions compare to the experts? Read out the following paragraph, and in the time left ask the group if they agree with these recommendations. You could hold another vote – how many people were surprised by the official decision, and do they think it's a responsible decision, that it's too limited, or not limited enough?

'The US National Advisory Board on Ethics in Reproduction met to discuss artificial twinning in humans, covering most of the issues included in this debate, and published their conclusions in 1994. They recommended that the only case in which artificial twinning should be used was to allow couples undergoing IVF to have twins in which both embryos should be implanted at the same time. There was one other possible scenario, also for IVF couples: that one embryo should be implanted and the other stored in case the first pregnancy did not result in a live birth; if the first pregnancy was successful the second embryo must not be used again by the same couple. As the board could not decide whether it was better for the embryo to be destroyed (either directly or used for stem cell research) or to be donated to another couple (meaning that identical twins could be born in different families), they recommended that this second scenario should not be allowed.'

Against

Anti-cloning campaigner (Against)
I believe all forms of cloning are wrong because of the problems caused. It causes health problems and distress to the clone and both the genetic and surrogate parents, as well as reducing the gene pool so that inbreeding becomes more likely. Embryos can be split several times, and each of the resulting embryos can be split again to produce many clones. If the clones have desirable traits, I can imagine that many childless couples will want one, and will pay to make sure they have a 'good quality' surrogate child.
Fact: Inbreeding in a family can lead to its extinction in humans: look at the Habsburg family!
Issue: Uniqueness is not only a right, but also a duty to prevent health problems in future populations.
Question: How much is a cloned human worth? More or less than one that isn't cloned?

Pro-life campaigner
Artificial twinning, like IVF, would create more embryos than are needed and the ones that aren't used are destroyed. Life starts at fertilisation so destroying an embryo is murder, and this isn't made any better by using them to research treatments for diseases first. I wouldn't have a problem with IVF or artificial twining if all the embryos that were produced were used – either by the genetic

parents or donated to couples that want their own child but can't produce their own embryos – but this won't happen.
Fact: Around 2 million embryos created by IVF between 1991 and 2017 have been destroyed because they were not needed or were not good enough to be implanted.
Issue: Life begins at fertilisation.
Question: How can you justify destroying an embryo?

Leukaemia patient
I have a type of cancer that affects my blood. It can be treated by a stem cell transplant, but the donor and I need to be genetically compatible otherwise it won't work. I've heard that some parents want to split the embryos they produce and store one so they can have a second child later on to act as a genetically compatible organ or tissue donor in case the first one has serious health problems, or even to provide a second copy of a child in case the first one dies. Even though something like that could save my life, I think keeping an identical twin in storage for years only to be born because its needed is wrong.
Fact: The creation of a 'saviour sibling' has been legally allowed in the UK since 2004. The process has been used a number of times to allow families affected by rare genetic conditions to have another child who is not only free from the disease, but also a tissue match for an affected older sibling. It is still illegal to create an artificial twin.
Issue: An identical twin shouldn't be kept in storage as an embryo so that it could be born for the sole purpose of donating organs and tissues.
Question: How would you choose which embryo to implant first and which to store to be born only to save the life of the first?

For

IVF couple
We've been trying for a baby for 10 years but without any luck so far. We would like the opportunity to split any embryo of ours that is produced by IVF. We'd love to have more than one child, so we'd be thrilled if we could have twins. What we'd really like to do, however, is to split the embryo and store one of the embryos produced. That way, if the first embryo doesn't implant properly or the pregnancy ends in miscarriage, we could still have a chance of having a child.
Fact: It is thought that around 30% of fertilised eggs develop into a live baby: miscarriages and implantation problems are very common.
Issue: Artificial twinning increases our chances of having a child.
Question: Why shouldn't we have our own child?

Pre-implantation genetic screening couple
We are both carriers of cystic fibrosis, so there is a 25% chance that each child we have will be severely affected by the disease. We could undergo a special type of IVF called pre-implantation genetic screening. Some cells would be taken from the embryo before it is implanted and tested to see if the embryo will have cystic fibrosis, but this can harm the embryo and even destroy it.
If we could split the embryo, one embryo could be tested so we could be sure the second embryo doesn't have the disease and before it's implanted. We'd donate any of our unused embryos to research so more can be discovered about cystic fibrosis.
Fact: From 2005 to 2007, 8140 embryos were donated to research in the UK – but no studies using them have focused on cystic fibrosis.
Issue: This technique could help prevent suffering.
Question: Why shouldn't we try to make sure that we prevent cystic fibrosis in our children as there's no effective treatment or cure yet? If we can't prevent it, what's wrong with donating the embryos we won't use so researchers will be able to discover a good treatment?

Philosopher

I'm interested in identity and uniqueness, especially in twins. Twins are often seen as having a 'special bond' – some people think they would be psychologically damaged by being born a few years apart, but actually they would be only as psychologically affected as 'normal' siblings who are exposed to different environments in the womb and once they are born. Having twins a few years apart could even be good for them, as their parents will have more time to look after them.

Fact: Embryos are usually only stored for 10 years in the UK, although in special circumstances this can be extended.

Issue: It would benefit both identical twins and their parents if their birth could be separated by a few years.

Question: Twins are around 5 times more likely to die during pregnancy and the first few weeks after their birth – why wouldn't you want to prevent this by allowing them to be born separately?