

# Science Debate Kit: Stem Cells



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## Debate Kit: Stem Cells

### Should the UK government fund embryonic stem cell research?

The different 'rounds' of the debate help students think through the issues and reconsider their opinions. The structure also shows them how to build a discussion and back up their opinions with facts.

You can use all eight characters, or fewer, as you wish.

The minimum is the four essential characters (in bold), this gives two for and two against.

#### Characters

##### For funding

- **Steve Silver** – Wheelchair user
- **Maddie Clark** – Embryonic stem cell scientist
- Orrick Adair MP – Politician
- Prof. Gala Takana – Historian of science

##### Against funding

- **Dr Rosie Swann** – GP
- **Rahul Singh Gupta** – Human rights campaigner
- Abigail Chandler - Former IVF patient
- Owen Martins – Children's charity worker

#### Facilitation tips

Ensure pupils know there is no right or wrong answer. Be observant of ones who want to speak and are not getting a chance. Encourage students to give a reason for their opinions.

For groups who may need extra support you can put the following prompt sentences upon the board:-

"I think the government should/shouldn't fund embryonic stem cell research because....."

"I think ..... is the most important point to think about."

**Designed for KS4.**

**Has been used with ages 11-18**

## Learning notes

#### Learning objective:

- To practise discussing and debating issues and expressing an opinion
- Understand the arguments for and against the use of embryonic stem cells

#### Other learning outcomes:

- Consider social, ethical and factual issues in an integrated way
- Think about different points of view
- Learn to back up their opinions with facts

#### Curriculum points covered:

##### HSW

- Using data to draw conclusions
- Societal aspects of scientific evidence
- Developing an argument

##### Substantive

- What are stem cells and what might they be used for in future?
- What ethical issues do stem cell treatments raise?



# Debate

## Orrick Adair MP - Politician



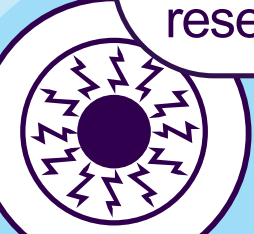
Thanks to our laws on embryo research, the UK has a strong record of stem cell research and patents in comparison to other countries. But if our country's scientists don't get enough government funding to drive their research, we'll fall behind. The research will still be done in another country, or by private companies who are only interested in profit. Then it will be more expensive for our public if they want to get treatments.

**Fact:** Patents can be placed on stem cell research, and researchers in other countries are already doing so. So whenever another scientist wants to use that research, they will have to pay for it.

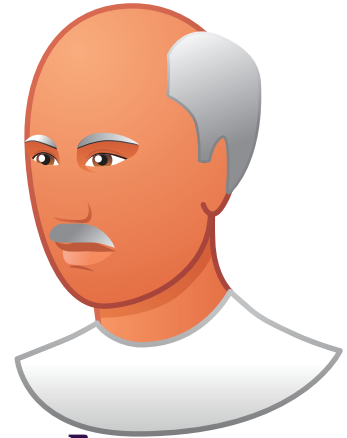
**Issue:** This sort of research is inevitably going to be done somewhere, and I would rather it was our scientists, our work, and our public who benefit.

**Question:** We have been world-class leaders in stem cell research - why should we lose our edge now?

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# Debate



## *Owen Martins – Children's charity worker*

Our charity helps some of the most vulnerable children in our society, protecting them from abuse and trying to give them life chances. We don't have enough money to help everyone we'd like to. I think embryonic stem cell research just has too far to go, it'll always be bogged down by controversy, and meanwhile we could be using the money to make real differences now to kids like the ones I work with. I just don't think this research should be a high priority for a government strapped for cash.

**Fact:** In 2005, the UK government provided £50 million for stem cell research, and this is expected to keep increasing.

**Issue:** The government's money could make a lot of difference elsewhere.

**Question:** Even if these treatments are developed, how many lives will they really improve?

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# ***Debate***

## ***Steve Silver – Wheelchair user***



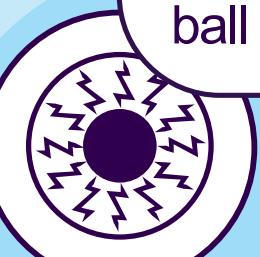
I was almost completely paralysed in an accident when I was fifteen. I can't look after myself and I need expensive care. I don't understand why we wouldn't support research which could give people like me our quality of life back. But scientists have trouble getting funding for practical trials. I'm an atheist and I believe we only get one life - I just want to be allowed to live mine like everybody else.

**Fact:** A 2003 survey showed around 70% of the British public supported the use of human embryos for medical research.

**Issue:** There's nothing else that can help me, but expert scientists believe treatments based on embryonic stem cells could one day heal spinal injuries like mine.

**Question:** Why should I have to live in a wheelchair all my life, just so a few people can feel good about not destroying a ball of cells?

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# Debate



## *Dr Maddie Clark – Embryonic stem cell scientist*

It's far too early to give up on embryonic stem cells. iPS cells aren't a simple solution - at the moment we can't keep them alive for very long and they'll take years and a lot of money to develop. Also, scientists wouldn't have worked out how to develop iPS cells without studying embryonic stem cells first. There's still a lot we need to learn.

**Fact:** Because they could become any kind of tissue, embryonic stem cells are much more versatile than adult stem cells. At the moment adult stem cells can only treat certain types of diseases and disorders.

**Issue:** Sick people don't have time to waste, and it would be morally wrong to avoid research that could help them.

**Question:** How do we know if we can even develop iPS cell or adult stem cell treatments without using embryonic stem cells. And even if we can, how much longer might it take?

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# ***Debate***



## ***Rahul Singh Gupta - Human rights campaigner***

There are people in the world so poor that they sell a kidney, or the cornea from their eye. Embryonic stem cell treatments will turn embryos into commodities. We'll need to create lots of embryo stem cell lines to match patient's tissues. I think vulnerable women will be encouraged to sell their eggs and undergo dangerous procedures to do so.

**Fact:** Between 1991-2005, there were 1.2 million unused IVF embryos, yet only 7% were voluntarily donated to science research of any kind. People don't want their embryos experimented on.

**Issue:** There's too much potential risk of exploitation and commercialisation, embryonic stem cell therapy is just too dangerous to get into.

**Question:** Can we really control embryonic stem cell research?

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# Debate

## *Prof. Gala Takana - Historian of science*



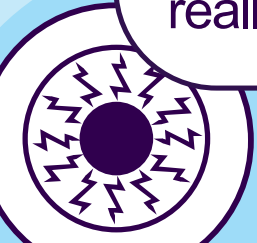
Good science is about being brave and active - making new discoveries and pushing the boundaries of what we know. In the past, scientists have done things which once seemed shocking - dissecting human bodies, organ transplants, vaccine research - but some of the end results have been lifesaving treatments and useful science. Give this research time, we shouldn't be too impatient.

**Fact:** History shows science doesn't always progress as quickly as we'd like - it took at least 20 years between discovering bone marrow adult stem cells in the 1950s, and performing lifesaving bone marrow transplants.

**Issue:** New methods always seem controversial, but we should appreciate the potential benefits.

**Question:** If embryonic stem cell research leads to lifesaving treatments in the future, will we really regret funding it?

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# Debate



**Dr Rosie Swann - GP**

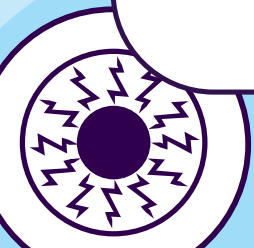
I see a lot of vulnerable patients who have had their hopes raised by the hype about embryonic stem cell research. I'm the one who has to tell them that it doesn't change things and they are still going to die of Parkinson's disease! But some desperate people are already spending their life savings travelling overseas for dangerous, experimental treatments with quack doctors.

**Fact:** In 10 years of research, no one's actually developed any scientifically proven treatments that use embryo stem cells, and there's a risk that experimental embryonic stem cell treatments can cause tumours.

**Issue:** The government needs to stop funding these false hopes, and focus on improving existing medical treatments.

**Question:** Isn't embryonic stem cell research already causing more harm than good?

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# Debate



## Abigail Chandler - Former IVF patient

I underwent IVF because I wanted a child, and there were leftover embryos from my treatment. I'm not religious, but to me each one of those embryos feels like they are part of me and my partner. Each of them could have turned into a baby – and grown into a person like you and me – if they'd been implanted. I can't bear the idea of them being experimented on and grown in labs.

**Fact:** Scientists have been able to 'turn back the clock' and make adult cells behave like embryonic stem cells – these are called Induced Pluripotent Stem Cells (iPS).

**Issue:** Research on eggs is one thing, but I think fertilised embryos are different, it just feels wrong. I don't think scientists should ignore the feelings of people like me.

**Question:** Why don't we concentrate on the alternative and put our funds into iPS and adult stem cells?

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## Teachers Notes

### Science Debate Kit: Stem Cells

#### Should the UK government fund embryonic stem cell research?

### Lesson plan

The different 'rounds' of the debate help students think through the issues and reconsider their opinions. The structure also shows them how to build a discussion and back up their opinions with facts.

#### Starter: 5 minutes.

What different types of human cells can the class think of. Do they know how they are made? What do they know about stem cells? Stem cell research raises ethical issues about what we think about cells and their potential.

#### Main Activity: 35 minutes.

- 1) **Split students into** as many **groups** as characters you want to cover.
- 2) **Give** them their **character cards** – one per group, and give them a few minutes to read them over.
- 3) Get one student in each group to **read out** their **first section** to the rest of the class.

**KS4:** Designed for KS4. Has been used with ages 11-18.

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What are the class's initial thoughts? Is there one position they identify with or reject?

- 4) Take it in turn to **read out** their **fact**.

Does it change the way they think?

- 5) **Read** the **issue**. Any different feelings?

- 6) Each team **asks** their question to the character of their choice.

**Support:** To help students you can put the following prompt sentences up on the board:

"I think the UK government should/shouldn't fund embryonic stem cell research because....."

"I think ..... is the most important point to think about."

#### Plenary: 10 minutes

Vote for which position they agree with most (if there is one). Why? Which arguments were the most persuasive?

**Note** – Pupils can stay in roles all the way through debate, or only for the first round if you prefer. If it's all the way through, give them a chance to express their own opinion at the end and in the plenary.

For groups who are not confident at class discussion, it might help to have them start by discussing the question and/or their character's position in pairs, and then compare notes in fours. They've then had chance to rehearse some of what they want to say before having to do it in front of the whole class.

## Background notes for teachers

Stem cells are unspecialised 'starting' cells which differentiate and develop into specialised tissue cells. Some cells in the human body can't reproduce themselves, and must develop from **adult stem cells**. These can only develop into a few specialised cell types – epidermal stem cells into skin cells, bone marrow stem cells into types of blood cell.

Adult stem cells can be used in medical treatments, and some already exist, such as bone marrow transplants. In general, research into adult stem cell treatments is further along than embryonic stem cell treatments.

Embryos also begin as a clump of stem cells - **embryonic stem cells** - but they can develop into all the different kinds of cells in the body. Human embryo stem cells were first isolated in 1998.

Scientists believe embryonic stem cell research has enormous potential. It could advance understanding of the body's cells and be used to heal damage to the body, grow replacement body tissues, test drugs more accurately, or create treatments for things like Parkinson's, diabetes, and heart disease.

Embryonic stem cells are developed into 'stem cell lines' for research, meaning that a family of identical stem cells are developed from one 'parent' stem cell. In order to create an embryonic stem cell line, a fertilised human embryo must be destroyed. Although in theory only one embryo needs to be destroyed to start a cell line, patients may need more than one cell line for treatments, or many specialised cell lines

will be needed to match patients' immune systems. To date, there are 30 stem cell lines banked in the UK.

The Human Fertilisation and Embryology Authority (HFEA) was established to oversee private and public fertility treatment and research in the UK. Since 2001, the UK government has permitted and funded embryo stem cell research on embryos under 14 days old. Scientists are permitted to create embryos solely for research, and each application for research is reviewed by the HFEA.

In 2007, researchers developed a way to turn ordinary adult cells back into stem cells. These are called induced pluripotent cells (iPS). The research is still extremely new and iPS cells will need much more research before they can be made stable and usable.

#### Suggested homeworks:

**Ethics:** Students write a letter to the science minister, arguing for or against funding of embryonic stem cell research and giving reasons why. They should argue the opposite side to their character in the classroom debate.

**Biology:** Students to prepare a poster illustrating four types of human cell and noting some of the differences.

#### For more info, supporting resources and DIY debate kit templates

<http://imascientist.org.uk/debate/>

**Free I'm a Scientist mugs to all teachers who email us their DIY kits, we'll put them online for other teachers to use too.**