

Five Myths about Human Embryonic Stem Cell Research

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Debates about research on human embryonic stem cells are often portrayed as opposing two irreconcilable camps. On the one side are placed scientists, who see this research as offering new hope for people with incurable degenerative diseases; on the other side are placed religious groups, who oppose all research on human embryos – to which they assign an equivalent status to adult humans. However, research conducted at Innogen on the views of a range of specialists involved with stem cell research has challenged this dichotomy. In particular, it has demonstrated that the issues raised by human embryonic stem cell research are much more diverse and complex.

PRINCIPAL PERCEPTIONS ABOUT RESPONSES TO RESEARCH ON HUMAN EMBRYONIC STEM CELLS

Stem cells are basic cells which can give rise to specialised cell types such as nerves or muscles. Research on human stem cells can be conducted on so called ‘adult’ stem cells, derived from particular tissues (e.g. bone marrow, umbilical cord, etc.) or on ‘embryonic’ stem cells, isolated from early stage embryos (these can be surplus to IVF treatments, or created specifically for research using somatic cell nuclear transfer – cloning – techniques).

Research on human embryonic stem cells is usually portrayed as a polarised opposition between research scientists seeking cures for serious diseases and a few people whose religious convictions demand that embryos are given the full respect that would be due to an adult human. We suggest that the simplistic portrayal of debates about human embryonic stem cell research (SCR) rests on five widely-held assumptions which bear re-examination:

1. All stem cell scientists are positive about the therapeutic prospects of embryonic SCR
2. The main benefit expected from SCR is cell replacement therapies for patients
3. It is only a few religious people who are against human embryonic stem cell research
4. The only ethical issue is the status of the embryo
5. A cloned human embryo is the same as an embryo produced by fertilisation

By drawing on data from in-depth interviews with around 70 professionals involved in SCR (including junior and senior, academic and industry researchers and clinicians in the UK and Australia), we show that each of the above assumptions masks interesting dimensions of SCR that would benefit from further explorations. We now examine the five propositions in more depth.

ALL STEM CELL SCIENTISTS ARE POSITIVE ABOUT THE THERAPEUTIC PROSPECTS OF EMBRYONIC SCR

The impression often given in debates around embryonic SCR is that there is scientific unanimity in acknowledging the direct potential of this research for therapies. We suggest that the situation is somewhat more complex.

We found that most researchers, whether working in the adult or embryonic stem cell field, viewed research on each as complementary. However, it was clear that they varied in their optimism regarding the therapeutic prospects of embryonic stem cell research. Stem cell scientists experienced with adult stem cells tended to be more sceptical of the promise of embryonic stem cell therapies, largely because they saw a big gap between experimental results and clinical reality.

Some researchers, including those specialised in embryonic stem cells, were concerned about the focus on searching for the most pluripotent stem cell (the one that can divide into the most cell types) arguing that, depending on the application of the cell, pluripotency, and its attending risk of tumour formation, could be a disadvantage, rather than an advantage.

Thus, human embryonic stem cells are not seen by all researchers as the therapeutic panacea they are often presented as in public. As a result, many of the specialists were particularly concerned not to over-state the potential benefits of cell replacement therapies and, in particular, not to raise expectations of patients unrealistically.

THE MAIN BENEFIT EXPECTED FROM SCR IS CELL REPLACEMENT THERAPIES FOR PATIENTS

Public presentations of the potential of embryonic SCR typically discuss a variety of serious degenerative diseases that might be cured by cell replacement therapy. However, our interviewees argued that the prospects for realising these therapies are mostly in the far future (e.g. 20 years) and that their application may be restricted to small groups of patients.

Nevertheless, our respondents did put forward benefits from embryonic stem cell research that may have impacts far outweighing those from cell replacement therapies and that could be realisable more quickly. Some of the other major benefits from embryonic stem cell research included:

- Basic science, furthering basic understanding of biology
- Modeling human diseases
- Harnessing the body's own regenerative capacities
- Bioreactors
- Drug development – toxicity screening resulting in reduced use of animals

The concept of immediate therapies as the main driver for the research was particularly noticeable in the context of research on “therapeutic cloning”. This technology, also known as “somatic cell nuclear transfer”, is often put forward as the ideal solution to immune rejection through patient specific cell therapy. In contrast, our interviews suggest that it might more usefully be applied as a tool, rather than directly as a therapy. Many proponents of embryonic SCR also expressed doubts as to the possibilities of patient-specific stem cell therapies being affordable on a large scale.

Some scientists raised concerns about the focus of public discussions on these direct therapeutic applications. Some even felt that they had to focus on these promises in public in order to put across potential benefits.

IT IS ONLY A FEW RELIGIOUS PEOPLE WHO ARE AGAINST HUMAN EMBRYONIC STEM CELL RESEARCH

Objections to embryonic stem cell research in Europe, USA and Australia are generally seen to come purely from religious perspectives (usually from a Christian basis, particularly Catholic, Evangelical Protestant or Orthodox). This view was not substantiated in our interviews. Many people (including research scientists) who were not opposed to embryonic stem cell research raised important concerns about the research. Similarly, not all Catholics and Evangelical Protestants were opposed to embryonic SCR, and some even worked in the field.

People interviewed in this research who were against embryonic stem cell research were motivated by a range of different reasons and some came overtly from a non-religious perspective. This is, of course, not to deny that there are people in the UK and Australia for whom the status of the embryo, derived from a religious understanding, is of crucial importance.

THE ONLY ETHICAL ISSUE IS THE STATUS OF THE EMBRYO

Concerns about embryonic SCR are usually reduced to concerns about the status of the embryo. Those people who hold that the embryo at conception should be treated as equivalent to an adult human are pitted against those who view the embryo as 'just a ball of cells'. While there is some truth in this characterisation (we did find people at both ends of this spectrum) the reality was that people's views were more complex and a diversity of issues was raised.

Many scientists, even though they considered embryos to be a ball of cells, were still concerned that these be treated with respect. Some researchers weighed up the cost of destroying embryos against the value of potentially important applications to human health and the need to balance the unmet needs of the sick with sensitivity towards the embryo. Others pointed out that the consequences of not pursuing research on embryonic stem cells may be more negative than doing the research. Others felt that, having produced 'spare' embryos, they had a moral imperative to use these embryos, rather than let them go to waste.

Many issues, beyond the status of the embryos, were raised about embryonic SCR, such as:

- Unnecessary hype that may lead to patient disappointment
- Concerns about coercion or 'instrumentalisation' of the female body
- The impossibility of getting fully informed consent
- The potential prohibitively high cost of any stem cell therapies
- "Maverick" scientists going to clinical trials too early and endangering patients' lives
- Widespread commodification and commercialisation of the human body
- The complexity of resource allocation. Given that people around the world are dying of diseases that are cheap to prevent, how can expenditure on this research be justified?
- Embryonic stem cell research is preferable to exploiting poor people to donate their organs to wealthier people

A CLONED EMBRYO IS THE SAME AS AN EMBRYO PRODUCED THROUGH FERTILISATION

Our interviews highlighted a number of ways of conceiving of an embryo produced by cell nuclear transfer.

Broadly, three attitudes towards cloned embryos were expressed:

- A cloned embryo is no different from other embryos
- A cloned embryo is essentially a biopsy grown in a particular way (and hence deriving cells from the embryo is unproblematic).
- A cloned embryo is not really a human – therefore deriving stem cells from cloned embryos is more acceptable than doing so from IVF embryos.

A small proportion of people viewed cloned embryos as something 'other' than conventionally produced embryos, not really human and therefore available for SCR. For others, cloned embryos held the same concerns as non-cloned embryos. For some interviewees, use of cloned embryos for SCR held more of a problem than use of 'spare' embryos because this involved creating embryos specifically for the purpose of destroying them.

CONCLUSIONS

Research on human embryonic stem cells is often portrayed in simplistic terms. We suggest that this perception is misleading and that:

- Whilst few research scientists would not advocate continued research on human embryonic stem cells, there is heterogeneity with respect to expectations of therapies based on these cells.
- The main benefits from human embryonic stem cells may come in areas other than cell therapies e.g. in basic science or toxicity testing and drug development.

- Concern and uncertainties about the ethical acceptability of embryonic stem cell research does not just derive from religious perspectives and not all religious people are against embryonic stem cell research.
- There are issues other than the status of the embryo that concern people regarding research on embryonic stem cells.
- Cloned human embryos are construed in very complex ways.

We suggest that the current simplification of the issues into one of scientific freedom versus the role of religion in society may have the effect of polarising the debate, and ignoring other issues that are deserving of attention. Furthermore, some scientists appear to be struggling to find a space where they can voice their concerns without jeopardising the whole stem cell research agenda. We suggest that it would be beneficial to continue to view the question of human embryonic stem cell research as one of particular ethical sensitivity but one which is more complex than is sometimes portrayed. We need to consider how this simplification occurs and to find safe spaces where research scientists can voice their concerns.

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