Embryo Research, Human Stem Cells and Cloned Embryos

Summary Report from the Church and Society Council to the 2006 Church of Scotland General Assembly

Introduction

1. Embryonic stem cells and cloned embryos have been subjects of major debate during the past 8 years in the UK, Europe and the industrialised world. The Church of Scotland has played a significant role in this wider debate. It is, however, 10 years since a major report on embryology, *in vitro* fertilisation (IVF) and embryo research was brought by the Board of Social Responsibility to the 1996 Assembly,[i] and 5 years since reports on stem cells from that Board and from the Society Religion and Technology Project (SRT) were debated in 2001.[ii] [iii] SRT also reported on animal and human cloning in 1997,[iv] and made brief stem cell reports in 2002 and 2003. Important developments in the science in early 2004 prompted the SRT Project to bring a Supplementary Report on Cloned Human Embryos to the 2004 Assembly, which decided:

> '*to remit for further study, within the Church and Society Network, the issue of human embryology and stem cells in the light of recent scientific and medical developments and for a Report to be made to the General Assembly of 2005*.'

2. A full report of this study has been prepared by an ecumenical working group set up by the SRT Project and the Social Interests Committee of the Board of Social responsibility. This has been produced as a separate document which should be read in conjunction which this shorter report for the General Assembly. This report is especially timely because the Government announced a consultation on ethical, regulatory and legal issues in reproductive research with a view to replacing the 1990 Human Fertilisation and Embryology Act with new legislation. During the preparation of our report, a working group was set up to prepare a response, which was submitted by the Church and Society Council in December 2005.[v]

3. We have reviewed the relevant sections of the 1996 report *Preconceived Ideas: A Christian Perspective of IVF and Embryology* and its recommendations, and the reports on cloning and stem cell issues at subsequent Assemblies. The 1996 report affirmed 'the sanctity of the human embryo from the moment of its conception', and stated "the human embryo must be regarded as an actual person … at all stages of development from the moment of conception" and that as a result "all research on human embryos is morally wrong." But it also recognised that some felt "the need of childless couples and the potential benefits of embryo research … outweighed the obligation felt for the embryo." That report aimed to hold together diverse viewpoints, some of which were left unresolved. 1996 General Assembly deliverances reflect this equivocal situation in referring to the sanctity of the embryo, but recognising the differences of view over IVF and embryo research, and welcoming the limitation of research to 14 days. The 1997 Assembly opposed reproductive human cloning. The 2001 Assembly accepted the creation and use of cloned human embryos for medical research, but opposed the use for stem cell research of surplus embryos from IVF treatments. We note that the logic of the 2001 position has been challenged, and that in the current state of the science it would effectively rule out most research with embryonic stem cells.

Scientific Context and Case Studies

4. Stem cells are 'ancestor' cell in humans and animals, which are able to renew themselves and also to differentiate into cells which have specific functions in body tissues. They may be obtained from embryos, some adult tissues, foetal tissue and placental cord blood. The isolation of stem cells in the laboratory has created hopes that they could be directed to yield different types of body cell to replace those lost in serious, often incurable, degenerative human diseases, and to treat spinal cord injuries and other conditions. In most cases the

translation of this potential into practice looks likely to lie a long way in the future, however, as discussed in more detail in the full report. [vi] Scientifically, embryonic and adult sources of stem cells have their pros and cons. For example embryo stem cells cannot be transplanted directly into an adult patient because of a risk of cancer. They must be 'differentiated' into the desired, specific cell type, requiring very careful controls. Cells from embryos would also be of a different genetic type to the potential patient, with a risk of rejection. Adult cells might be derived from tissues taken from the patient themselves, but in the case of genetic diseases, the cells may still carry the mutation which would eventually reproduce the condition. A major drawback with adult-derived cells is to produce sufficient cells to be useful in therapies, because they are rare in the body and have limited potential to be replicated in the laboratory. In all these approaches, there are large uncertainties in these early stages of research. Damage has been done by exaggerating the potential of rival routes, whether by over-enthusiasm or for political ends.

5. If ways can be found to derive the relevant cell types from stem cells in sufficient quantities, and overcome the many technical hurdles, and if laboratory results can be translated into safe and effective clinical practice, then the potential range of conditions for which they may offer treatment is very wide. Chapter 3 of the full report explores three of these as examples which illustrate how stem cells might be used in treatments. Each example illustrates the serious difficulties which would have to be overcome for any of these to lead to useful therapies, whichever route is used:

- neurodegenerative disorders such as Parkinson's disease, requiring neuronal cell types which might be derived from embryonic, foetal or adult sources (Example 1)
- diseases of the blood and immune systems, using haematopoietic adult stem cells in bone marrow (Example 2)
- diabetes, requiring insulin secreting cells in the pancreas, derived from embryonic or adult sources (Example 3)
- acute liver failure requiring hepatocytes, the predominant mature cells types in the liver
- damage to heart tissue requiring cardiomyocytes, the predominant mature cells types in the heart.

6. Most embryo stem cells are derived from surplus embryos from in vitro fertilisation (IVF) treatments. Hopes for an alternative approach, making embryos by nuclear transfer cloning (the method used to create Dolly the sheep), so-called 'therapeutic cloning', are now very uncertain after Korean research claims proved to be false and also due to the limited supply of human eggs. Cloning methods have potential to be used, however, in basic research into the causes of degenerative diseases, as described in Example 4 in Chapter 3, on motor neurone disease. Cells showing the progression of the disease might be derived from cloned embryos created from a skin or blood sample taken from a patient. Such neuronal cells are difficult to obtain otherwise.

Theological Perspectives

7. As a foundation to discussing stem cell research, we have re-examined the theological and ethical arguments concerning the moral status of the human embryo, and the theological significance that might be attributed at various stages of biological development. We start from the premise that all humans are equally creations of the triune God, uniquely made in God's image, regardless of any functional framing of the human condition, and so are of inestimable value. We understand the human person in the light of the incarnation, life, death and resurrection of Jesus Christ, and as relational and communal, called to relationship with Christ, one another and to the rest of creation.

8. Following in the footsteps of Jesus Christ many Christians are deeply committed to works of healing, medical care and research, and have been pioneers in many areas of medicine. The practice of science reflects God's creative image in men and women, as they seek to unearth

the truths of what God has embedded in creation, but scientific understanding is not the sole account of human being. We therefore profoundly need through the Holy Spirit to seek God's wisdom to understand where to act and where to withhold - out of obedience to God, respect for the rest of creation, care for others and especially the powerless, and in recognition of sin both in ourselves and the 'powers' of this world. We recognise the importance of the dialogue between our biology and our theology, each informing the other.

9. We approach ethics with the understanding that differences of judgement are to be expected among God's people, as we seek together to understand the mind of God on novel and often highly technical challenges to moral reasoning. The theological question of when a human life begins is foundational to discussing stem cell research. We consider that biblical teaching is unclear about when life begins. Passages may be cited to establish the claim that God knows, calls and loves each person before birth just as much as after (for example Ps. 139:13-16; Jer. 1:5; Is. 49:1; Gal. 1:15) but we feel it important not to go beyond what may reasonably be concluded, for example the silence of scripture in relation to the great majority of conceptions that do not give rise to babies. Christians should therefore recognise where their views are interpretations and should respect interpretations other than their own. We explore two main views on the status of the human embryo within a theological understanding.

Moral status of the human embryo – 'Absolute' Positions

10. In what is commonly termed an 'absolute' view, the human embryo is regarded as having the moral status of person from the very first instant of existence. In this view, the embryo already has the same human dignity as a person who has been born. Human dignity inheres in the very existence of the embryo, not in any property it possesses at this point. The key factor in this position is that conception is taken as the *beginning* of a life. Its lack of biological development is not the critical point, because God has brought a human life into being. The embryo also portrays a life at its most vulnerable. God's especial valuing of the weak and defenceless is underlined by the incarnation of Jesus Christ as an embryo. Arguably, we are obliged to protect all embryos as an expression of this truth. The use of the embryo as a source of stem cells for research or in medicine for another human life would be to sacrifice the weak to make life better for the strong. Indeed, for some it is tantamount to murder.

11. Alternatively, some acknowledge that there is uncertainty about the embryo and that most fail to become babies, but see all embryos as *potential* human beings. In the words of the 1996 Assembly report, this version of an 'absolute' view holds that this potential is not 'to be seen as growth into that which it was not before, but rather the fulfillment of that which it already is.'[vii] Embryos should always be given the benefit of the doubt, and be given from conception the protection we would expect to give a fully formed child or adult.

12. For those holding an absolute position, all embryo research should be forbidden that is not for the benefit of that embryo itself. Embryonic stem cells may be useful in medical treatment but the end does not justify the means. This leads to a strong objection to the provisions of the existing Human Fertilisation and Embryology Act (1990) which allows such research. The only alternative for them is research using stem cells derived from adult tissues or placental cord blood, accepting any limitations there might be from this restriction.

13. We agree that embryos are special, but we disagree about whether this is an absolute specialness that nothing can gainsay, or whether we recognise that there are other specialnesses which need to be taken into account. Is the embryo so special that no other considerations matter – even the potential to save life? The 1996 report identified an important tension for those who hold an absolute position of the sanctity of the embryo from conception, in its section entitled 'A Conflict of Obligations'. Should this theological evaluation be applied regardless of human need and circumstance, especially in addressing childlessness and research into genetic diseases? This question is even more acute now that

the prospects for embryo research include the whole area of regenerative medicine, as illustrated in our case studies. 'In coming to an assessment of their obligations and responsibilities, Christians differ. Some will out of principle apply the norm without compromise.' [viii] Others, however, feel that other important principles are even more compelling and would therefore allow some embryo research.

Moral status of the human embryo – 'Gradual' Positions

14. The second view, which was held by the majority of the working group, is that the moral status of the human embryo is not established until some time into its biological development after conception. A variety of reasons are advanced for this belief. The creation of a new life as a gift from God and creation of God is a shared belief with the 'absolute' view, but not all consider that this should unequivocally be seen as the point of fertilisation. An 'absolute' position, while stressing the fact of God's creation of the embryo as the point of moral significance, *de facto* puts priority on the genetic completion of the embryo at conception. For some, this attributes too a high a status to the establishment of genetic completion and uniqueness. The full report explores whether this is adequate to define the beginning of life as understood in a Christian context, and examines other senses of 'beginning'.

- Individuation – this is when an embryo is established as a single individual, at around 14 days. Some hold that before this point individual personhood cannot be considered a property of single embryos, since this entity could produce no, one, two or more people. It can only be said in retrospect.
- Implantation – the beginning of relational life with the mother over a period from 6-14 days. Both positions see the relational aspect of our humanity in God's image as having a central importance in our understanding of the human person. For some this makes implantation, the beginning of physical relationship with the mother, the most significant point at which we can speak of the embryo as a human person.
- Differentiation into the organs starts at after 14 days. Some would hold that a level of development of the embryo after conception is necessary before we can speak meaningfully of a human person in relationship, both with the mother, and more profoundly with God.

For some a matter of great importance is that the large majority of conceptions fail to go on to produce babies, which raises theological questions discussed in the full report. Some agree with MacKay's argument, quoted by the 1996 report, that these should not be regarded either biblically or logically as human persons.[ix] Only those which become babies are human persons to whom God can say, as to the psalmist in Psalm 139 'I knew you even in the womb'.

If relationship to God is the most basic relationship, in what sense can human personhood be established until we know which individual an embryo will be, that it has begun to develop functional capacities, and has begun relationship from its own side? An absolute position maintains that it is the fact of creation that establishes the moral status, regardless of biological development. A gradual position asserts that the process of fertilisation is regarded as just one of a series of morally and theologically significant developments in the early embryo's life. Only at some functional stage may we talk meaningfully of a human person and of mutual relationship with God. Before this point we do not have a human person.

15. The majority of the working group considers that the current UK law makes a valid judgement in seeing 14 days as representing the crucial period before which human personhood is not clearly established. While the human embryo deserves greater respect than that generally accorded to human tissues, it should not necessarily be given the respect that is given to actual persons until about this time. Some would draw a line at an earlier point, congruent with the beginning, rather than the end of implantation. Within the variations of the

gradual position, embryo research might be permitted up to 14 days, but only for a very good reason, because had one not chosen an embryo for research and implanted it instead, it would have had a chance of becoming a baby.

Applications of Stem Cell Research

16. This conclusion is then applied to a range of particular questions relating to stem cell research in Chapter 5 of the full report, which lead to the proposed deliverances to the Assembly:

- For which medical purposes might embryo research be permitted?
- If research is permitted, what are acceptable sources of these embryos?
- May *surplus* embryos from IVF or PGD treatments be allowed for stem cell research?
- Should embryos be *created* by IVF methods just for use in stem cell research?
- Should embryos be created for use in stem cell *therapies* in future?
- Should embryos be created by *cloning* methods just for use in stem cell and other medical research?
- Whether various ways to create non-viable human embryos are permissible as a source of stem cells for research
- Should research into adult and cord blood stem cells be pursued instead of embryo stem cell research, or as a parallel route?

17. In the review of the UK legislation, the Warnock Committee's concept of the 'special status' of the embryo [x] should not be lost with the growing pressure to increase embryo use from communities engaged in stem cell, nuclear transfer and related areas of research. It is a valid expression of the moral dilemma felt by many that, if some research using embryos is accepted for certain crucial medical reasons, we are still dealing with an entity which either is already, or under the right circumstances could become, a human person.

18. The purposes for which research using embryos may and may not legitimately be undertaken should, therefore, continue to be defined in law. Research should be allowed only by specific licence from the national regulatory body. The justification for embryo research should be on a 'No research unless …' basis, not 'Yes, provided …' That is to say, say licenses for embryo research should be allowed, under specific, limited and peer-reviewed purposes, …

- only on a case-by-case basis, and
- only when the realistic benefit is of such significance that the destruction of embryos for the purpose might be considered a justified moral cost, and
- that no realistic or practical near-term alternative exists to using human embryos and that the potential for such alternatives have in every case been explored by the license applicant, and
- that the desired research outcome is of great medical importance in relief of human suffering, is realistic in its aims and timescale, and would be freely available, not just for wealthy individuals or societies, and
- that consent procedures should be followed extremely carefully followed, with appropriate counselling, especially where, for example in some stem cell research, truly informed consent is difficult to give because the outcomes are inherently uncertain.

Surplus IVF Embryos

19. The normal source of embryo stem cells in laboratories across the world where research is being performed is from 'surplus' embryos which are unwanted after IVF treatments. These are readily available in large quantities. Most of the working group considered it is less ethically contentious to use surplus IVF embryos for research and for possible therapies, since these embryos are not now destined to produce children but to be destroyed. This might be seen as an example of the ethical doctrine of 'double effect' by which an act which they

would consider wrong if done in itself – in this case creating an IVF embryo which would be destroyed in research - might be justified if it occurs as a by-product of another, well-intentioned act, namely creating an IVF embryo to try to have a baby.[xi] The Council proposes that the Assembly accepts that 'surplus' embryos derived from IVF treatments may be used in stem cell research. It would also seem logical to accept the use of unwanted embryos from pre-implantation genetic diagnosis.

Creating IVF Embryos for Research

20. UK legislation permits the creation of embryos solely for research either by IVF methods or by nuclear transfer cloning. There are different views on this. One view sees it as wrong under any circumstances to cause to come into existence something with the potential for becoming a human person and then deliberately to destroy it. Thus to create any human embryo solely for research is wrong, regardless of the purpose. A second objection is that the type of manipulation done to the embryo in stem cell research is unacceptable, because *de facto* the embryo is regarded simply as a cellular resource from which to extract particular cells. This could be seen as too instrumental towards an entity to which a special status had been assigned. Some therefore believe that embryos should never be *created* for stem cell research for either of these reasons. Others, however, feel reluctant to say 'never', being only too aware of the provisionality of our present knowledge about such a rapidly moving field of science and medicine, and consider that in very exceptional circumstances embryos might be created for research.

21. We considered that it would instrumentalise embryos too far if we were to allow them to be created routinely for clinical treatment. We should not prematurely embark on that route until it has been established that no alternative route is reasonably likely using adult or placental stem cells or some other therapeutic method.

Creating Cloned Embryos for Research

22. Some would reject any use of *cloned* embryos in research for the same reason as in the previous section, namely that it would involve creating embryos explicitly for research. Others agree with the House of Lords' committee which concluded that it should only be an exceptional reason that justified the use of cloned embryos for stem cell research.[xii] Cloned embryos were originally proposed as a potential way of producing genetically matched replacement cells by creating a cloned embryo and thence stem cells from, say, a blood sample from the patient. This idea is known as 'therapeutic' cloning to distinguish it from illegal 'reproductive' cloning in which the embryo would be implanted to produce a baby. The group considered that speculative research for this purpose is not justified because the claimed therapeutic intention is currently unrealistic. Two purposes for the creation of cloned embryos might prove an allowable exception for some Christians. One is the Example 4 in the case studies where they could provide a source of cells for studying terminal diseases for which no other source is envisaged. Another is research aimed at discovering the factors that might enable scientists to reverse adult cells routinely back to a totipotent state and eliminate the need for embryos to be used to make stem cells.

Alternatives Routes to Using Embryos in Research

23. A variety of technical methods have been proposed to solve the basic ethical objection of embryo research. Some propose making embryos which are incapable of developing into a full pregnancy - by disabling the ability of an embryo to implant in the womb, by creating non-viable animal-human hybrid embryos, or by parthenogenesis. Technical fixes like these do not often solve ethical dilemmas. For many who strongly object to embryo research, the creation of non-viable embryos is also not permissible. Animal-human hybrids also raise serious ethical problems. The *viability* of the embryo is moreover not the only crucial issue. More fundamental principles of the moral status of the embryo are involved.

24. For those for whom the use of any embryos to produce stem cells is ethically impermissible, the only sources of stem cells are from adult tissues or placental cord blood. These have the advantage over embryo stem cells that they could be of the same genetic type as the patient, and be less liable to immune rejection. The main disadvantages are that stem cells in adult tissues are quite rare, they cannot be multiplied in the laboratory, and their purpose is to regenerate only cells relevant to that particular part of the body. Some recent research suggests that some cells from adult tissue may sometimes be induced to form a much wider range of cells types than had been previously assumed. Some opponents of embryo research have put great stress on this, but it is very uncertain.[xiii] *A priori*, the case for adult cells would seem weaker, than for embryonic stem cells. The latter must be capable of producing all cell types of the human body, by definition, whereas adult stem cells are not designed to do this. The majority of the group concluded that although a promising avenue of research, it is uncertain whether these cells derived from adult tissues would ever bypass the need for embryonic stem cells. On present evidence, many in the research community consider that important data are expected to come from both routes, and that different diseases may require different routes for producing the relevant replacement cells. It is important ethically not to make exaggerated claims for the potential of *any* stem cell method or to raise premature expectations.

Postscript – Stem Cells in a Global Context

25. In seeking to bring recommendations to this Assembly we are very aware that not all in our group agree with the position and some of the deliverances. We recognise as a group that differences would have been the outcome whatever positions we had adopted. Nonetheless, there are also issues on which we agree. One of these is a wider question about how far we are justified in pursuing what to some looks like luxury research for the rich of industrial and developing countries, when so many more pressing medical problems exist. We recognise that a priority of the gospel is the poor and those whom the world leaves behind as the 'have not's'. This leaves us dissatisfied about the balance of funding priorities for less glamorous but equally difficult scientific problems of malaria and HIV/AIDS. At some point in future, the ethical priorities for stem cell development will become an important question.

26. The perspective of the kingdom of God and the ethics inspired by the incarnate, suffering and resurrected Christ need urgently to be brought to the questions of embryo research, as changes to the law are being considered and research trajectories are developed. It is an area in which it is important for the church to continue to be active - at the level of theological and scientific evaluation and policy engagement, and also in the thinking of its membership. This summary report and the full report are commended to congregations, sessions, presbyteries, the Guild, and our ecumenical partners whose help in preparing this report we gratefully acknowledge.

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[iii] Church of Scotland (2001) *Report of the Board of Social Responsibility,* Reports to the General Assembly and Deliverances of the General Assembly 2001.
[iv] Church of Scotland (1997) *Cloning Animals and Humans*, Supplementary Report to the General Assembly and Deliverances of the General Assembly 1997.
[v] Response to the Public Consultation on the Review of the Human Fertilisation & Embryology Act from the Church and Society Council of the Church of Scotland and its Society Religion and Technology Project, 5 December 2005, Society, Religion and Technology Project website : http://www.srtp.org.uk/hfea-review.doc
[vi] Scientific and regulatory aspects of stem cells are described in Chapter 2 of the full report. A useful explanatory text is the schools' booklet 'Stem Cells science and ethics', Barfoot, J. Mauelshagen, C., Bruce, D., Henderson, C., and Bownes, M. (eds.), produced by the Scottish Institute for Biotechnology Education, University of Edinburgh, 2005.
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