Introduction

“The thing that I want more, though, is to be able to put my arms around him. That’s what he’s entitled to ... and I believe that day is coming.”1 (Christopher Reeve)

These moving words from the late Christopher Reeve echo in the hearts of all those affected by a spinal cord injury (SCI). Reeve was paralysed at 43 years of age following an equestrian accident. He was a formidable advocate for human embryonic stem cell (hESC) research. In Ireland, SCI has an incidence of 50 per year and over 1,200 people are currently living with this disability.2 hESC research provides enormous hope for those desperately seeking a cure for this devastating injury; however, within such a dream lies one of the biggest ethical dilemmas of our time. It has been said that no field of biological science has been more controversial than that involving human reproduction.3 Contraception, abortion and in vitro fertilisation (IVF) have provoked enormous public debate in Ireland. We now face another controversy involving human reproduction: hESC research. The word ‘adult’ implies that cells have undergone a certain degree of differentiation toward their predetermined lineage. Adult stem cells therefore include those derived from: (a) the adult human; (b) the foetus; (c) umbilical cord blood and placenta; and, more recently, (d) from the amniotic fluid. Embryonic stem cells (ESCs) are derived from the inner cell mass (ICM) of the embryo.

Why are adult and embryonic stem cells different?

Adult stem cells are rare, difficult to identify, and do not grow indefinitely like embryonic stem cells. They are for the most part multipotent (give rise to the tissue of their origin) and only display a restricted degree of plasticity. hESCs can be grown in culture and are seen to divide indefinitely, as was first demonstrated by Thomson et al in 1998 (Figure 1). hESCs are pluripotent, meaning that they have the ability to derive cell types from all three germ layers.5 Evidence emerges on a daily basis supporting the potential of hESCs for regeneration. Cummings et al demonstrated locomotor recovery following human neural stem cell transplant into a damaged mouse.
spinal cord. The first controlled clinical trial on the therapeutic potential of hESCs will take place this year. However, this research does not come without profound ethical and legal issues. Embryos are destroyed when harvesting cells from the ICM; therefore, hESC research revisits one of the most fundamental ethical debates of mankind: what is the moral and legal status of the human embryo?

**Philosophical perspective**

The practice of IVF, the discovery of which marked a milestone in infertility treatment, results in supernumerary embryos. Considerable ethical issues arise when a couple decides the fate of these ‘spare’ embryos following completion of their families. Couples have four options:

1. Donate to other couples.
2. Discard.
3. Preserve by cryopreservation.
4. Donate for research, enabling hESC research.

Is it morally right that embryos are used for research? It may be helpful here to introduce the work of Locke and Kant. Locke’s principles on the concept of the ‘person’ are fascinating, as he argues that persons and humans should be separated. He defines a person as “a thinking intelligent being, that has reason and reflection, and can consider itself, the same thinking thing, in different times and places”. Thus, according to Locke, personhood is a matter of psychological capacity. Kant goes further and associates personhood with moral agency. So a demonstration of moral agency is sufficient to bestow the value of personhood. According to Kant, only persons have moral status. But are embryos persons and, if so, when do they become persons? While these are intriguing philosophical questions, we agree with Baroness Mary Warnock in her proposition about bypassing the concept of the person altogether: “Since there seems no separately satisfactory way of distinguishing a person from a non-person, apart from their supposedly having rights, it seems better to take the direct route forward and ask whether or not human embryos have rights”.

There are three currently held positions regarding the moral status of the embryo:

1. **The embryo consists of undifferentiated cells and does not have any rights.**
   This is the so-called ‘pro choice’ view, which holds that, in order to have any moral status, an entity must be, or must have been in the past, conscious, self-aware, sentient, viable and rational. An early embryo has none of these characteristics and therefore has no moral status whatsoever.

2. **Moral value develops gradually as life itself is continuous – the egg and sperm are alive, as well as the one-celled embryo.**
   Professor Anne McLaren asserts that the appearance of the primitive streak on day 14 marks the beginning of the individual. Prior to this, the embryo does not display definite boundaries in differentiation, and so it is a reasonable assertion that this marks the beginning of life, and only then warrants moral status.

3. **The embryo has the same rights as the newborn child from the moment of conception.**
   The assertion of Aristotle’s concept of ‘potentiality’ adequately explains this argument. If a fertilised ovum has the potential to become a newborn individual(s), should it not be regarded with the same moral status as the individual(s) born from that fertilised ovum?

**Religious perspective**

Catholicism remains the predominant religion in our ever-growing pluralistic society. The Roman Catholic Church believes that life begins at the moment of fertilisation and that the embryo should be regarded with the same moral status as that of the newborn child. Those who concur with the Catholic Church a fortiori forfeit use of intra-uterine devices (IUDs) for contraception, the ‘morning after’ pill and, of course, hESC research. But what will Catholics do if hESC research bears fruit? Ethically, can they benefit from products directly associated with this research? It may be argued that since hESC research is for the common good, and since those supernumerary embryos used in research would otherwise have been discarded, utilisation of treatments derived from such research would be ethical.

The Protestant view of hESC research ranges from the restrictive to the non-restrictive. For those in the restrictive category, a person is not defined by capacity but rather by having a personal history, despite being unaware of such history. For these individuals, procurement of hESC raises serious moral issues. On the other hand, those in the non-restrictive category argue that the moral difference between the potential good of hESC research and that of the blastocyst becomes sufficiently substantial to make it ethically warranted.
Most followers of Islam would agree with hESC research as it has enormous potential to improve human suffering. Islam regards personhood as a process that occurs gradually as the foetus develops and is only achieved when ‘ensoulment’ occurs around the fourth month of intra-uterine life. Like other religions, Judaism has no wide consensus on the use of embryonic stem cells, as this is a new and evolving science. However, under Jewish law all embryos under 40 days are ‘like water’. If this is interpreted literally, there should be no moral impediment for hESC research.11

Legal perspective

Within the European Union, there exists considerable variation among member states regarding legislation governing hESC research. It is permitted in the United Kingdom and is regulated under the Human Fertilisation and Embryology Authority (HFEA) Act. Legislation in Germany is curious in that it forbids derivation of hESCs from embryos under its Embryo Protection Law, but allows importation of embryonic stem cell lines derived elsewhere under strict conditions.12 Ireland has no formal legislation concerning hESC research. See Figure 2 for details on other countries.13

No legislation is currently being prepared in Ireland to deal with hESC research. It is unclear under current State law whether the right to life of the pre-implantation embryo should be defended. Under Article 40.3.3 of the Irish Constitution: “The State acknowledges the right to life of the unborn and, with due regard to the equal right to life of the mother, guarantees in its laws to respect, and, as far as practicable, by its laws to defend and vindicate that right”. It must be stated that the word “unborn” causes confusion, as no indication of its meaning is given. If the Irish term “beo gan breith” or “unborn” applies from the moment of conception, then hESC research is illegal and unconstitutional.

The Commission on Assisted Human Reproduction (CAHR) was established in 2000 to examine assisted human reproduction, including the issue of hESC research. Its March 2005 report recommended that: "Embryo research, including embryonic stem cell research, for specific purposes only and under stringently controlled conditions, should be permitted up to 14 days following fertilisation”.14 If this recommendation were enacted into law then it would be legal under the Constitution to carry out hESC research until day 14 post fertilisation.

Political perspective

The choice of whether or not to authorise embryonic stem cell research is a political one. Politicians must act as consequentialists and foresee who may benefit and who may suffer from any law enacted by them. Several challenges face politicians when legislating for hESC research but none are as pertinent as: (a) the patenting of discoveries involving hESC; and, (b) the commercialisation of the human embryo.

Patenting

Should products from embryos become patentable under European patent law? An interesting case of patentability arose in the US in which a patent was awarded to the Wisconsin Alumni Research Foundation (WARF) for stem cells derived from spare embryos created for IVF. In turn, Geron, a biopharmaceutical company, was granted a licence agreement by WARF in return for funding further research. Geron now holds exclusive rights to develop stem cells from these stem cell lines.
The general consensus held by the European Group on Ethics in Science and Technology is that unless isolated stem cells have not been modified, they are so close to the human body that their patenting is a form of commercialisation of the human body. Only stem cells modified by in vitro treatments, or those genetically modified to have characteristics for specific industrial application, are patentable. While patents are an incentive for scientific innovation there is a risk that such patents may cause commercialisation of the embryo.15

Commercialisation
To illustrate how embryos may become commercialised, we shall return to Kantian philosophy: in order for something to attain personhood it must have moral agency. For example, a car has no moral agency and is therefore not a person. Similarly, according to Kant everything has either a ‘price’ or a ‘dignity’. Consider the following example:
A. “Cars have no dignity and so have a price; they have exchange value.”
B. “Persons have dignity and so are priceless; they have no exchange value.”

Note, however, the use of the word ‘persons’. Now let us replace the words ‘persons’ and ‘cars’ with ‘embryos’ in the above example:
A. “Embryos have no dignity and so have a price; they have exchange value.”
B. “Embryos have dignity and so are priceless; they have no exchange value.”

As noted previously, we decided to bypass the concept of the person in reference to the embryo and instead ask whether the embryo has moral value. We can accept that the embryo has some moral value since these embryos are ex hypothesi both human and alive. So according to the above, if an embryo has moral value then it is priceless and cannot be exchanged. But if an embryo has no moral value then commercialisation of human embryos becomes ethical. The embryo is protected from commercialisation under Article 3 of the European Union Charter of Fundamental Rights: “In the fields of medicine and biology, the following must be respected in particular: the prohibition on making the human body and its parts as such a source of financial gain”. It is crucial within the realm of public morality that embryos are not seen as a means to an end but as an end in themselves.16

Conclusion
The Irish Bioethics Committee has addressed ethical issues on embryonic stem cell research in Ireland, but legislation has not yet been formalised; the Oireachtas Committee has yet to pass judgment on the report submitted by the CAHR. While it is necessary that this report be adequately discussed and its recommendations considered, Article 40.3.3 of the Constitution should also be revised to clarify the term ‘unborn’. In the interim, the discourse will continue. There is no doubt that debate on hESC research raises one of the most fundamental and challenging ethical dilemmas of our time. The spectrum of thought in this area is wide ranging, from those who view it as a perverted and demeaning commercialisation of a flourishing new science, to those who accept it ethically in light of its benefits to others. In our scientific quest to cure disease and relieve suffering, it is imperative that we retain foresight. It is crucial that our ingenuity does not become entangled in the net of political and economic gain, but that our judgment is influenced by good science, appropriate philosophical consideration, and sound ethics.

References
3. Committee on the Biological and Biomedical Applications of Stem Cell Research. Stem Cells and the Future of Regenerative Medicine, 2002.