Position Paper of the Bioethics Consultative Committee
on

Stem Cell Research

Etymologically speaking, the term "*bio*ethics" means "the ethics of *bios*" or "the ethics of life", but the ancient Greek root *bios* has a different meaning. It does not refer to "life" as such, nor to animate or animal life, (for which the Greeks used the term *zoe*) but rather "a course of life" or "a manner of living" or "a human life as lived". Animals have life (*zoe*); human beings alone have a life (*bios*) - a life lived not merely physiologically, but also mentally, socially, culturally, politically, and spiritually. [1]

The proper application of *bio*ethics to specific situations, therefore, has to begin not with judging whether "x" or "y" is ethical or unethical, but with undertaking fundamental inquiry into the full human and moral significance of developments in biomedical and behavioural science and technology. For this reason specific technological activity such as embryo and stem cell research, assisted reproduction, cloning, or the uses of knowledge and techniques derived from human genetics has to be considered in relation to broader ethical and social issues not tied to a specific technology. This is because scientific research, being a human activity, is primarily a moral endeavour. [2]

Embryonic stem cells

Embryonic stem cells (ESC) are the cells from which the different kinds of tissues in the human body originate. Today the preparation of human ESCs implies the following:

(a) the production of human embryos (usually by somatic cell nuclear transfer technology) and/or the use of the surplus embryos resulting from in-vitro fertilisation (IVF) or frozen (cryopreserved) embryos;

(b) the development of these embryos to the blastocyst stage;

(c) the isolation of the embryoblast or Inner Cell Mass (ICM) from which the embryo proper is derived - which implies the destruction of the embryo;

(d) culturing these cells on a feeder layer of irradiated mouse embryonic fibroblasts in a suitable medium where they can multiply and coalesce to form colonies;

(e) repeated sub-culturing of these colonies which lead to the formation of cell lines capable of multiplying indefinitely which preserving the characteristics of ESC for months and years.

These ESCs are only the point of departure for the preparation of different cell lines with the characteristics proper of the various tissues (muscle, neural, epithelial, germinal, etc). Methods for obtaining them are still being studied but animal experiments have shown that they are able to produce differentiated cells which, in a normal development, would derive from the three different embryonic tissue layers: endoderm (intestinal epithelium), mesoderm (cartilage, bone, smooth and striated muscle) and ectoderm (neural epithelium, squamous epithelium).

Non-embryonic Stem Cells

Studies carried out since the early 1970s had indicated that many adult tissues contain stem cells (ASC) that could not be re-programmed, but that were capable of producing only cells proper to a given tissue. In more recent years, however, pluripotent cells were also discovered in various human tissues - in bone marrow, in the brain, in the mesenchyme of various organs, and in umbilical cord blood. These are cells capable of producing different types of cells, mostly blood cells, muscle cells and neural cells. Further research has established how these cells could be recognised, selected, maintained in development and induced to form different types of mature cells by means of growth factors and other regulating proteins.

The progress and results obtained in the field of ASCs show not only their great plasticity but also their many possible uses, in all likelihood no different from those of embryonic stem cells, since plasticity depends to a large extent upon genetic information which can be reprogrammed.

Therapeutic applications

The extent to which findings from animal experiments are applicable to humans has not yet been clarified but there are indications of great promise in the application of stem cell research in the treatment of various pathologies for which no definitive remedy is currently available. Because many diseases such as Parkinson’s disease, Alzheimer’s disease, heart disease and diabetes mellitus, result from the death or dysfunction of a single cell type, it is believed that the introduction of stem cells of this type into a patient will restore lost or compromised function. Now that researchers have discovered means of isolating and culturing stem cells, they are trying to determine how to direct such cells into becoming the specialised cells and tissues that are needed for transplanting into patients. Understanding this complex process could lead to improved means of preventing and treating birth defects and cancer. Also, by producing a virtually unlimited supply of human cells and tissues in the laboratory, pharmaceutical researchers could develop and test new drugs in a manner not previously possible.

Some Ethical concerns.

1. **The moral Status of the human embryo.**

The nature of the human embryo is of central importance in bioethics and, for obvious reasons, the arguments for or against human cloning and embryonic stem cell research are intimately linked with the issue of the moral status of the early human embryo. Various ethical viewpoints have been expressed on the extent of protection that should be accorded to the human embryo in the earliest stages of its development, but no consensus has been reached on this controversial issue. The most basic [ethical] objection to embryonic stem cell research is rooted in the fact that such research deprives a human embryo of any further potential to develop into a complete human being. [3]

2. Human Cloning and embryonic stem cell technology.

Human cloning is ethically objectionable because it violates certain fundamental principles of medically-assisted reproduction. It undermines the dignity of the human subject by treating it as a means rather than as an end in itself. The harvesting of embryonic stem cells from cloned human embryos involves the ablation of their Inner Cell Mass, a process which critically damages and interrupts the further development of these embryos. The production of human embryos for research purposes is prohibited by the Bioethics Convention of the Council of Europe. [4]

Conclusions

This topic was discussed at a meeting of the Bioethics Consultative Committee on Tuesday 17th February 2004 and, in the light of the above, the following conclusions were reached:

1. **Stem cell research provides a new, interesting and challenging avenue for the treatment of various ailments in Medicine.**
2. **There is nothing ethically objectionable in the use of actual stem cells for research or treatment purposes.**
3. **Harvesting stem cells from human embryos, however, presents a serious challenge to moral and ethical orthodoxy because the embryos are killed in the process.**
4. **The ethical objection to the use of human embryos as a source of stem cells applies equally to fertilised ova destined to die a natural death as well as to 'surplus' embryos produced by in-vitro fertilisation.**
5. **The use of adult stem cells does not give rise to any ethical problems.**
6. **The commodification of the human embryo presents in itself serious ethical challenges.**
7. **Embryonic stem cell lines obtained by different researchers by the destruction of human embryos and made available on the international or national market also present a serious moral and ethical challenges. The commercialisation of human body parts is ethically objectionable in itself.**

8. **Stem cells and the respective cell lines derived therefrom, whether harvested from umbilical cord blood, spontaneously aborted embryos/fetuses or adults through procedures which fully respect the integrity of the human being, do not present any ethical problems as long as they are used in conformity with ethically acceptable research and therapeutic procedures.**
9. **The use of stem cells in conjunction with procedures for the cloning of human embryos presents a serious ethical affront inherent in the cloning process itself irrespective of whether the process is interrupted at any stage of embryological development or allowed to run its full course.**

References

1. Kass, L.R. Adapted from the Chairman's opening remarks at the first meeting of the U.S. President's (George W. Bush) Council of Bioethics, 17 January 2001.
2. *ibid.*
3. National Academy of Sciences's Report on Stem Cell Research. 2002, p.44.
4. Bioethics Convention of the Council of Europe. Art. 18.

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