

Polemics

Behind the last act of spectacle-science: embryonic stem cells

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Critique of dogmatic medicine

IT IS OFTEN COMMENTED just how little we learn from history. Yet when this statement is applied to the world of science, the effect it generates – or at least ought to generate – is one of perplexity, or disconcertment at the very least.

Unfortunately, these are precisely the sensations by which this medical historian has been seized on an almost daily basis in the face of the recent all-pervasiveness of the much-hyped theme of embryonic stem cell research in the media and in the most varied scientific/academic environments. It is nigh impossible not to associate this phenomenon of scientific marketing with the phrase coined by the physician and historian Gregorio Marañón, who, back in the first half of the last century – 1946 – denounced a certain “trend” of his time, which he called “the superstition of the latest thing in knowledge”^a.

In an essay entitled *Critique of Dogmatic Medicine*, Marañón alerted his scientific colleagues to the need to study the history of medicine as an antidote to superstition, dogmatism and ignorance, which, he argued, were invariably, and increasingly more rapidly as time went by, humiliating and indeed retarding science. He supported his argument with reference to dozens of “scientific disasters” from recent years and decades that had been provoked by “precipitated and blustering conclusions”, the fruit of naive enthusiasm or – worse still – of other interests, and which had caused no little damage to the development of science – which was serious enough – and to the lives of many people – much more serious indeed.

Faced with this reality, Marañón defended the development of a critique of the dogmatic model of medicine, based, on one side, upon recognition of the failure of scientific dogmatism – or scientificism – and, on the other, on recognition of the deep complexity of worldly phenomena, the understanding of which requires coherent and serious participation of other fields of knowledge.

Unfortunately, it would seem that Dom Gregorio’s warnings were neither heeded nor even understood by a large portion of the scientific community.

The last act of spectacle-science in the 20th century

Not long ago – less than a decade – one well-known endeavor, amply covered in the media, proved just how little we learn from the past and how prone we are to repeating its errors. I refer to the Genome Project.

At the turn of this century, the race to complete the sequencing of the human genome became *the* scientific theme par excellence. The consensus at the time was that such a feat would bring about a veritable medical revolution, triggering a series of fantastic transformations in our lives and societies. The “prophecies” uttered by the adepts of the new genomic dogma seem to have contaminated not only the lay public, always hopeful before the panaceutic proclamations of modern medicine, but also the sagacious capitalists, who invested millions in the revolutionary project. After a spectacular career in two North-American companies – one public, the other private – accompanied almost daily by thousands of on-line spectators, an audience at a veritable show of science, the result arrived not as a wave of ecstasy, but as a pail of cold water. Not because they had failed to pull it off, but because the feat, once complete, *failed to work miracles*; in other words, in these last few years, the mapping of the human genome has not brought any immediate benefit to applied medicine: not a single pill, no revolutionary treatments capable of saving lives, curing the terminally ill or making the paraplegic walk, etc. Nothing, at least not in the last or next few years or decades...

It is hard to believe that the scientists, especially the geneticists directly involved in the project, only reached this depressing conclusion at the end of their frenetic work. But even if they clearly must have known well in advance, why was this pivotal detail not divulged? Why was such mystique allowed to envelope the Genome Project?

The answers to these questions are certainly not all that difficult to find, but rather than take that route, I would prefer to push forward a little in time, shifting the focus from the last to the latest great scientific idol of our time: the use of embryonic stem cells for therapeutic ends^b.

Stem cells

Research with adult (non-embryonic) stem cells – mainly extracted from blood from the umbilical chord or from bone marrow – began over a decade ago, when it was discovered that the undifferentiated character of these cells allowed for a considerable margin of “manipulation” on the part of the scientist, who could, with the right technology, *transform them* or *differentiate them* into specific cell-types, thus making it possible to regenerate tissues or even entire organs.

Therapeutic experiments with adult stem cells in humans began much more recently and have been yielding encouraging results in various parts of the world, including Brazil, especially in the regeneration of heart tissue damaged by cardiac arrest.

In the wake of the *Dolly* circus, however, a new type of stem cell, yet more promising than the adult variety, became the new object of scientific interest: the embryonic stem cell, that is, the undifferentiated cells present during the initial stage of embryogenesis – the blastocyst. According to some scientists, this type of stem cell has a number of advantages over the adult variety insofar as it offers greater “plasticity”, responding more readily to processes of induced differentiation for the production of particular lines, as well as surmounting the genetic limitations of adult stem cells in relation to congenital diseases. All this, of course, is in theory.

Leaving aside, at least for the time being, the ethical issues involved in this kind of research– as harvesting the cells entails sacrificing the embryo, “obtained” through cloning or from IVF clinics, which keep banks of frozen “surplus” embryos – I would first like to address the strictly scientific aspects of the issue, which have not been duly clarified in the accessible media.

Scientists researching embryonic stem cells, or pressing for the right to conduct such research, unanimously recognize the “enormous technical difficulties” the investigative process presents^c. Unlike with adult stem cells, experiments with embryonic stem cells have enjoyed no recognized therapeutic success, even in animals^d. Quite the contrary, in fact; important studies have shown that therapeutic experiments with embryonic stem cells have caused tumors in animals, and we can only assume the same would occur in humans^e.

Recently, a team of Korean scientists, the first to openly attempt to conduct stem cell research on human embryos, published a note explaining that “of the three human cell clusters obtained through cloning – out of hundreds of attempts using hundreds of eggs – only one yielded an embryonic cell line”. However, they go on to add that “that line proved unfit for research or therapeutic use”^f. Conclusion: the chances of our managing to harvest useable lines for research in the near future are negligible.

According to Natalia López Mortalla, professor of biochemistry at Navarra University in Spain, “cloning technology is extremely inefficient and, in the case of primates, not one genuine embryo has come of the thousand attempts (thousand eggs) already made”^g. On the other hand, she continues:

there are clear biological criteria to distinguish between a living cluster of more or less organized cells and an individual. With some caution, “therapeutic cloning” could be converted into a nucleus transfer technology, which is not actually cloning. [...] And if some day it were proved that embryonic cells can be used to cure, we could harvest them by other means that do not require ova”^h.

Furthermore, in relation to stem cells extracted from embryos “produced” through assisted reproduction and subsequently frozen, the argument that those individuals would be virtually non-viable, but nonetheless useful from the therapeutic perspective, lacks sufficient grounds.

In short, from the strictly scientific point of view, there is absolutely nothing to justify the euphoria certain sectors of society, the mass media in particular, have sought to propagate throughout the nation, and which reached its climax with the recent passing of the Biosecurity Bill by the National Congress, authorizing research on stem cells extracted from human embryos. Contrary to what we have seen with adult stem cell research and experimentation, the outlook for embryonic stem cells in the short and medium term is far from promising. Here in Brazil, the very scientists who held the front line in the fight for the Biosecurity Law are already beginning to admit as much more explicitly¹. Just as occurred with the Genome Project, after the fanfare and apocalyptic, sentimentalist retort, comes talk of prudence and patience...So what exactly is at play in all of this?

Behind the science-spectacle

As I see it, there are two key questions here that warrant careful attention. One is explicit, the other veiled, albeit not entirely unknown. I would like to begin with the latter, which strikes me as somewhat simpler and less intriguing, so that I can dwell longer on the former, by far more instigating and challenging from the historical viewpoint.

With the authorization of embryonic stem cell research in Brazil, the first beneficiaries, economically speaking, will be the clinics that own stocks of frozen embryos, declaredly the first line of supply for research development. This means a new source of income for these companies, not to mention lower costs incurred through the obligatory maintenance of “surplus” embryos.

In terms of the cloning process, it is well known that the raw materials required are extraordinarily expensive and that many companies and laboratories specializing in biochemical products stand to make a lot of money from the opening of this new line of research.

The other major factor, however, and the one that has been seized upon as the *pièce de résistance* for scientists defending the right to conduct research on stem cells extracted from human embryos is the *sacred inviolability of scientific progress*.

For a considerable portion of the scientific world, barring or prohibiting the development of any line of research, even one that does not present favorable short or medium-term prospects, for “extra-scientific” reasons is not only an affront to the dignity of science, but an anti-human stance, as the great driving force behind our civilization is and has been scientific progress.

Without doubt, freedom to research is one of the fundamentals of scientific development, but according to the values of free, democratic society, the exercise of a freedom is not only a question of rights, but also of duties. Science is free to research, but it must always respect, promote and never compromise life.



Demonstrators in favor of the Biosecurity Law commemorate its approval in Brasília (DF)

It is well known that scientists who defend the right to do research on stem cells extracted from human embryos justify their position ethically by drawing upon philosophical arguments that relativize the concept of human life, whether through a diffuse notion of impersonal continuity^j or through the Kantian notion of self-determination^k. However, the very development of science itself in recent decades, particularly in the fields of genetics and reproductive medicine, has undeniably moved in the direction of an increasingly more *genetic* and *personalist* vision of human life. In other words, never before have we had so many reasons – provided by science itself – to affirm that human life originates at the moment of fecundation, the union of egg and sperm^l. To insist on ignoring such evidence today is tantamount to denying the very advances of science and to rejecting the natural process of philosophical revision that must accompany the development of scientific research and ethics.

In this sense, demanding liberty to do research on stem cells extracted from human embryos – even at the blastocystic stage – in the name of “scientific progress” strikes me as simplistic and dogmatic. What we have here is a re-emergence of the scientific dogmatism diagnosed by Marañón over fifty years ago. Behind this “spectacle” lies not the “age-old struggle between the lights of science and the dark pall of religion”, but the ideological stance of a scientificism that, taking recourse to a purely technicistic and pragmatic conception of science backed up by an opportunistic reading of philosophy, seeks to justify the “advancement of science” for its own benefit.

Careful analysis of history – particularly the history of science – in its more or less recent instances, as we have had the opportunity to point

out, allied with the consequent dialogue between science and philosophical anthropology, continues to be the best preventive measure against the “syndrome” of dogmatic medicine. And yet Dr. Marañón’s remedy continues to be met with disdain. Not because it is too bitter a pill, but because it simply demands that the “patient” stop, think, reflect and take a few days off for contemplation. And that is something the *spirit* of our age cannot allow. We cannot stop, science cannot stop. After all, time is short, and time is ...

But in the meantime, how many more acts in the spectacle of science will we have to watch?

Notes

- 1 Cf. Gregorio Marañón, “Crítica de la medicina dogmática” in *Vocación y Ética y otros ensayos*. Madrid, Espasa-Calpe, 1966, p. 342.
- 2 For a more complete treatment of this and other themes related to the Genome Project, see the excellent work by Dr. Marimélia A. Procionatto, entitled “Projeto Genoma: uma leitura atento do livro da vida?”, submitted as a master’s degree dissertation on the History of Science post-graduate programme at PUC São Paulo in 2001. Marimélia Procionatto is also a doctor of biochemistry and a lecturer at Unifesp/EPM. Like that of the author and others directly involved in this undertaking, my criticism is not directed at the project itself, which is undoubtedly of vital importance and enormous scientific value, but toward the mystification that was allowed to cloud its handling at the time.
- 3 Cf. for example, the articles published in the dossier “Célulos Tronco” in issue 51 of this journal, especially those by Anne Fargot-Largeault, “Embriões, células-tronco e terapias celulares: questões filosóficas e antropológicas”, and Mayana Zatz, “Clonagem e células-tronco”, *Estudos Avançados* 51, May/Aug. 2004, pp 227-256.
- 4 Freed CR., “Will Embryonic Stem Cells be a Useful Source of Dopamine Neurons for Transplant into patients with Parkinson’s Disease?” *Proceedings of the National Academy of Sciences*, vol. 99, 2002, pp. 1755-1757.
- 5 Cf. J. Marx, “Mutant Stem Cells May Seed Cancer”, *Science*, vol. 301, 2003, pp. 1308-1310; and M. E. Valk-Lingbeek; S. W. Bruggeman and M. van Lohuizen, “Stem Cells and Cancer: the Polycomb Connection”, *Cell*, vol. 118, 2004, pp. 409-418.
- 6 N. L. Mortalla, “La clonación terapéutica: ni clonación, ni necesaria”. ABC Madrid, Mar. 3, 2005. More recently, a new note announced unexpected success in harvesting lines (May 2005), though the paper published that same month in the journal *Cell* once again indicated that all of the lines obtained were “ill” and “incompatible with therapeutic use”.
- 7 *Idem*.
- 8 In early June 2005, James Battey, a researcher at the Bethesda National Health Institute in Maryland, USA, issued a statement in which he claimed to be successfully obtaining embryonic stem cells from adult cells. Cf. *O Estado de S. Paulo*, June 8, 2005, p. A22.

- 9 Cf. “Marco político e científico: entrevista com Mayana Zatz”. *Agência Fapesp*, 10/ 3/2005. Electronic newsletter: http://www.agencia.fapesp.br/boletim_dentro.php?id=3400.
- 10 Cf. Mayana Zatz, *op. cit.*
- 11 Cf. Anne Fargot-Largeault, *op. cit.* According to the author, “It is not a matter of arguing that the human embryo, from its earliest stages of development, is an object of respect and therefore untouchable. Respect, in the Kantian sense, is due to the moral subject, that is, to a being capable of self-determination, of behaving in accordance with his or her understanding of the moral imperative. A embryo at the blastocystic stage has no moral autonomy...” (p.240).
- 12 Cf. Vicent Bourguet, *O ser em gestação; reflexões bioéticas sobre o embrião humano*, São Paulo, Loyola, 2002, and Jean Bernard, *Da biologia à ética*, Campinas, Editorial Psy, 1994.

Bibliography

BERNARD, Jean. *Da biologia à ética*. Campinas, Editorial Psy, 1994.

BOURGUET, Vicent. *O ser em gestação; reflexões bioéticas sobre o embrião humano*. São Paulo, Loyola, 2002.

FARGOT-LARGEAULT, Anne. “Embriões, células-tronco e terapias celulares: questões filosóficas e antropológicas”. *Estudos Avançados* 51, maio-ago. 2004, pp. 227-245.

FREED CR., “Will Embryonic Stem Cells be a Useful Source of Dopamine Neurons for Transplant into Patients with Parkinson’s Disease?” *Proceedings of the National Academy of Sciences*. vol. 99, 2002, pp. 1755-1757.

MRAÑÓN, Gregorio. “Crítica de la medicina dogmática”. Em *Vocación y Ética y otros ensayos*. Madrid, Epasa-Calpe, 1966.

MARX, J. “Mutant Stem Cells May Seed Cancer”. *Science*, vol. 301, 2003, pp. 1308-1310.

MORTALLA, N. L. “La clonación terapéutica: ni clonación, ni terapéutica, ni necesaria”. *ABC*, Madrid, 3 mar. 2005.

PORCIONATTO, Marimélia A. *Projeto Genoma: uma leitura atenta do livro da vida?* Dissertação de Mestrado, São Paulo, PUC-São Paulo, 2001.

VALK-LINGBEEK, M. E.; BRUGGEMAN S.W. e VAN LOHUIZEN, M. “Stem Cells and Cancer: The Polycomb Connection”. *Cell*, vol. 118, 2004, pp. 409-418.

ZATS, Mayana, “Clonagem e células-tronco”. *Estudos Avançados* 51, maio-ago. 2004, pp. 247-256.

ABSTRACT - Rooted in Gregorio Marañón's "critique of dogmatic medicine", this essay discusses stem cell research from the viewpoint of scientific, philosophical and ethical considerations that most published works do not always take into account. It is incumbent that scientific positions on this issue be analyzed in light of the political, ideological and historical scenarios in which we are immersed.

KEYWORDS - Bioethics, Stem Cells, History and Philosophy of Science.

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Translated by Anthony Doyle. The original in Portuguese is available at http://www.scielo.br/scielo.php?script=sci_issuetoc&pid=0103-401420050003&lng=pt&nrm=iso.

Received on 7.21.2005 and accepted on 8.8.2005.