

Bioethics networks and reproduction technologies: theoretical and methodological controversies

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Abstract

The object of this paper is to discuss some of the theoretical and methodological controversies surrounding the emerging field of bioethics, especially focusing on reproduction biotechnologies, attempting to give some examples of its implications as a network of controversies. Initially, it presents the new reproduction biotechnologies in terms of the effect which they are producing on our understanding about human nature and life, as well as the context of the emergence of bioethics, traditionally conceived of as a critical and analytical example of the relationship between technology and humanity. As an alternative way of explaining these relationships, it outlines the aspect of *bioethics as a network effect*, in which the technology-society hybrid is shown both in the building of bioethical norms and in the instabilities which challenge these norms. As a way of understanding this heterogeneous and complex network, Controversy Analysis is proposed as a methodological tool. In order to illustrate the richness of such perspective, a brief empirical study is presented, in which an attempt is made to track controversies articulated around the relations between bioethics and reproduction biotechnologies, with a specific focus on stem cell research, as published by the *on-line* media from January of 2004 until July of 2006, raising questions about subjects such as: life, humanity, artifice and autonomy.

Keywords

Bioethics, reproduction biotechnologies, networks, controversy

Introduction

We live in times of intense turbulence across boundaries, in which what is understood as human nature seems to become increasingly artificial, generating a fear of what hybridization processes might produce. Alternatively to this situation of fear, it is possible to argue in favor of the creative and inventive potential

present in such hybridization processes, which offer unexpected perspectives about being agents and about living in society.

This last perspective is presented in a very fertile way from the concept of *socio-technical networks*, or collectives (LATOURET, 1994; 1996; 1999; 2001), which rejects the previous separation between society and technology,

between nature and artifice, in order to think about the subjective and social effects which these hybridizations produce. In the scope of this work, the hybridizations which biotechnologies have been creating in contemporary collectives are specifically dealt with.

According to RABINOW (2002), the present times seem to be characterized by the appearance of something he calls *biosociability*, in which biotechnological projects – the Genome Project, for example – bring about transformations in societies’ practices and ethics, remodeling them and life in general.

“(…) the new genetics will cease being a biological metaphor for modern society and will become a network for the circulation of identity terms and restriction places, around which and through which a truly new kind of self-production will appear: let’s call it biosociability” (RABINOW, 2002, p.143).

Nature itself - human nature included - becomes modeled by technique, becoming increasingly artificial. GARCIA DOS SANTOS (2003) shows the problems in this field, inquiring about up to what extent the advancements in technoscience are making obsolete the criteria that framed the concept of human, leading us closer to a concept of post-humanity. By analyzing projects such as the VHP (“*Visible Human Project*”) and the HGP (“*Human Genome Project*”), the author confronts us with a progressive hybridization between living and inanimate beings – an absence of limits which challenges even the field of norms and Law itself. Quoting jurist EDELMAN:

“The destruction of the idea of natural nature caused an extraordinary development of the subjective rights. (...) all it takes is that Law rules that a cell is one thing, all it takes is that is rules that a uterus is an object of lease, for the cell to be patented and the uterus be subjected to a lease contract” (EDELMAN, *in* SANTOS, 2003, p.242-243).

Apparently, the legal system has been trampled by the appearance of new situations, conditioned to the possibilities open by new technologies, for which it does not have proper parameters, like, for example, those in which it is impossible to distinguish with clarity between people and things – as in frozen or *in vitro* embryos – or between man and other living things – as in the biotechnological experiments which combine human and animal genes. In practice, the legal field seems to be stretched between the logic of the market and intellectual property, which gives almost unlimited powers to science and technology, and the logic of the construction of a “non-humanist law system”, which proposes to go beyond private interests.

It is in this context of uncertainties and blurring of boundaries that bioethics gains in relevance, whose normative capacity must be understood from a complex and dynamic perspective. We seek to approach the subject through inquiring about the new reproductive biotechnologies, conceived as agents/actors¹ which operate in the hybridizations characteristic of the present days. As in GARCIA DOS SANTOS:

“the opening of this field is creating unheard-of situations. In England, a young woman wishes to experience Immaculate Conception because she identifies with the Virgin Mary, while a gay couple and a lesbian couple wish to constitute a new type of family. In Italy, elderly women wish to become mothers. Japanese clients travel in order to contract wombs for hire abroad, because this activity is illegal in their country. In the United States, many babies given birth to by substitute mothers are being abandoned because they were born of the wrong sex; at the same time, legal disputes transfer to judges the responsibility of deciding who the mother is: the woman who supplied the egg, or the woman who bore and gave birth to the child? The world over, the traditional concepts of life, death, procreation, parenthood, and relatedness are being imploded and the controversy around the moment in which the human material becomes a person is big” (GARCIA DOS SANTOS, 2003, p.239).

Consistent with a network perspective, we argue for the previous non-separation between humanity and technology, which equally pushes us away from any deterministic position, whether technological or sociological. From our point of view, the field of bioethics seems to be framed by a position of externality regarding the production of the technosciences – these, in turn, being external to society. Thus we have, on one hand, the whole of technoscientific production, made more dynamic by increasingly faster advancements, and, on the other hand, bioethics, as a normative field responsible for ordering and limiting the materialization of biotechnological possibilities.

We propose a different reflection, which has as its focus the middle spaces in which these fields mix, in an environment of controversies. We seek to explore a conceptual field and a methodological perspective capable of bringing us closer to bioethics as a network effect, in which knowledge and norms reciprocally produce each other, human and non-human agents mix, making it impossible for any rule to be previously set – it will be always the stabilization of a game of arguments, interests, and mobilization of allies. For this we initially present a brief panorama of the field of reproduction biotechnologies, giving special relevance to the controversies which unfold around the topic of life. Next, aiming at illustrating the hybridizations being accomplished by this field and with the object of shedding light on some potential repercussions of these subjects in society, we seek to map these controversies in some types of media, specifically focusing on stem cell research.

Bioethics, technology and humanity – A few current dilemmas in reproduction biotechnologies

Reproduction biotechnologies seem to configure themselves as a visible area for the study and understanding of the fluidity of the borders between the human and non-human, the natural and artificial, because

“(…) the fertilization and reproduction processes are made artificial to such an extent that it is possible to

initiate human life in the laboratory, change its genetic composition, select the obtained product and initiate its development, only then entrusting its evolution and maturation to a human uterus, whether or not genetically related with the embryo" (KOTTOW, 2005, p.21-22)

TESTART (1995), one of the pioneers of *in vitro* reproduction techniques – and leader of the first French research team to be successful in the conception of a test-tube baby – already pointed to the inclusion of the artifice dimension in human reproduction, until then understood as something quite natural. TESTART (1995) evidences such mixtures when talking about the happiness of the parents when faced with an *in vitro* fecundated baby:

"(...) at the end of the tribulations of an impotent therapeutic process, they discovered in the roundness of a womb that they would be three. And that this third is not the thing of specialists: free from an odyssey in which syringes, hormones, scalpels, tubes and artificial liquids mix, he is just their son" (TESTART, 1995, p.21).

It can be perceived that "parental love", besides mixing with technological artifacts, seems to begin to exclude physical contact. In the following sequence, what the author describes as the set of devices which belong to the "artificial" procedures is mixed with terms and forms which seem to recreate a natural reproduction process.

"First, the receptacle which collects the semen, a cylinder the width of a thumb and the length of a hand, the antechamber of which, of considerable size, is cut by a vulvar fringe. The chalice for the virile offer is a phallic negative or a vaginal molding? Next comes the tube where the gametes marry. The tube is fragile, long and straight; the English language (...) uses the same word (...) to designate the uterine tube and the test-tube. The tube is placed in a warm place, a womb which, by the way, shelters premature babies. When the epopee of the cells destined to procreation is concluded, the speculum's large hands distend the vagina and the egg is pushed into the matrix, thanks to the fine catheter. This mimics the long meatus of the rigid phallus; the muscle delegates the ejaculatory function to the syringe" (TESTART, 1995, p.22-23).

The depiction of IVF-ET - *in vitro* fertilization and embryo transference presented by TESTART suggests quite clear possibilities of what he ironically calls "*a la carte eggs*": children will be chosen according to specific standards; conception will become a completely transparent process; humans might be biologically designed; and life will be subject to manipulation.

It is interesting to note that, when the techniques – assisted fertilization, for example - are used to help in the initial stages of conception, there is little or no questioning. However, when the issue touches the field of *in vitro* reproduction, there appear the bioethical controversies and complaints about the excess of artificialization of something that would be, in principle, natural - the beginning of life – configuring an arena in which religious, secular, and technical-scientific arguments mix.

Much of the bioethical criticism of *in vitro* reproduction falls on questions related to discarding embryos which, having been produced in excess, are often reclaimed as scientific research material. The question arises: should we consider those embryos as morally human persons? The questioning about the beginning of life and the protection of this human person become especially tense, and also in controversial questions regarding "wombs for hire"²: what is the status of the biological material implanted in the receptor uterus: human being or project? Son or stranger? Various answers are possible, however none of them is based on solid foundations, creating once again, a controversial and complex picture.

Another important source of controversies is linked to stem-cell research:

"Obtained from adult tissue, stem cells are not morally questionable, because they are not all-potent cells, with enough genetic capacity to form a new human being (...). On the other hand, embryo cells (...) are considered, by the adepts of the conceptional³ view, as morally valid human beings. Therefore, they prohibit the use and the investigation of these cells for therapeutic purposes" (KOTTOW, 2005, p.32-33).

It is in embryo cells that simultaneously lie all-potency which makes possible the substitution of organs and the bioethical controversy about the protection of the human person, unleashing intense questioning which

"(...) try to determine the moral status of the different participants and the ethical conduct which should be adopted regarding them. This explains why the initial and fundamental problem is to determine the beginning of human life and the moral status it has, as there is ample consensus, although not absolute, that all human life, once recognized, is, indiscriminately, a moral subject to which the same fundamental rights of preservation, protection and support are conferred" (KOTTOW, 2005, p.22).

We may perceive that the concept of human life, associated with the ideals of preservation and protection, seems to frame bioethics' actions. We thus agree with KOTTOW when he affirms that it is exactly in the field of human reproduction, with its diversity of concepts and perspectives about the beginning of life on the one hand, and intense technological development, on the other, is an exemplarily fertile terrain open for bioethical production.

THOUVENIN (2002) understands that the field of medical bioethics is the result of the many concerns surrounding the use of technosciences in the field of biology, which gained momentum in the 1970's in the United States, with the goal of examining the ethical conditions of research involving human beings. A similar conclusion is reached by researcher GARRAFA (2004), for whom this concept of bioethics gained visibility with the publication of a book entitled "*Bioethics: A Bridge to the Future*", by POTTER, in 1971. For GARRAFA, it is possible to differentiate bioethics from persistent situations – which analyze matters from people's daily life, like racism and

gender discrimination - and the bioethics of the emerging situations - which studies conflicts between progress of biotechnologies and citizenship. Also according to GARRAFA (2004), "the triumph of new conquests cannot destabilize the fragile balance of relations which, with hard work over many centuries, men and women have succeeded in keeping between themselves and nature".

This affirmation seems to support the concept of bioethics as a manager of instability risks in the relations between the biotechnologies and men/citizens, reinforcing the exteriority among them, a perspective which is reinforced by SARNÉ and BINDÉ. In an article published by the Folha de São Paulo newspaper, these authors raise an alert about new possibilities of discrimination which would threaten modern man, starting from two critical dimensions of the experimentations in genetic medicine: eugenics, derived from the improper use of biotechnologies for commercial purposes, and the attack on human liberties, derived from the possibility of genomic manipulation. For GARCIA DOS SANTOS (2003), the alerts present in these publications simultaneously denote great concern for the defense of humans and the belief in a bioethics capable of accomplishing this defensive task.

JONAS (*in* GARRAFA, 2004) seems to have a similar conception of bioethics, when he argues about the necessity of ethical guidelines that would move in the same frantic rhythm as technoscience. His conclusion derives from the insight that there would be an imbalance between the rapid speed of scientific progress and the slow rhythm of ethical progress. Thus JONAS (2004) proposes a control of biotechnological advancements through high-speed bioethics. The idea is to attempt to establish limits that would be fluid enough and in constant reconfiguration – to the technosciences, without establishing a conservative fear in relation to them. Thus, also for JONAS (2004), bioethics and technoscience are distinct fields, and the latter should be ordered – and therefore determined – by the first.

For other authors, like SCHRAMM (2005), it is exactly the fertility of this field of biotechnological controversies which drives bioethical production, and it must govern itself by respecting ethical pluralism and, consequently, the autonomy of individuals. According to him, an analytical and normative dimension is necessary for dimensioning conflicts, aiming at preserving democratic co-existence based on pacific agreements between those involved, and not on the principle of the victory of the stronger:

"the form of ethics applied called bioethics – particularly its secular branch – considers cognitively pertinent and morally legitimate that its social function should be both analytical (or critical) and normative. That is, being at the same time capable of analyzing (...) the interests and conflicts of value that inevitably appear (...); of prescribing the desirable behaviors, and of proscribing those which could be considered harmful to an acceptable coexistence by anyone sufficiently rational, reasonable and willing to enter in dialogue and make agreements as moral agents. (SCHRAMM, 2005, p.45).

Technology, in its turn, is understood as fundamental ethical property, and its use must be dimensioned in favor of development – technological knowledge must provide the possibility of avoiding certain suffering.

SCHRAMM (2005) defends, therefore, the idea that bioethics should be governed by the recognition of the human right over the artifice, a right to transform even human nature,

"(...) as long as certain conditions of biosafety and orderly life in common are respected, with responsibility, even by preserving balances necessary for the quality of life of the future generations, the well-being of sentient animals, and the quality of the natural ecosystems" (SCHRAMM, 2005, p.47).

But who decides - and how – the exact measure of quality of life? Technology, philosophy, businesses, ordinary citizens, or lawmakers? Could a bioethical system understood only in its analytical and critical dimensions, guided by a perspective which prescribes behaviors and hampers control, handle the instability and fluidity of the borders and limits experienced nowadays? Would it not be necessary to think of bioethics as an effect of this whole quite heterogeneous controversy network?

Searching for a methodology: the networks' perspective and controversy analysis

The controversies surrounding reproduction biotechnologies and their repercussions in bioethical terms show, among other things, the urgency of taking into account the mixtures which we produce and which, at the same time, produce us. We, thus, propose implementing a notion of networks or collectives.

The notion of networks makes possible symmetry in the approach to each and every collective, conceiving the oppositions or polarities as the result of a group of operations to which humans and non-humans are enlisted, producing reasonably stable effects. This capacity of enlisting or mobilizing allies also is responsible for the amplitude, the size of the networks - thus, what we call "universal" is nothing more than a very ample network.

In networks, a fact may be understood from the circulation of enunciations along a chain of transformations/hybridizations, in which some elements are subtracted, and others are added. From link to link, facts are built, revealing the reasons they occurred, and their production details. One of the decisive concepts for understanding the construction of facts is the black-box notion (LATOUR, 2000), used to refer to a very well-established fact or artifact, in which there is no discussion about its contents. The expression "to open the black box" means not to accept the fact as given, seeking its genesis and evidencing the collective dimension of its construction, its normal trajectory and its appropriation by the various actors. From this perspective, the production of knowledge may be understood as the "exportation" of the enunciations from its starting place and

these enunciates end up broadening their action through such circulation. On account of that path, it is possible to affirm that a fact always leaves a trail, a historic, which follows increasingly implicitly in new arguments.

The solidity of a fact depends, therefore, on different operations and mobilizations of the collective, and, in these processes, there may be the appearance of new enunciates, which do not endorse it. At this moment, the black box could be opened in controversies, in an arena of argumentations and counter-argumentations, in which new allies – actors, texts, and tools – are mobilized, until a new form is outlined, with the appearance of a new object. The diffusion of this new object – a new enunciate – throughout the network happens as it starts being used by others as the basis for new arguments. It will, then, grow old and thus become a new black box.

The condition of something which has not yet become as stable as a black box is called, by sociologists of science and technology, translucent box, or grey box:

“The term black box (...) is used in science sociology to talk about a well-established technical fact or artifact. This means it is no longer the object of controversy, inquiries or doubts, but rather accepted as a given (...). When a technology is not completely established as a black box, we refer to it as a grey box (Latour) or translucent box (Jordan and Lynch)” (VINCK, 1995, p.176).

By taking advantage of the grey box condition of some contemporary issues – in the context of the present work, those that report to the networks which articulate bioethics and reproduction biotechnologies - we may perceive a collective of mediations, a negotiation of interests which articulate humans and non-humans, enlisting governments, texts, bacteria, computers, citizens, entrepreneurs, as allies for their arguments. All of them start sharing a common destiny.

This conceptual body requires a work methodology which may be resonant to it, capable of mapping such networks in terms of their geography – main attackers and spokespeople – and of their dynamics – the fluxes of the different translations⁴.

According to LATOUR (2000), interesting research must be capable of placing itself in the black box construction moments, which allows it to follow the controversies. For the author this requires that we place ourselves in symmetry to what concerns the establishment of any polarity, discerning what is involved in each argument. In following the controversies, we need to pay attention to the extent of the network that is being built, that is, perceive that the actors are always punctualizations⁵ of much vaster and more heterogeneous networks.

A privileged observatory for the tracking of networks resides, therefore, in controversies, hence the option for the analyses of controversies as a methodological tool for mapping the networks which articulate current productions in the fields of biotechnology and bioethics.

Analyses of technical and scientific controversies was highlighted from research done by NELKIN et al. (*in*

VELHO *at al*, 2002), in which it was sought to understand the way in which scientific knowledge depended on negotiations and debates between the interested parties, involving different segments of society – which already gives us a hint that to follow the controversies is also to understand the mix between knowledge and society:

“Controversies (...) make various actors appear, as well as those they mobilize in the construction and deconstruction of the facts (...). The nature of the used arguments and their contingencies make it possible to put in the spotlight social processes which otherwise might be dissimulated” (VINCK, 1995, p.116).

When we propose to make use of the controversy analysis methodology, some stages can be outlined (VINCK, 1995). Firstly, it is sought to evidence interpretative flexibility of the analyzed subject, that is, its nature as an artifact, through the identification of several arguments. Next, it is necessary to describe the construction (or not) of the consensus which responds for the “closing” of the referred to controversy. Lastly, it is important to list the closing processes to the broader spheres, that is, to connect the networks at issue to wider ones, reaching others. According to PEDRO (2005), the understanding and mapping of controversies requires giving special attention to knowledge-power devices which work in networks, bearing in mind that the proposed arguments are not only technical one, but are also strongly entwined with beliefs, interests, and with other networks into which the scientists are inserted.

The analysis of controversies, therefore, seems to be in synch with network reference, because, in the context of science and technology, experimental proceedings and objective rules are not enough to resolve disputes - when a resolution is reached, it is the result of pressure, agreements which do not include only accepted knowledge, but also the interests and goals of humans, involving, most of all, their negotiations with non-humans⁶. Hence, the proposal of this study to explore some controversies surrounding reproductive biotechnologies and their resonance in the bioethics field.

As a visible arena of such controversies, we have opted to focus on the media, since the participation of the common citizen in networks which articulate these themes has been happening, most of all, through the amplification that the media is capable of producing, which makes it a privileged actor. As PEDRO points out:

“(...) we recognize the media function of not only defining certain subjects as controversial– therefore, as something that has to be thought over and discussed – but also of offering the points of view which could be considered as possible alternatives to the problem. Additionally, because of its own spectacular way of working, the media has the power to amplify the subject, giving it an even greater visibility” (PEDRO, 2005, p.8).

Let us then see how these controversies unfold, from their repercussions in the media.

What is life, after all? Mapping controversies

In order to illustrate the dynamics of the controversies which are inherent to reproduction biotechnologies and the bioethics field, we are going to analyze a few articles published by the media. We have selected pertinent articles from the “Época” and “Isto É” magazines – both available online – as well as from the “O Globo” and “Folha de São Paulo” daily newspapers – also in their electronic versions, referring to the period from January 2004 to July 2006. The articles have been selected because of their references to the semantic field related to the subject of bioresearch.

On first analysis, we perceive that bioethical controversies, mainly in Brazil, have been focused on two subjects: abortion and stem cell research. In both, the question which intensely stimulates arguments and counter-arguments has to do with the identification of the exact moment at which it is possible to determine whether or not there is the existence of human life and the defense of the protection of the autonomy of this life when facing invasive technologies considered contrary to the nature of life. In these controversies, we may find the involvement of important actors: governments, religious leaders, scientists, lawmakers, communications channels, artists, companies. We have opted to limit our analysis to the subject of stem cell research, because it is the object of a much more globalized debate than the subject of abortion, in addition to bringing more elements to bear in the controversy.

On 16/July/2004, in an article for Época Online magazine, denunciations made by American researchers about the manipulation of research results by the government of the United States – so that the scientific community was being pressured to reveal only the results in line with government interests – was presented:

Politics and science do not mix. Or better said: they should not mix, alerts a report by the Union of Concerned Scientists, an American NGO that accuses the George W. Bush administration of putting unacceptable pressure on the scientific community of the United States. The entity accuses the government of distorting, censoring and manipulating research in order to meet political interests (GRECCO, 2004).

Researchers accuse the government of mixing politics with science. This seems to outline a first polarity: on one side, the defenders of detached objective science, whose knowledge is free from political interests; on the other side, interests, politics, and the government.

On 15/Oct/2004, the media, also through Época magazine, seems to adopt a clear position amid the controversy involving stem cells. A lengthy article was published, mentioning important names in the pro stem-cell research movement– such as the musicians Herbert Vianna and Marcelo Yuka, both of them physically impaired. The article starts with a question which already seems to indicate the side the magazine is taking:

Is there a nobler destiny for embryos discarded by fertilization clinics than to serve the research for the

treatment of currently incurable diseases? (SEGATTO et al., 2004).

The magazine presents the controversy as having well-defined opposing fields:

In Brazil, the question is at the center of a continuing debate which opposes, on one side, religious groups, and on the other, scientists and those who suffer incurable diseases (SEGATTO et al., 2004).

The right to life issue seems to be at the center of the dispute. In a quite illustrative passage of the hybrid character which makes the subject unique, the article allows us to catch a glimpse of how nature is built according to the way in which the collectives are woven.

The definition of the **right to life** is at the core of the dispute. In the definition of those who have a person suffering from a degenerative disease, or someone who has lost his/her movements at home (...) the **right to life** is to free his/her son/daughter from the respirator, close the incision in his/her belly through which s/he is fed, rescue his/her dignity. For the Catholic Church and some part of the Evangelicals, life is in a frozen embryo, even though it will never meet a uterus. This line of thought leads to the belief that cells abandoned by couples and destined to the waste bin deserve more respect than people who are living **half a life** (SEGATTO et al., 2004, our emphasis).

This passage shows that the media not only register the subject, but also presents the various sides of the controversy and, what is more relevant, appear as an important voice for one of the contenders. Judging by the nobler linguistic treatment given to the pro-life argumentations of the defenders of stem cell research, the scales of the right to life seem to be inclining to their side. By using a word such as “waste bin”, it makes one of the groups appear to be defending the indefensible: “waste” against “dignity”. Media, artists, ordinary citizens with diseases, scientists, they all seem to come together against the backward and fundamentalist religious people.

Convictions make sense only to those who believe in them (...) it is not fair that they would want to impose their beliefs and obstruct research in a secular State. By following the logic that only God may cure, the Church has opposed itself (...) to much medical advancement (SEGATTO et al., 2004).

In the aforementioned article, that argument is once again reinforced through an affirmation by LAHN, from the University of Chicago:

the controversy will be forgotten in a few years (...) What moves humanity is the desire for a **better life**. The conviction raised exclusively by a few Christians is a cultural conviction of the moment. It is not universal, nor eternal (SEGATTO et al., 2004, our highlight).

This report seems to indicate that, in opposition to supposedly sectarian arguments, the universal and eternal conviction would be that of the scientists. They know what this “better life” is, while perceptions by religious leaders would be encumbered by limitations – cultural, local, therefore, having less value when compared to universal and timeless scientific knowledge.

In this article, as a strategic next step of the agents defending stem cell research, an approximation to the Evangelical representatives in the National Congress is also shown, giving evidence to the political movement of science and revealing that such controversy does not end in science labs. Even though scientists consider scientific knowledge to be unconnected to culture, these ties seem to become clear in some passages, like:

To gain the sympathy of Evangelical parliamentarians is, now, the strategy planned by patients and scientists (SEGATTO et al., 2004).

A second important subject refers to human autonomy. In an article from 30/May/2005, in the *Época Online* magazine, the text informs us that:

Pope Benedict XVI indicated his support to the Italian bishops engaged in the abstention campaign in the referendum about assisted fertilization which will happen in Italy on the 12th and 13th (...) As the popular consultation will be valid only if half plus one of the apt voters participate, abstention could sabotage the referendum (ÉPOCA ONLINE, 2005).

We may perceive the clear position of the Pope against assisted fertilization, reinforced by the militancy of the church, through actions of the bishops. The article itself, further on, reveals the reason:

Human beings cannot be reduced to a means, because it is an end, as Christ teaches and human reason dictates – the Pope stressed (ÉPOCA ONLINE, 2005).

The question seems to reside in maintaining the autonomy of man, who cannot be treated as a passive tool. These considerations became even more evident in the passage which follows:

With the victory of a “yes” vote, there would be changes in four points of the law: the prohibition of embryo research would be suspended, the limits to the number of eggs which could be fertilized in one treatment would be removed, the way for the donation of sperm and eggs would be open, and parts of the text which implies that fertilized eggs have full legal rights would be changed (ÉPOCA ONLINE, 2005).

The questions of the Church seem to be focused on the understanding of human life as naturally autonomous and free, not passive or being associated with notions like tools or merchandise. Even with the defeat of the referendum, the arguments of the Church did not lose force, as became evident in an article by *Folha Online* on 21/June/2005, which mentions the publication of a book by the Pope, in which the subject remains a topic.

One of the chapters (in the book) is entirely dedicated to the **right to life** in Europe. (...) Ratzinger recognizes the current cultural values, as freedom of belief, the rights of man and democracy, but highlights its limits. (...) Individual freedom which does not discriminate (...) could easily become a new dogmatism (...) The self-manipulation possibilities that man has achieved (...) are disturbing threats (...) especially if there are no moral measures. (VLAHOU, 2005, our highlight)

Freedom within limits seems to be the exact recipe for a perfect life, according to the Pope. Autonomy, yes, but not allowing it to become a creed that would replace the word of the Church in the guidance of actions in society.

It is interesting to note that, on the site of the CNBB – National Conference of Brazilian Bishops – there are articles which merge scientific and religious arguments. Among them, an interview by TEIXEIRA (UNIFESP) given to the “*Médico Repórter*” Magazine, on 13/Oct/2004, in which she concludes that:

The human being cannot be used as a means of research. (...) Utilitarianism brings back the Roman motto: your death is my life. (...) Society is being misinformed by the media. The interviews I have been giving appear only on the university channel (...) Last week, *Globo’s JN* (Evening News) presented a case of self-transplantation of adult stem cells with success, and immediately in the sequence came therapeutic cloning, suggesting that it was the treatment used (TEIXEIRA, 2004).

The CNBB brings us, then, an alternative scientific discourse to those presented by the mass media, evidencing a controversial field. It also reveals that the category of scientists and academics is not a solid and homogeneous block. There are divergences which bring the scientific discourse close to the religious discourse and which seem to have some difficulty to find a voice. This happens because, through the mobilization of allies in its circulation in the networks, scientific discourse makes the Catholic one become its opposition, as anti-scientific, erasing its own heterogeneity, as well as that which exists in the dominion of the Church and religion.

This heterogeneity, however, is capable of gaining a voice at some moments, as is illustrated in an article in *O Globo Online* from 22/Apr/2006, when it presents diverging arguments inside the Church itself:

One of the main cardinals of the Roman Catholic Church supported the limited use of condoms in the fight against AIDS. The declarations of Carlo Maria Martini go against the orientation of the Church which bans the use of condoms, alleging that they are a type of artificial contraception (...) Recently, two other cardinals, the Belgian Godfried Danneels and the Mexican Javier Logano Barragán, have made similar declarations about the use of condoms⁷ (GLOBO ONLINE, 2006).

Thus, although the media has been feeding the controversies from reasonably well-defined positions, it is possible to demonstrate the heterogeneity which these controversies encompass.

A further ingredient in this complex network is offered to us in an article published by *Folha Online*, on 17/Oct/2005, in which an “ethical delegation”⁸ is made to non-human actors: artifacts built inside the biotechnological research labs.

Ethical dilemmas which, for many people, have made it impossible for them to obtain stem cells from human embryos are beginning to get a scientific response. Two new studies in mice were successful in obtaining these cells by means of other techniques (LOPES, 2005).

These techniques could solve bioethical problems caused by the destruction or scientific use of unwanted human embryos. Stem-cells would no longer be obtained from these embryos, but would instead be artificially produced in a laboratory. This new technique would have the power of enlisting, among its allies, religious leaders and scientists. Its political power becomes evident through the possibility of bringing together these polarized fields.

A few considerations are worth being made, in an attempt to make a synthesis of what we have analyzed up to here. Firstly, it is worth remarking that we have concentrated basically on the first stage of controversy analysis, that is, the identification of the main subjects and mobilized arguments. It has thus been possible to reveal the interpretative flexibility with which the network articulated by the reproduction biotechnologies and their repercussions in commitments in the bioethics field. However, since this is merely an illustration - which covered a short collection period of articles in the media - it has not been possible to identify the trends for closing the controversy.

Yet, the analyses which were carried out point to the pertinence of this type of methodology for approaching networks which articulate humans, non-humans, nature, artifacts, and artifices. Additionally, they allow us to see how a subject - life - may be differently translated by many actors; how different alliances are established, aiming at making certain arguments valid; how science and society, as we many times have conceived them, are only punctualizations of much vaster and more heterogeneous networks.

Final considerations

The controversies that we have been following, both in the theoretical field, and in the repercussions which they have started generating in social networks, give evidence to the impossibility of a human being's defining himself/herself as being cognitively different from non-humans from the starting point, when questions brought up by new reproduction technologies are discussed in public. How do we then consider the bioethics which is being debated in the discussion of these biotechnologies and is being made dynamic by the power of the hybrids? Most of the time, we tend to notice, in the bioethics field, the prevalence of concerns about risks which biotechnologies could expose humanity to. This aspect becomes central to the discussion when, in the context of contemporary biosociability, nature has started being constantly modified and redefined. Such redefinitions always create new risks, which, in their turn, originate new controls, at an ever increasing pace, the dynamics of which generates ever more numerous hybrids. On this point, we have argued, bioethics gains special relevance; not only as bioethics in its mere nominative sense, but, above all, as a producer of new existence, as a way in which society, humanity, and technology may (re)invent themselves.

As KOTTOW (2005) tells us in controversial bioethical discussions, by "denouncing" the excess of artificiality which accompanies discussion about the beginning of life, mixing religious, secular, and technical-scientific arguments. Echoing this is LATOUR's concept that we should

not conceive of networks as having a single controlling essence, a single center of power, but as having diffuse circulating power, whose movements we must follow so as to understand the crystallizations which start to stabilize themselves. Thus, we also need to understand the controversy networks around biotechnologies and bioethics: flows of arguments and counter-arguments which gain the status of "facts" and, on that path, define power centers.

It is also worth recovering the idea that the collectives are defined not by their limits, but by their connections (SERRES, 1999), which makes it impossible for their productions to be contained by fixed barriers or by previously defined normalcy. Constant cross-boundary flows define new spaces in proportion to their movements, transforming the collectives and, consequently, drawing new power geographies, which, in their turn, generate even new overflow...

"This is the plasticity and the irony of the networks: they expand in the right measure to which they escape. If the networks are, on the one hand, under pressure, on the other hand they are opening. Openings happens, precisely in the process of escaping from pressure (...) in this ephemeral line between the crystal and liquid" (NOBRE et al., 2001/2002, p.54).

In bringing this dialogue to the field of bioethics, we may perceive that, although bioethics sees itself as a regulating center, it also generates mediations/pressures in its altercations with technologies and, at these movements, transforms itself. This ephemeral line between restraint and flow makes the collectives dynamic. Therefore, it is impossible for bioethics to be a mere regulatory control based on and limited by human ethics and biotechnology and which is carried out by humans. We propose thinking about bioethics as having a network effect, operating from the hybridization of humans and non-humans. We understand that bioethics is being incorporated into networks in which the humans responsible for its formulation are already hybrids: they are socio-technological productions. If the controversies about bioethics are centered around the right to life, these new actors can ask: what is life, after all? Or, rather, this is too modern a question for "cyborg" bioethics, which is already being built amid labs, media, businesses, ordinary citizens, bioethicists, lawmakers, silicon, microorganisms...

Notes

1. The notion of actor is used in the terminology of scientific and technological sociology to name the humans and non-humans that act in the network, producing significant transformation effects (VINCK, 1995).
2. When an *in vitro* fecundation is reached and the zygote is implanted in a leased or borrowed uterus.
3. Trying to evaluate the exact moment when a *human life* appears, there are different perspectives - none of them hegemonic, though. The *conceptional view* believes in the beginning of the human life as simultaneous to the union of the egg and the sperm. The *evolutive view*, on its turn, believes that such appearance occurs in a certain moment

of the process of maturation of the embryo. The *social view*, by not postulating natural essences, sees the human person as the product of its social context. And, finally, the *relational view* points to the recognition of a human person exactly in the establishment of a relationship with it.

4. The notion of translation is used within the sphere of social-technological studies to designate the appropriation which the actors make of the network. To translate means to attribute an element of a network to a role to be performed by him/her, a practice which is done by all actors, in a mutual and continuous movement, according to the wishes, expectations and/or interests of each of the translators.

5. The notion of punctualization refers to the moments in which the network “disappears” and works as a single actor (LAW, 1992).

6. An interesting study using the analysis of controversies was carried out by Guesser (2005) around the subject of the free software.

7. In the context of the fight against the HIV virus, artificial contraception is accepted as a **defense of life**.

8. The notion of delegation refers to the mediation carried out by the technical objects in our daily lives, which sometimes allow, sometimes prevent our actions: “The morality of our society is greatly indebted to those permissions and prohibitions” (LATOURE, 1996, p.161).

Bibliographic references

ÉPOCA ONLINE. Papa apóia boicote a referendo italiano sobre reprodução assistida. **Revista Época on-line**, São Paulo, 30 mai. 2005. Available at: <<http://revistaepoca.globo.com/Epoca/0,6993,EPT970384-1663,00.html>>. Accessed: 9 Jul. 2006.

GARRAFA, V. **Bioética em Ação: até onde avançar sem agredir?** 2004. Available at: <<http://www.cjf.gov.br/revista/numero7/artigo10.htm>>. Accessed: 15 Mar. 2006.

GARRAFA, V. **Reflexões bioéticas sobre ciência, saúde e cidadania**. 2004. Available at: <<http://www.portalmedico.org.br/revista/bio1v7/reflexoes.htm>>. Accessed: 15 Mar. 2006.

GLOBO ONLINE. Contra a Aids, preservativo é um mal menor, diz cardeal. **Jornal O Globo online**, 21 Apr. 2006. Available at: <<http://oglobo.globo.com/online/mundo/plantao/2006/04/21/246919376.asp>>. Accessed: 9 Jul. 2006.

GRECCO, D. Temperatura Máxima. **Revista Época on-line**, São Paulo, 19 Jul. 2004. Available at: <<http://revistaepoca.globo.com/Epoca/0,6993,EPT761387-1664,00.html>>. Accessed: 9 Jul. 2006.

GUESSER, A.H. **Software livre e controvérsias tecnocientíficas: uma análise sociotécnica no Brasil e em Portugal**. 2005. 183 f. Dissertação (Mestrado em Sociologia Política) - Programa de Pós-Graduação em Sociologia Política, Universidade Federal de Santa Catarina, Florianópolis.

KOTTOW, M. A Bioética do Início da Vida. In: SCHRAMM, F.R. & BRAZ, M. (Org.). **Bioética e Saúde: novos tempos para mulheres e crianças?** Rio de Janeiro: Fiocruz, 2005. p.19-38.

LATOURE, B. **Jamais fomos modernos**. São Paulo: 34, 1994. 149p.

LATOURE, B. Do humano nas técnicas. In: SCHEPS, R. (Org.) **O Império das técnicas**. Campinas: Papyrus, 1996. p.155-166.

LATOURE, B. Como redividir a grande divisão. **Mosaico – Revista de Ciências Sociais**, v.2, n.1, p.168-199, 1999.

LATOURE, B. **Ciência em ação: como seguir cientistas e engenheiros sociedade afora**. São Paulo: UNESP, 2000. 438p.

LATOURE, B. **A Esperança de pandora**. São Paulo: EDUSC, 2001. 372p.

LAW, J. **Notes on the theory of the actor network: ordering, strategy and heterogeneity**. 1992. Available at: <<http://www.lancs.ac.uk/fass/sociology/papers/law-notes-on-ant.pdf>>. Accessed: 4 Apr. 2004.

LOPES, R.J. Equipe de cientistas deriva células sem matar embrião. **Folha de São Paulo online**, São Paulo, 17 Oct. 2005. Available at: <<http://www1.folha.uol.com.br/folha/ciencia/ult306u13867.shtml>>. Accessed: 9 Jul. 2006.

NOBRE, J.; PEDRO, R. Dos sólidos às redes: Algumas questões sobre a produção de conhecimento na atualidade. **Documenta EICOS**, Universidade Federal do Rio de Janeiro, v.12/13, p.43-56, 2001/2002.

PEDRO, R. Tecnologias de vigilância: um estudo psicossocial a partir da análise de controvérsias. In: ENCONTRO ANUAL DA ASSOCIAÇÃO NACIONAL DE PÓS-GRADUAÇÃO E PESQUISA EM CIÊNCIAS SOCIAIS, 29, 2005. **Anais da ANPOCS**, 2005, p.1-32.

RABINOW, P. **Antropologia da razão**. Rio de Janeiro: Relume-Dumará, 2002. 204p.

SANTOS, L. G. **Politizar as novas tecnologias**. São Paulo: 34, 2003. 320p.

SCHRAMM, F.R. Cuidados em Saúde da Mulher e da Criança, Proteção e Autonomia. In: SCHRAMM, F.R.; BRAZ, M. (Orgs.). **Bioética e Saúde: Novos tempos para mulheres e crianças?** Rio de Janeiro: FIOCRUZ, 2005. p.39-65.

SEGATTO, C.; TERMERO, M. A Guerra das células-tronco. **Revista Época on-line**, São Paulo, 18 Oct. 2004. Available at: <<http://revistaepoca.globo.com/Epoca/0,6993,EPT825942-1664,00.html>>. Accessed: 9 Jul. 2006.

SERRES, M. **Luzes: cinco entrevistas com Bruno Latour**. São Paulo: Unimarco, 1999. 267p.

TEIXEIRA, A. Entrevista concedida à revista médico repórter. **CNBB**, 13 Oct. 2004. Available at: <<http://>

www.cnb.org.br/index.php?op=pagina&subop=469>. Accessed: 9 Jul. 2006.

TESTART, J. *O ovo transparente*. São Paulo: EDUSP, 1995. 136p.

THOUVENIN, D. A Bioética é de má-fé? In: LECOURT, D. (Org.) *As leis bioéticas, ou como mascarar os interesses contraditórios?* São Paulo: Edições Loyola, 2002, p.55-85.

VELHO, L.; VELHO, P. A controvérsia sobre o uso de alimentação alternativa no combate à subnutrição no

Brasil. *História, Ciências, Saúde – Manguinhos*, v.9, n.1, p.125-157. 2002.

VINCK, D. *Sociologie des sciences*. Paris: Armand Colin, 1995. 292p.

VLAHOU, A. Papa critica aborto e fala da reevangelização da Europa em livro. Folha de São Paulo online, São Paulo, 21 Jun. 2005. Available at: <<http://www1.folha.uol.com.br/folha/bbc/ult272u43701.shtml>>. Accessed: 9 Jul. 2006. 

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