

Stem cells: Nursing professional's scientific and ethical conception

Danusa Begnini
Silvana Bastos Cogo Bisogno
Ivana Beatrice Mânica da Cruz
Tamires Patrícia Souza

Abstract

Stem cells: Nursing professional's scientific and ethical conceptions

This study analyzed nursing students' speech on the use of embryonic stem cells (ESCs) in researches and potential therapeutically procedures, by means of exploratory qualitative inquiry involving speech analysis. The analysis suggested that, despite the conceptual bases on ESCs are relatively correct, the conceptions on their use in bioethical context were strongly based on information disseminated by the medias. Concerning the ethical questions, the speeches were ambiguous sometimes, even if it could identify them as either opposing or advocating the use of the ESCs in research and therapeutics. The set of results suggests the necessity of the bioethics debate of controversial issues, like the ESCs, being incorporated in the agenda of the professional collectives so these represent legitimate bridges between the production of the scientific knowledge, the ethical discussion and dissemination of these information to society.

Key words: Ethics. Bioethics. Stem cells. Nursing.

CEP approval No. 23081.009909/2010-56



Danusa Begnini

Nurse graduated at the Federal University of Santa Maria (UFSM)/Higher Education Center of Northern Rio Grande do Sul (Cesnors), Palmeira das Missoes, Rio Grande do Sul, Brazil

The scientific development responsible for the highlight of the so-called *regenerative therapies* has the integration of researches in areas of cell biology, biotechnology, tissue engineering, and stem cells as basis. Among those researches, those related to embryonic stem cells (ES cells) use certainly are those that most strongly wakens bioethics interest ¹. Authors such as Zago and Covas ² stress that, in addition to ethical dilemmas involved in blastocyst destruction to get the embryonic stem cells, those opposing this research procedure argue that there is not any need for this research, since adult stem cells are promising and not polemic source of autologous for transplantation.

The major argument among opponents to ESCs systemic research and clinical use is that human embryos gotten from in vitro fertilization during the uterine pre-implantation stage may potentially become



Silvana Bastos Cogo Bisogno

Nurse, Master's Degree in Nursing, and assistant professor at the Health Sciences Department, Palmeira das Missoes, Rio Grande do Sul, Brazil



Ivana Beatrice Manica da Cruz

Biologist, Master's Degree and PhD in Genetics and Molecular Biology, associate professor at UFSM Health Sciences Center, Santa Maria, Rio Grande do Sul, Brazil



Tamires Patricia Souza

Nurse, graduated at UFSM/ Cesnors, Palmeira das Missoes, Rio Grande do Sul, Brazil

human beings and, therefore, it would not be morally correct to accept its destruction. Those who advocate ES cells use, on reverse, argue that one should not treat embryos naturally bore by the mother as *equal* and the in vitro fertilized embryos cannot naturally develop if they are not implanted in mother's uterus – and the majority of human embryos bore in clinics would have little probability to remain alive. It is estimated that, according to developmental biologists, 75% to 80% of all lab created embryos would not be able to remain implanted in the uterus and many among them would be naturally lost due to the presence of genetic problems.

The United States Council on Bioethics in 2005 recommended that, with the perspective of creating alternative to ethics controversy on human embryos destruction and, at the same time, to assist continuity of regenerative research, efforts should be undertaken to create alternative strategies to get pluripotent stem cells which would not involve human embryos direct destruction ^{3,4}.

Hyun ⁵, in his review called The bioethics of stem cell research and therapy, commented that two studies were published later in Nature suggesting ESC alternative origin. The first encompassing the undertaking o biopsies in live embryos ⁶ and the second involving bio-engineering of ESC similar cells in analysis by Meissner and Jaenisc⁷. Other studies, such as that undertaken by Robert Lanza et all ⁸, got ESC from mice embryos at eight cells stage – technique that is able to preserve embryos' capability to be implanted and, thus, to survive as analyzed by Fuchs, Tumber, and Guasch ⁴.

Few studies were done in Brasil on production of induced pluripotent stem cells lineage capable to change into any type of cells, since they are similar to ESC – like in Japan, the United States, Germany, and China, according to Diniz and Avelino ⁹. In this case, such studies got direct support from the Ministry of Health (MH), and they were coordinated by neuroscientist Stevens Rehen ¹⁰, from the Federal University of Rio de Janeiro (UFRJ) Biomedical Sciences Institute, and by biomedical Martin Bonamino, from the National Institute of Cancer (Inca).

In spite of the incentive to research that yield alternative to ESC use, with Law No. 11.105/05 (or Law on Biosafety), Brazil also approved, after heated discussions, the use of human embryos derived from in vitro fertilization for scientific research. Recently, the National Sanitary Surveillance Agency (Anvisa), from MH, published Resolution RDC 23, of May 27, 2011¹¹, which sets forth on technical regulation for germinative cells and tissues bank work.

Article 18 of this resolution deals on the free and clarified consent term (FCCT), advising that it must be written in clear and understandable language and it must have, whenever fit, donors' authorization for use of their embryos in research. Thus, item VIII sets that in the FCCT should state *manifested will to donate or not material for research projects that had previously been approved by the Research Ethics Committee*

(CEP) and the National Research Ethics Commission (Conep)

In spite of the controversies related to stem cells use in research and, later, in tissues and organs regenerative techniques, and how much society reacts and discusses about the topic is an issue that does not have been investigated in depth, at least, in Brazil. Among health area professionals studies are also rare and very little is known about their conceptions regarding stem cells or about what they think on scientific and ethical implications related to the procedure ^{12,13}.

Perhaps, in the near future, one of the health area professions that will directly receive the impact from these regenerative technologies is nursing, indissolubly connected to human care, Shiratori et al comment: *One notices, in the world scenario, the introduction and adoption of new technologies and techniques, which are available to all, setting an institutional differential in the development of organizations. One needs for this professional's qualification and detachment in order to be committed with the outcomes derived from it, as well as been motivated for new applications* ¹⁴. One issue is open, in this context, that needs to be better explored regards nursing professionals' scientific and ethical conceptions on stem cells use, who work as undergraduate professors.

This study aims at identifying nurses/professors' conceptual bases and conception on embryonic and adult stem cell topic, in order to contribute to clarify and to foster discussion. It aimed also to evaluate the occurrence of ethical dilemma about the embryonic stem cells in regenerative cell therapy, opposing it to conception of care that subsidizes the nursing professional work.

One desires with the reading of this article, therefore, to minimize the rooted concept of a distant reality, knowing the promotion of this research, in which nursing care works in stem cell therapy. It allows, also, bringing back the discussion related to ethical issues that pervade opposing opinions and knowledge among these professionals.

One intends, still, to embrace the nursing class and its concepts to cell therapy, showing how much could still be effectuated in the area.

Materials and method

Studies on ethical conceptions and opinions about embryonic stem cells (ESC) by health professionals still are incipient in Brazil. This paper, because it deals with emerging conceptions, carried out qualitative survey with exploratory descriptive feature. In addition to still uncovering little known social process, referring to special groups, the qualitative approach in survey provides building new approaches,

review, and creation of concepts and categories during the investigation, as defined by Minayo¹⁵.

Among these Professional, those of nursing stand out, since their work is strongly based in the act of caring, not only as physical procedure, but as ethical attitude. What does the nurse think about this? How does he applies these notions in his Professional work? Aiming at contributing to clarify these questions, research population was comprised by nursing professionals.

The study was undertaken between March and December 2010. The interviewees were selected and invited to participate in the study at a public high education institution, located in the northern part of the state of Rio Grande do Sul. Professors graduated in nursing work in the Nursing Department at this location.

The Nursing course offered by the institution qualifies professionals with generalist profile, accrediting and graduating them to work in health prevention, promotion, and rehabilitation, as well as in teaching and in research. Ten (10) professional from an universe of sixteen (16) nurses/professors were interviewed, considering that they accepted to participate in the research, and who had effective work with Nursing undergraduate students. It should be highlighted that department professors directly involved in this study were excluded.

Data collection was carried out through semi-structured interviews, carried at interviewees' working place, which lasted 10 minutes, in average. The guiding axes of the questions included the evaluation of the conceptual bases on stem cells, source to get knowledge on the topic by interviewee, knowledge about potential ESC use in health area, and ethical controversies.

Depositions were recorded and transcribed later, respecting the truthfulness and comprehension of the material. The faithful recording and *literal* translation, if possible, from the interviews and other data collection modes whose raw material is the speech, is crucial for a good understanding of the internal rationale of the studied group or collectivity ¹⁵.

Data analysis was done based in methodological and analytical guidelines for qualitative research proposed by Minayo ¹⁵, targeting three complementary goals related to the social investigation proposal: the first, it is inserted in the context of the discovery that it is proposed by the research; the second, that is undertaken by means of tagging among findings, hypothesis, or presumptions; and the third, which aims at expanding the understanding of cultural contexts. The conceptual base that guided data analysis was raised from scientific literature during the period of January 2010 and November 2011, in articles published in the Scielo database. Only the articles in Portuguese were selected, since they can be accessed with greater ease by all professors.

The subjects were identified, in the text, by a letter followed by a number (Ex: E1, equivalent to interviewee No. 1). The study was approved by the Federal University of Santa Maria Research in Ethics Committee, and every participant signed the free and clarified consent term (FCCT).

Results and discussion

The major conceptions and core ideas emerged from the study that are evidenced in interviewees' speeches and identified in their impressions, doubts, opinions, and certitudes about treatment with stem cells are presented and discussed next.

The conceptual bases on stem cells from interviewees' discourse were initially analyzed, finding that, in the general context, it is clear the meaning of what ESC would be and what they would serve for. This affirmative can be noticed by the following speech:

“Look, stem cells are cell that have a very high capability to adequate into other cells and to reproduce itself, that is what I know (...) ela it is compatible with several tissues, then and therefore, it can be inserted in other tissues and then yield new cells with function in accordance with those already existed in that tissue” E7.

Concerning the source of information on stem cells researches and potential use, the majority of interviewees commented that their knowledge on the topic had come from the mass media, such as magazines with national circulation and not from

technical-scientific readings. This statement may be exemplified in the speech:

“Concerning scientific knowledge, I see it rather deficient because I have not followed up the evolutions that taking place in knowledge. We listen as common sense, as laymen, through television, in the news, that researches are been undertaken, and so on” E7.

This interviewee’s statement corroborates with Lana¹⁶ states in a study on religiousness in the context of stem cells therapies, by showing that the press stresses the healing potential of stem cells experimental therapies, and sometimes it is expressed in a religious language. One example is *Veja* magazine cover report with the title *“The medicine that does miracles: treatments with stem cells in Brazil”*¹⁷. The magazine cover shows two hands touching each other at finger point, an allusive reference to Michelangelo’s painting at the Sistine Chapel, in which God extend his hand to Adam. One notices that media is among the major information heralds.

Nevertheless, it seems that interviewees’ scientific knowledge on stem cells is not based in scientific literature, from articles in scientific journals or books, but, mostly, in laymen and parascientific information, of general reading, polemic or derived from sensationalist reports, as evidenced by the

speech that follows: *“(…) what we get most in the news related to stem cells research one ends up always getting something and reading even if just news releases, but without any depth” E10.*

Since it is a relatively recent topic, based in concepts and definitions of molecular, cell, and developmental biology, discussion on stem cells still yields doubts to a significant number of people, even to health professionals, such as it is the case of nurses. Souza and Elias¹⁸ comment that society, through organized groups, discusses in depth the aspects involved in stem cells use with healing goals. However, as this is a current topic and it is under development, it is understandable that there is not consensus yet about what should or should not allowed or banned. Thus, for the majority of interviewed professionals there is not referentials that minimally insures that these researches result in effective therapies:

“(…) I think that it still is a little explored topic if compared to the quantity of functions that have been discovered from these cells. I think that they are cells with high replication power, which can be differentiated in several types of tissues, and to provide one more therapeutic option for many diseases” E10.

Concerning nurses/professors’ opinions about the progress that treatment with regenerative cell therapy could represent for human health, some professionals

express very optimistic opinions on its clinic-therapeutic use, as shown in the speech that follows: “(...) *it came to make a revolution, and to improve people’s health (...) I see it as kind of hope, sometimes when researchers talk about stem cells, they state it as a hope (...) for a better life condition, rejuvenation, living longer*” E8.

Other professionals express some level of concern and the necessity of additional studies before such technologies are applied in large scale in people: “*Look, I have a worried conception, but, at the same time, one has to think about the benefits (...) many diseases may be solved (...) I see the negative side in as much as studies are not safe yet*” E7.

It is important, now, to make the comment that it was not noticed in the interviewee’s speech a systemized discernment of what would be the researches and development with embryonic stem cells that lead to embryos’ death and raise ethical questioning, or therapies with adult stem cells researches and therapies that originate from undifferentiated tissues kept in/on organism, which preserve the potential of differentiation. Among those, the hematopoietic tissues from red bone marrow, already studied in depth and used in some types of anticancer therapies (particularly, leuchemia). It is clear that these researches raise ethical questionings as well, but at other level – which was not

the core focus of the study, a reason for not deepening with the issue.

Next, questionings were made about the ethical aspects of ESC use and the professionals’ stand on these issues. Initially, it was questioned if interviewees were pro or against using these cells in research. It was noticed many stands that were sometimes ambiguous, as exemplified in these speeches: “*I am totally favorable. Everything that is within ethical limits and providing some kind of benefit, I am totally favorable*” E7; “*One knows that, nowadays, moral, ethics, principles, values are been discussed by people, not only by health professionals, but by humanity (...) I believe that is advantageous as long as it is used correctly*” E2.

Other speeches clearly expressed how much the topic is controversial: “*Look, I think that this is a very polemic topic. There is a really an ethical polemic at this regard, even religious, one may say*” E3.

Some discourses show the existence of ethical questions, but they indicated that they will end up been circumvented by the “*inevitability*” of the advances in science, technologies and utilitarian conceptions of embryos produced *in vitro*. This conception was identified in these speeches:

“*(...) science advanced at fast pace in past years as never seen in such a long time (...) Then, from my point of view I don’t see*

any possibility of setback, I think that social control, scientific community control is needed for suited use of the stem cells (...) I think that, yes, here are ethical dilemmas, but there is no way out” E3.

“Well, I believe, I am pro of the embryonic fetus when it is inevitable (...) and it goes to the trash. Thus, if it goes to the trash, why not help other people? I am totally in favor. And concerning having carcinogen origin in others, I don’t know (...) but I am favorable as well, I think that this can be controlled in the future” E6.

”The issue about withdrawing the embryo is related to the following, it embryos were created only with this goal, I would be against, but the fact that having embryos bore in vitro and that they end up been in excess and been discharged, I understand that they could be used” E9.

“(...) science has evolved a lot, I think that there is a religious and belief issue in it (...) I would consider more ethical to use the cell not from the embryo, as it must have the death of this embryo, except that this embryo was not conceived, there is an entire issue of involvement, one is not waiting, it was programmed for that (...) It was made for that and to be used in that, then (...) I maintain the stand that the adult would be better used, but I think that more studies are needed, more explanations, because religiousness sometime makes us very blocked with past things that we once believed, we keep on believing in science, like the use of the condom, religion bans its use but we know

that if we do not use it, there will be health problems Then, as long as there are more studies, more dialogue, more knowledge about this, to see up to what point this embryo will be alive, and it Will have a kind of life, feelings that we cannot use them” E8.

These statements, mainly the last two, are inserted in the conceptions proposed by some researchers, just as foreseen by Bergel ¹⁹. His work on stem cells and freedom of research discusses embryonic stem cells use in scientific research, advocating the position that the embryos use for research goals, in its set, will serve for ethically acceptable goals to search for new knowledge that, direct or indirectly, are useful to improve human beings’ quality of life or to prevent their premature death.

The researcher highlights, additionally, that there would be differences between embryos fertilized in maternal womb and those gotten through assisted fertilization techniques. And that, in the case of the later, their use in research would be ethically acceptable, once they are not been implanted in their parents or donated to sterile couples, they will die, not been useful for any end. Thus, its use in research would dignify its existence since it allows knowledge generation about cell regeneration processes.

If Bergel’s ¹⁹ conception contributes toward the debate on ethics in embryos use to get ESC, those who are against ESC use

argue that there is major problems in applying control mechanisms that could be adopted to ensure that *embryos were not produced Just for researches' goals.*

Other questionings made to research participants involved clarification of the existence of adult stem cells that could yield regenerative therapies without raising ethical problems – the case of ESC research. Some of the research subjects were favorable to both cell types research: *”I am favorable for using both cells types, both the embryonic and the adult, and I think that as long as it is specified the goal for using this cell and get knowledge, I think that an embryo still is an embryo, having four days of life, the practice is acceptable, I believe that if it is to improve people’s health conditions and for healing diseases, I am very favorable of the practice”* E10.

The above stand establishes a link with Caplan’s ²⁰ deposition, which justifies the search for solutions through research that manipulate stem cells to change them into other cells, enabling, thus, to cure disease in human bodies. However, this was not the stand of the majority, and other opinions targeted to ethical issues on ESC research were identified and related with nursing professional realm:

”(...) I think that is an ethical dilemma and it needs to be discussed a lot, I think that we do not discuss this topic, it does

not pervade many debates still in health area, because it still is new, ti still is recent, then one does not have much mastering about it yet (...) I think that it is important (...) and another detail, the nurse when he graduates does not know where he is heading. And he has an opportunity to work in a place where stem cells are used” E4.

Other discourses, in spite of been generic, were identified as opposing to ESC research and use: *“(...) I always think that we have to preserve life (...) for example (...) I have a death risk for the mother and, then, I have a baby in this mother’s womb, then I am always in favor of preserving this mother’s life because it is a life that exists already, thus, in this sense I think that we must have an ethical care in order not to harm that donor”* E7.

Other ethical questioning raised in the study relates to children gestation with the objective of getting cells that could therapeutically help healing a brother or a close relative. The majority stood against this condition. Thus, nurse/professor’s view regarding the decision of bearing a child to use the cells from this umbilical cord to contribute in cell treatment of a close relative and histologically compatible seems to get support in the following analysis:

”I do not agree because I think that this is a very large weight on a child, and almost the same thing, or very similar, to a child that

arrives to save a marriage where one seeks someone's salvation or that of an event on a gestation; thus, in this sense, I think that it is a very complicated gestation (...) We set a stake, but this is a bet that people are capable to cope. Do you imagine bearing a child thinking in healing someone and this healing does not happen?" E3.

It was verified that, based in this analysis, in spite of ethical thought in nursing is a basic requirement for individual's Professional work, the topic on ESC research still is very controversial and it raises insecurity and ambiguous conception identified in majority of the interviewed nurses/professors' speeches. It seems that Brazilian nursing, as in other health professionals' societies, did not deepen the discussion on this topic. This lack of *discussion in health area professionals' collective* is quite concerning because it creates a phenomenon of professional exemption represented by the silence of entities and in the speeches of its members as individualized citizens, and not as categories.

Final considerations

The outcomes of the study indicate the importance of fostering capacity-building courses to disseminate and deepen the notion on stem cells among nursing professionals. Such training may be considered of significant social relevance, since it interests not only to nurses who

work with patients with pathologies that can be treated with this technique, but it potentially can interest all those who, in the near future, may deal with it in caring for patients in their expertise. These courses should deal both on use of embryos in stem cells research and on bioethical issues related to this technique.

Concerning ethical issues, one cannot pass without mentioning that, in addition to health professionals, the interviewees are individuals immersed in society and their opinion about the topic reflect the morality and doubts of the social context in which they are part. In the other hand, the characteristics of their professional activity provide them with opinion forming position, a condition of fundamental relevance to promote ethical reflection and moral enhancement in society.

Therefore, it is pertinent to stimulate care and attention of nursing professional. This zeal should be understood, similarly, to patients, particularly those transplanted with stem cells, a technique under consolidation process that, consequently, still needs perfecting. Knowing the importance for the professional to distinguish and to recognize signs and symptoms, guiding in relation to the new life condition and the involved, the nurse participates and influences patient's life, at this transition instance, knowing that, in spite of it all, it is patient's own life, with his meanings and confrontations.

Nevertheless, the caring act wakens the awareness of the crucial importance for each human being. By introjecting this awareness, the nursing professional starts, then, to dedicate different care to the sick individual, predisposed to participate in his fate, searches, sufferings, and success. Consequently, he participates in every phase of patient's prognostics.

The feasibility of correlating pathology with the healing possibility may and must be clarified by the nursing professional to patient, highlighting the possibility of getting better prognostic of the disease or even his cure – which can bring him new life and health conditions.

Resumo

Este estudo analisou o discurso de enfermeiros docentes sobre a utilização de células-tronco embrionárias (CTE) nas pesquisas e em potenciais procedimentos terapêuticos, mediante investigação qualitativa exploratória envolvendo análise de discurso. A análise sugeriu que, apesar das bases conceituais sobre CTE serem relativamente corretas, as concepções sobre seu uso em contexto bioético foram fortemente baseadas em informações veiculadas pelos meios de comunicação. Acerca das questões éticas, os discursos foram muitas vezes ambíguos, ainda que se pudesse identificá-los como se opondo ou defendendo o uso das CTE na pesquisa e terapêutica. O conjunto dos resultados sugere a necessidade de o debate bioético de questões controversas, como as CTE, ser incorporado na agenda das coletividades profissionais com vistas a que estas representem pontes legítimas entre a produção do conhecimento científico, a discussão ética e a veiculação dessas informações para a sociedade.

Palavras-chave: Ética. Bioética. Células-tronco. Enfermagem.

Resumen

Las células madre: las concepciones científica y ética del profesional de enfermería

Este estudio analizó el discurso de los profesores de enfermería en el uso de células madre embrionarias (CME) en investigación y en el potencial de los procedimientos terapéuticos, a través de la investigación exploratoria cualitativa implica un análisis de discurso. El análisis sugiere que, a pesar de las bases conceptuales sobre la CME son relativamente correctas, las concepciones de su uso en el contexto de la bioética se basan en gran medida en la información transmitida por los medios de comunicación. Sobre cuestiones éticas los discursos eran a menudo ambíguos, aun cuando pudieran identificarlos como opuestos o abogando por el uso de la ESC de investigación y la terapia. Los resultados generales sugieren la necesidad de un debate bioético de los temas polémicos, como el de las CME se incorporarán a la agenda de las comunidades profesionales para que representen puentes legítimos entre la producción de conocimiento científico, el debate ético y la difusión de esta información a la sociedad.

Palabras-clave: Ética. Bioética. Células madre. Enfermería.

References

1. Oliveira Júnior EQ. A ética médica, a bioética e os procedimentos com células-tronco hematopoéticas. *Rev Bras Hematol Hemoter.* 2009;31(supl.1):157-64.
2. Zago MA, Covas DI. *Células-tronco, a nova fronteira da medicina.* São Paulo: Atheneu; 2006.
3. The President's Council on Bioethics. White paper: alternative sources of human pluripotent stem cells. Washington, DC: National Academic Press; 2005.
4. Fuchs E, Lumber I, Guasch G. Socializing with the neighbors: stem cells and their niche. *Cell.* 19 mar 2004;116(6):769-78.
5. Hyun I. The bioethics of stem cell research and therapy. *Clin Invest.* 4 jan 2010;120(1):71-5. doi: 10.1172/CI40435.
6. Chung Y, Klimanskaya I, Becker S, Marh, Lu Si, Johnson et al. Embryonic and extraembryonic stem cell lines derived from single mouse blastomeres. *Nature.* 2006;439(7073):216-9.
7. Meissner A, Jaenisch R. Generation of nuclear transfer-derived pluripotent ES cells from cloned Cdx2-deficient blastocysts. *Nature.* 2006;439(7073):212-5.
8. Chung Y, Klimanskaya I, Becker S, Li I, Maserati M, Lu Si, Zdravkovic I et al. Human embryonic stem cell lines generated without destruction [Internet]. *Cell Stem Cell.* 2 feb 2008 [access 17 jun 2011]. Available: <http://images.cell.com/images/EdImages/chung.pdf>.
9. Diniz D, Avelino D. Cenário internacional da pesquisa em células-tronco embrionárias. *Rev. Saúde Pública.* 2009;43(3):541-7.
10. Universidade Federal do Rio de Janeiro. Instituto de Ciências Biomédicas. Laboratório Nacional de Células-tronco Embrionárias - Lance Rio de Janeiro [Internet]. s.d. [acesso 18 jun 2011]. Disponível: <http://www.lance-ufrrj.org>.
11. Agência Nacional de Vigilância Sanitária. Resolução RDC nº 23, de 27 de maio de 2011 [Internet]. Dispõe sobre o regulamento técnico para o funcionamento dos bancos de células e tecidos germinativos e dá outras providências. *Diário Oficial da União.* 30 maio 2011 [acesso 18 jun 2011];(102):seção I, p. 88. Disponível: <http://www.in.gov.br/visualiza/index.jsp?data=30/05/2011&wpag=nav88&totalArquivos=216>.
12. Goldim JR. Pesquisas em células-tronco. Bioética e ética na ciência [Internet]. 2002 [atualizado em 28 fev 2006; acesso 11 nov 2006]. Disponível: <http://www.ufrgs.br/bioetica/celtron.htm>.
13. Bernard C. Introduction a l'étude de la médecine expérimentale 1865 [monographie on ligne]. Paris: Editions Garnier-Flammarion, 1966 [lyaccès 17 avr 2010]. Disponible: http://classiques.uqac.ca/classiques/bernard_claude/intro_etude_medecine_exp/intro_etude.html.
14. Shiratori K, Figueiredo NMA, Porto F, Silva CSI, Teixeira MS. O sentido de ser humano: uma base reflexiva para o cuidado de enfermagem. *Rev Enf UERJ.* 2003;11(2):212-6.
15. Minayo MCS. *O desafio do conhecimento: pesquisa qualitativa em saúde.* 10a ed. São Paulo: Hucitec; 2007.
16. Luna N. Religiosidade no contexto das terapias com células-tronco: uma investigação comparativa entre pesquisadores "iniciantes e iniciados" e seus pacientes. *Religião e Sociedade,* Rio de Janeiro. 2008;28(2):156-78.
17. A medicina que faz milagres: tratamentos com células-tronco no Brasil. *Veja.* 23 nov 2005;38(47).

18. Souza MHL, Elias DO. As células-tronco e seu potencial de reparação de órgãos e tecidos [Internet]. In: Centro de Estudos Alfa Rio. Programa de educação continuada. Manual de instrução programada: princípios de hematologia e hemoterapia. 2a edição. s.l.: Centro de Estudos Alfa Rio; 2005 [acesso nov 2007]. Disponível: <http://perflin.com/cear/artigos/stem.pdf>.
19. Bergel SD. Células madre y libertad de investigación. Rev Bioétic. 2009;17(1):13-28.
20. Caplan AL. Does stem cell advance provide an ethical out? Doctors, funders shouldn't put all their embryos in one basket [Internet]. 2007 [acesso 20 nov 2007]. Disponível: <http://www.bioethics.net/articles.php?viewCatv2warticleIdv19>.

Received: 7.22.11

Approved: 11.18.11

Final approval: 11.21.11

Contacts

Danusa Begnini - danusabegnini@hotmail.com

Silvana Bastos Cogo Bisogno - silvanabisogno@yahoo.com.br

Ivana Beatrice Mânica da Cruz - ibmcruz@hotmail.com

Tamires Patrícia Souza - tamires_psouza@yahoo.com.br

Danusa Begnini - Rua Valentin Stefanelo, 274, Centro CEP 98350-000. Jaboticaba/RS, Brazil.

Authors' participation in the article

Danusa Begnini applied the study and she was the main writer. Silvana Bisogno guided the study and she was responsible for outlining, analysis, discussion of results and overall review of the manuscript. Ivana Cruz collaborated in pertinent issues on stem cells and their use in health area and in the overall review of the manuscript. Tamires Souza collaborated in the transcription of collected data.