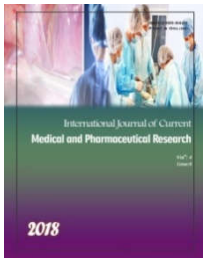
Research Article

INTERNATIONAL JOURNAL OF CURRENT MEDICAL AND PHARMACEUTICAL RESEARCH

ISSN: 2395-6429, Impact Factor: 4.656
Available Online at www.journalcmpr.com
Volume 4; Issue 6(A); June 2018; Page No. 3348-3351
DOI: http://dx.doi.org/10.24327/23956429.ijcmpr20180459



IVF AND THE ETHICAL DILEMMAS OF INFERTILITY

Raghavendra Rao M.V[1]., Sireesha Bala[1]., Sripada Pallavi.T[2]., Krishna Sowmya.M[3]., Ramanaiah.C.J[3]., Samir Fatteh[1]., Kumar Ponnusami[1] and Sateesh.Babu.A[1]

[1]Avalon University School of Medicine, Curacao, Central America
[2]Apollo Institute of Medical Science and Research Institute, Jubilee Hills, Hyderabad, Telangana
[3]Burjil Hospital, Abu Dhabhi, UAE

ARTICLE INFO

Article History:

Received 12th March, 2018
Received in revised form 10th April, 2018
Accepted 7th May, 2018
Published online 28th June, 2018

Key words:

Cloning, Chimeric research, Surrogacy, IVF, hESC, Orphanage,

ABSTRACT

Ethics is an understanding of the nature of conflicts arising from moral imperatives and how best we may deal with them (1). Nuremberg code was formulated in response to the criticism of unethical human experimentation conducted by Nazi doctors during Second World War. It was the first international code of ethics in clinical research laying down the guidelines for research on human subjects (2). It laid down ten clear principles to be followed by researchers and made voluntary consent essential, allowed subjects to withdraw from the experimentation at any time, banned experiments that could result in major injury or death of the subjects, and made mandatory to have preclinical data before experimenting on humans. Medical ethics also deals with the choices made by society, the distribution of resources, and access to health care, and the dilemmas arising from them (3). The challenge to international research ethics is to apply universal ethical principles to biomedical research with considerable variation in standards of health care in a multicultural world with diverse health-care systems. Medical research which is necessary and fundamental for acquiring and propagating worthwhile novel knowledge is equally controversial because of the conflicts of interest of the researchers or the sponsors (4). Both universal and regional guidelines have been proposed to strike a balance between these two opposing interests and to ensure standardized ethical research. Beneficence is directed to promote the well-being of patients and society. On the other hand, non-maleficence implies first do no harm which can be achieved by careful decision making and having adequate training. Justice deals with the equitable distribution of social benefits.(5)

INTRODUCTION

As a result of the continuity of fast-paced scientific discovery, the issues surrounding molecular biology techniques remain a hot topic, with people divided into both sides of the controversy (6). That is, there has been a little public discussion of the ethical issues raised by animal cloning projects. Also, increased livestock production can result in net social benefits to livestock producers. However, the social issues of cloning tend to focus on human clones regarding both availabilities of cloning technology and integration of clones into society (7). Reproductive cloning raises the question of cost and who should have access. However, the biggest social argument is that cloning negates a person's right to individuality and ignores the potential psychological effects of such a parentless and de-individualized identity (8). Also in case of stem cell research, chimeras research and in-vitro fertilization (IVF) killing of pre-embryo/ embryo have received severe criticism from society. Surrogacy has generating concern in society as it involves the use of commercial use of the reproductive capacity of women for the third person as per the contractual terms and condition which goes against the human right to dignity, the integrity of a person. There has been a push towards science with expected benefits for society; yet measuring the social impact of research remains a major challenge (9). Governments had begun to invest public funds into scientific research with the expectation that military, economic, medical and other benefits would ensue and a result large amount of public money being 212 invested in the research. However, the growth of scientific research during the past decades has outpaced the public resources available to fund it (10). Using public money for expensive medical researchers as stem cell research, cloning, IVF, etc. raise agitation among people as these is inaccessibility of health care for many. Society has adopted the rescue mentality even when such efforts are extremely expensive and, regarding the number of individuals affected, could be used more effectively in other medical arenas. Ethical issues in animal cloning Cloning has been around since 1952 when Robert Briggs and Thomas King externally fertilized and developed a leopard frog using the somatic cell nuclear transfer. Though scientists had discussed the need for

Corresponding author:* **Raghavendra Rao M.V
Avalon University School of Medicine, Curacao, Central America

communication about the ethical ramifications of cloning since as early as 1972, it was not until the successful cloning of a sheep named Dolly in 1997 that cloning came to the forefront of scientific and societal discussion (11). To date, scientists have successfully cloned many other species, including a cat, horse, gaur, rabbit, deer, chickens, cows, mice, goats, pigs, mules, and, most recently, a rat. In the works project to clone primates, dogs, and a host of endangered species. The humanized mouse is most important animal model in biomedical research. The development of humanized mouse requires integration of human stem cells to mouse for a desired phenotype. The present medical molecular biology is capable in doing so but several ethical issues have been raised in the practice of humanized mouse. The humanized mice are only available animal models to study human diseases precisely. The 3Rs principle was designed to with three objectives one refines, reduce, replace. In the biomedical research use of animals had a long history and rapidly increasing. The techniques used in biomedical research including molecular biology may cause pain to these animals. Here, 3Rs concept emphasize reduce the number of animal use in biomedical research, refine experimental protocols, and if possible replace animal models with others such as computational models and mathematical models (12). The most serious consequence is the pain and suffering experienced in the cloning process by animals involved in cloning procedures. Other negative consequences to animals include the deleterious effects of cloning on other populations of animals, such as livestock, unwanted pets, or endangered species (13). Human beings may be adversely affected by compromising the safety of the livestock used in food production. Animal cloning might also be criticized on deontological grounds and the objectification and commodification of animals (14). Ethical issues in stem cell technology Stem cells are primitive cells with the capacity to divide and give rise to more identical stem cells or to specialize and form specific cells of somatic tissues. Broadly speaking, two types of stem cell can be distinguished: embryonic stem (ES) cells which can only be derived from pre-implantation embryos and have a proven ability to form cells of all tissues of the adult organism (termed 'pluripotent'), and with an important function in tissue replacement and repair (15). In Somatic Cell Nuclear Transfer (SCNT), reprogramming is achieved after transferring nuclear DNA from a donor cell into an oocyte from which the nucleus has been removed. Human embryonic stem (hES) cells are derived from the so-called 'inner cell mass' of blastocyst stage embryos that develop in culture within five days of fertilization of the oocyte. Stem cell research offers the hope for new therapies for life-threatening diseases and for understanding basic mechanisms of human development and differentiation (16). However, human embryonic stem cell, somatic cell nuclear transfer (SCNT) and fetal stem cell research raise sharp ethical issues, and these ethical issues need to be discussed to ensure that stem cell research is carried out in an ethically appropriate manner. a. Ethical issues in human embryonic stem cell research Human embryonic stem cell (hESC) research is ethically and politically controversial because it involves the destruction of human embryos. It is not disputed that embryos have the potential to become human beings (17). For the formation of embryonic stem cell lining remaining frozen embryos could be used after the complete the infertility treatment. Some couple chooses to donate these remaining embryos to research rather than giving them to another couple for reproductive purposes or destroying them (18). Several ethical concerns come into play when a frozen embryo is donated; including informed consent from the woman or couple donating the embryo, consent from gamete donors involved in the creation of the embryo, and the confidentiality of donor information. b. Ethical issues in SCNT research Embryonic cell lines and autologous embryonic stem cells generated through somatic cell nuclear transfer have also been proposed as promising candidates for future therapies. Some people who object to SCNT believe that creating embryos with the intention of using them for research and destroying them in that process violates respect for nascent human life (19). The risk of severe congenital disabilities would be prohibitively high in humans. Second, even if SCNT could be carried out safely in humans, some object that it violates human dignity and undermines traditional, fundamental moral, religious, and cultural values (20). Some scientists wish to use nonhuman oocytes to derive lines using human nuclear DNA due to the shortage of human oocytes for SCNT research, These so-called "cytoplasmic hybrid embryos" raise some ethical concerns (21). Some opponents fear the creation of chimeras-mythical beasts that appear part human and part animal and have characteristics of both humans and animals. c. Ethical issues in Fetal Stem Cell research Pluripotent stem cells can be derived from the fetal tissue after abortion. However, use of fetal tissue is ethically controversial because it is associated with abortion, which many people object to (22).. The creation of chimera either human-animal and or lower organism requires stem cells capable of developing particular tissue/organ (23). Today, most human-nonhuman chimeras (henceforth HNHchimeras) are used to investigate and model human biological functions and diseases that would be difficult to study in other settings. In the future, human-animal chimeras could be created to grow human organs or tissues within animal organisms, and this method could be used for more successful xenotransplantation (24). Due to the mixing of human and animal cells, the chimera debate has distinctive features which make it more than a subset of the stem cell discussion and which bring with it genuinely new ethical problems(25). The source of the alleged unnaturalness lies in the fact that creating chimeras involves violating the natural species boundaries between humans and non-humans (26 The concept of a boundary between humans and nonhumans–and of the problematic of crossing it by creating human-animal chimeras–is widespread in the discussion of interspecies (27). The central issue in the context of moral status is the special, superior moral status of human beings than other species (28). According to the Moral Status Framework, what is distinctively problematic about chimera research is the possibility that the introduction of human material would enhance an animal's moral status without respecting the moral obligations entailed by that status (29). Developing human-nonhuman chimeras in human stem cell research can violate human dignity in two ways (30 Ethical issues with Primate Chimera The troubling possibility of a nascent primate with functional neural human cells in its brain in biomedical research gained significant concern worldwide. The concern is possible changes in the capacities of the engrafted animal in a way that leads to threaten human dignity and to re-examine its moral status (31).

History

In 1977, Steptoe and Edwards successfully carried out a pioneering conception which resulted in the birth of the world's first baby to be conceived by IVF, Louise Brown on 25

July 1978, in Oldham General Hospital, Greater Manchester, UK.(41,42)

The second successful birth of a test tube baby occurred in India just 67 days after Louise Brown was born.(42) The girl, named Durga conceived in vitro using the methods of Subhash Mukhopadhyay, a physician and researcher from Kolkata.(43)

Sighificance of Research

Human cloning, as a well- defined technique allows the creation of an identical coy of a genome. The idea of human cloning can be easily classified in to reproductive and therapeutic cloning. Reproductive cloning is the more likely creation of entire human in-vitro. ill date, no human clone has ever been born officially, and it is not very likely to be done shortly with the existing rigid guidelines. However, mindsets and beliefs among both communities have drawn a red line in the public domain that furthering the conflict (32). Undoubtedly, therapeutic cloning possesses potential to cure genetic and neurodegenerative disorders including Alzheimer's and Parkison's disease. Apart from the core therapeutically applications, organ transplantation increasingly supports human cloning (33). There has been an increase in demand for organs and tissues including heart, liver, kidney, lung, blood and plasma component and bone marrow. In the traditional procedure, it is quite difficult to find suitable donor and availability of the desired organs for sudden transplant. Reproductive and therapeutic cloning could result in immediate availability of desired organs and tissues (34). Besides availability, these novel technologies offer the best match to a recipient. Such tissues and organs are grown in the laboratory, in a controlled condition, do not have any immune complications which are considered as a major challenge in organ and tissue transplantation (35). A cloned human may not have command over its own life and may not get respect and place in society due to its unnatural birth and ambiguity in genetic identity. It is evident that there is a misunderstanding about human cloning by definition and associated ethical issues (36). The moral responsibility of researchers also has to be counted upon how he/she views application of scientific knowledge and associated technologies for altruistic purposes.

Where the researches go next?

Ethical issues in Surrogacy and IVF Surrogacy is an agreement under surrogacy act, beneficial for all the parties. A 'surrogate mother' is a woman, who agrees to bear a child for another woman who is incapable or unwilling to do so herself for financial and compassionate reasons. Surrogacy can be altruistic or commercial, depending upon whether the surrogate mother receives financial benefit for her pregnancy. The most common type of surrogacy is genetic surrogacy where a surrogate mother is genetically related to the child (37). Here a woman's egg is fertilized by the sperm of the commissioning father (the male partner of the couple desiring a child) by artificial insemination. The surrogate is the genetic mother of the child and commissioning mother takes over the role of social and legal mother. It is sometimes referred to as 'partial surrogacy' as a child is genetically linked with his father, but in the case of commissioning father being infertile, the sperm of a donor is used to fertilize the surrogate's egg, which is referred to as traditional surrogacy. Another form of surrogacy is gestational surrogacy or full surrogacy, where an egg is fertilized by in-vitro fertilization (IVF) and is implanted into the uterus of the surrogate mother by using egg and semen obtained from commissioning parents or anonymous donors (38). In vitro fertilization (IVF) is an assisted reproduction technology which requires the intervention of a medical team. This intervention begins by taking a history of the couple followed by physical and laboratory examinations. (39).

Current Debate

Summary Since a long time, there have been continuous and rigorous debates and discussions on advanced molecular technology and their prospects. This could be a result of lack of complete and precise information about the objectives and aims of such advanced technology. Moreover, the concept of human and animal cloning, IVF, surrogacy, chimera, etc. themselves have varying impact on society. All of these are ethically salient issues, some addressing the moral permissibility of the science itself and others addressing issues that arise from the way in which the science is conducted or commercialized. Moral responsibility and ethical regulations could be the drivers to bring a bright side of technology rather than creating an obstruction. No doubt, there have been incidents associated with the malpractices of scientific knowledge but the restriction, on the whole, could result in even worst consequences. At the same time, there must be a provision for legal action in case of violations and malpractices.

References

1. Coleman C H, Menikoff J A, Goldner J A. *et al* The ethics and regulation of research with human subjects. Newark: Matthew Bender Co, 20053–50.
2. Sankar P. Communication and miscommunication in informed consent to research. *Med Anthropol* Q200418429-446.
3. Veatch R M. The patient as partner: a theory of human experimentation ethics. Bloomington: Indiana University Press, 198716-76.
4. Jonsen A R. The birth of bioethics. New York: Oxford University Press, 1998125-165
5. Faden R R, Beauchamp T L. A history and theory of informed consent. New York: Oxford University Press, 1986114–150.
6. Gibbs J N. State regulation of pharmaceutical clinical trials. *Food Drug Law J* 200459265-285.
7. Morreim E H. Litigation in clinical research: malpractice doctrines versus research realities. *J Law Med Ethics* 200432474-484.
8. Hakimian R, Korn D. Ownership and use of tissue specimens for research. JAMA 20042922500 Savulescu J. No consent should be needed for using leftover body material for scientific purposes: against. *BMJ* 2002325649–651.
9. Greely H T. Breaking the stalemate: a prospective regulatory framework for unforseen research uses of human tissue samples and health information. *Wake Forest Law Rev* 199934740
10. Knoppers B M, Laberge C M. Research and stored tissues: persons as sources, samples as persons? *JAMA* 19952741806-1807.
11. Clayton E W, Steinberg K K, Khoury M J. *et al* Informed consent for genetic research on stored tissue samples. *JAMA* 19952741786-1792.

12. National Bioethics Advisory Commission Research involving human biological materials: issues and policy guidance (1999), available at.
13. Office of Human Research Protection, United States Department of Health and Human Services Guidance on research involving coded private information or biological specimens (August 10, 2004). 229
14. Evans B J, Meslin E M. Encouraging translational research through harmonization of FDA and Common Rule informed consent requirements for research with banked specimens. *J Legal Med*. (in press). 17-
15. Clayton E W. So what are we going to do about research using clinical information and samples? IRB20042614–15. 18-
16. Ashburn T T, Wilson S K, Eisenstein B I. Human tissue research in the genomic era of medicine: balancing individual and societal interests. *Arch Intern Med* 20001603377–3384. 19-
17. 19. Sade R M. Research on stored biological samples is still research. Arch Intern Med 20021621439–1440. 20-
18. Clayton E W. Informed consent and biobanks. *J Law Med Ethics* 20053315– 21. 21-
19. Goodson M L, Vernon B G. A study of public opinion on the use of tissue samples from living subjects for clinical research. *J Clin Pathol* 200457135– 138. 22-
20. Hoeyer K, Olofsson B-O, Mjörndal T. *et al* The ethics of research using biobanks: reason to question the importance attributed to informed consent. *Arch Intern Med* 200516597–100. 23-
21. Chen D T, Rosenstein D L, Muthappan P. *et al* Research with stored biological samples: what do research participants want? *Arch Intern Med* 2005165652–655. 24-
22. Wendler D, Emanuel E. The debate over research on stored biological samples: what do sources think? *Arch Intern Med* 20021621457–1462. 25-
23. Burton J L, Wells M. The Alder Hey affair: implications for pathology practice. *J Clin Pathol* 200154820–823. 26
24. van Diest P J. No consent should be needed for using leftover body material for scientific purposes: For. BMJ 2002325648–649. 27
25. Kettis-Lindblad A, Ring L, Viberth E. *et al* Genetic research and donation of tissue samples to biobanks: What do potential sample donors in the Swedish general public think? *Eur J Public Health* 28
26. Ohnishi A A, Nishigaki E, Sekimoto M. *et al* Attitudes of the Japanese public and doctors towards use of archived information and samples without informed consent: Preliminary findings based on focus group interviews. *BMJ Med Ethics* 200231 230 29
27. Winickoff D E. Biosamples, genomics, and human rights: context and content of Iceland's Biobanks Act. *J Biolaw Bus* 2001411–17. 30-
28. Morente M M, Alonso S. Current challenges of human tumour banking. *Hematol Oncol* 20052354–56. 31-
29. Maschke K J, Murray T H. Ethical issues in tissue banking for research: the prospects and pitfalls of setting international standards. *Theor Med Bioethics* 200425143–155. 32-
30. Allen M D. Commercial tissue repositories: HIPAA raises sponsors' fears. IRB 2004269–10. 33-
31. Ford GG. Thousand Oaks, CA, USA: SAGE Publications; 2006. Ethical reasoning for mental health professionals. 34-
32. Barry LK. Ethical issues in psychiatric research. *Psychiatr Clin North Am*. 2009;32:381–94. 35-
33. Fulford KW, Howse K. Ethics of research with psychiatric patients: principles, problems and the primary responsibilities of researchers. *J Med Ethics*. 1993;19:85–91. 36-
34. Roberts LW. Ethics and mental illness research. *Psychiatr Clin North Am*. 2002;25:525–45. 37-
35. Cook-Deegan R. Protecting the vulnerable in brain research. *Cerebrum*. 2000;2:73–91. 38-
36. Kaup AR, Dunn LB, Saks ER, Jeste DV, Palmer BW. Decisional capacity and consent for schizophrenia research. *IRB*. 2011;33:1–9. 39-
37. Appelbaum PS, Grisso T. Sarasota, FL: Professional Resource Press; 2001. The macArthur competence assessment tool for clinical research (MacCATCR) 40-
38. *"1978: First 'test tube baby' born". BBC. 25 July 1978*. Retrieved *13 June* 2009. *The birth of the world's first "test tube baby" has been announced in Manchester (England). Louise Brown was born shortly before midnight in Oldham and District General Hospital*
39. Moreton, Cole (14 January 2007). "World's first test-tube baby Louise Brown has a child of her own". The Independent. London. Retrieved 5 May 2010. The 28-year-old, whose pioneering conception by in-vitro fertilisation made her famous around the world.. The fertility specialists Patrick Steptoe and Bob Edwards became the first to successfully carry out IVF by extracting an egg, impregnating it with sperm and planting the resulting embryo back into the mother
40. Schulman, Joseph D. (2010) Robert G. Edwards - A Personal Viewpoint, Create Space Independent Publishing Platform, ISBN 1456320750
41. Ayers C (2004). "Mother wins $1m for IVF mix-up but may lose son". *Timesonline*.

How to cite this article:

Raghavendra Rao M.V *et al* (2018) 'IVF and the Ethical Dilemmas of Infertility', *International Journal of Current Medical And Pharmaceutical Research,* 04(6), pp. 3348-3351.

****