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Biotechnologies and moral problem

Christina Jivkova*

Medical Faculty of the University "St. Climent Ohridsky", Sofia, Bulgaria

Abstract

The new biological technologies give possibilities to traditional medicine to receive more information of the human body and to treat the patients in new ways and more successfully.

They are: "Assisted reproduction (in-vitro fertilization)", "Genetic investigations and gene therapy". Genetic engineering" "Stem cells", "Cloning".

The Cloning was a non-sexual reproduction that created a genetically true copy of the biological subject. In the time of Cloning, the investigators found the stem cells. Now their attention is over the stem cells and their possibilities to "repair" the ill organs in the human body.

Stem cells are undifferentiated cells found in the embryos of animals and humans. The scientist uses them to treat different diseases, but this raises many ethical questions. The ethical questions are in connection with the type of stem cells they use.

Keywords: Cloning, Stem cells, Treatment, Moral problems

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*E-mail:hr_jiv@yahoo.com

Introduction

The development of biology, genetics, medicine, pharmacy at the end of XX century, bring along cloning of mammals, made the map of the human genome, genetic investigation and gene therapy reach new successes, assisted reproduction to become available procedure [1].

In 1997 the team of Dr. J. Wilmut from the Roslin Institute in Scotland had made a successful cloning of an animal through a "somatic-cell nuclear transfer". The cloning was a non-sexual reproduction that created a genetically true copy of the donor of the somatic cell. This meant that a live being may be created from every somatic cell. The cloning process creates a copy of the cloned genes of the organism in a way that is different from that of the sexual reproduction. With the sexual reproduction, the fetus takes half of its genes from the egg and the other half from the sperm. Cloning strikes on something very fundamental, it strikes on the way of creating life [2].

Cloning through "somatic-cell nuclear transfer" shows that the specialized somatic cells which were taken from the body of an adult under certain conditions can be re-programmed in fetus cell so that it divides and creates a new organism. It can happen with any cell of the human organism and an infant will result. It is a revolutionary biological discovery. It was found that any new separate cell in the body contains a collective genetic material (genome) and it is on this basis that an identical individual may be created [3]. This discovery proved that nature has insured against the disappearance of the species. A man is a universe, and out of any human cell, a new cloned man may be created.

This discovery is very important for the science, but method can't be used to clone a human being. This method will reproduce the genome, which already exists (98% from the genes to donor of the stem cell and 2% of the genes from the mitochondria of the donor of enucleated egg). Only sexual reproduction creates a new genome [4].

"No ethical permissions to use this method of cloning to clone human being" [5]. Cloning had a social discussion after cloning the lamb "Dolly" (1997). As a result in few European countries and USA, reproductive artificial cloning was banned. Only nature can use reproductive cloning (embryonic cloning-enzygotic twins) [6].

The cloning is related to the *in-vitro* process and genetic therapy. Cloning may take place only after the fetus was conceived through the *in-vitro* process. Genetic therapy may take place with the fetus if it is found that the fetus is a barrier to hereditary genetic diseases. Therapy of the genetic line can take place and so that many of the pathological genes may be interrupted and the family might get rid of hereditary diseases forever. It is no longer a dream; it is turning into a reality with the development of the new reproductive technologies [7]. The study of the human genome creates conditions for discovering the reasons for those diseases that couldn't be treated until now. As man delves deeper and deeper into secrets of his individuality, will he be able to discover everything about his biological essence? Is not the temptation too great? Only the future will tell us.

This progress provokes different moral anxiety; this is reflected over the legislation, new legislation was passed which banned the cloning in few countries in EC and in the USA. The prohibition of the therapeutic cloning stops the process of cloning organs and slows to the process of transplantation. Working over cloning the investigators found the stem cells. They found them in the embryo, embryonic stem cells and in the different organs of the body of the people, adult stem cells. "Most Christians-Catholics who uphold the dignity of embryonic human life agree that the destruction of human embryos for the sake of scientific or medical gain is unethical. Such persons may hold different positions, however, regarding whether it is acceptable to conduct research on stem cells obtained from embryos that have already been destroyed" [8].

The most significant moral problem joined with new technologies in the medicine is the question: how to provide stem cells? As we know the stem cells are "spare parts" for the organism. Broken and ill cells are replaced by healthy one. Stem cells can self-renew while remaining undifferentiated or can differentiate and contribute to the development or repair of tissues of the body [9]. The scientists find adult stem cells in many organ systems, including bone marrow, blood vessels, skin, kidney, heart, endocrine glands, pancreas, liver, mammary gland, lung, retina, prostate nervous system. Some of the stem cells can "transdifferentiate" into other tissue types depending on their location in the body. These findings raise enormous possibilities for "cell-based therapy" of many disorders [10]. The problem is that with growing age, the stem cells exhaust. When the doctors use stem cells from a donor, the recipient must take immunosuppressive drugs all life. The medications squeeze insusceptible framework and do not give probability for the undeveloped cells to be rejected. At the point when patients utilize immature microorganisms from givers, they take drugs to the finish of their life. From an ethical point of view is good to know that these medicines can provoke cancer [11]. When they utilize old foundational microorganisms from claim substantial cells which were turned in undeveloped cells, they don't take drugs.

Every patient has right to know, that when doctors use undifferentiated cells directly in the therapeutic application they have the ability to form a type of tumor called a teratoma.

The researchers speak for few types of stem cells:

Totipotent- they can self-renew, they are the progenitor of all stem cells.

Pluripotent- they can self-renew can divide and reproduce unlimitedly, they are immortal, can replace injured cells out of degeneration, and they can specialize in every tissue.

Multipotent- they can differentiate only in one type tissue [12].

Why it's very important to have resources of stem cells? Because the scientists and physicians who use stem cells in their practice "promised" that stem cells are very important for regenerative medicine. They think to use stem cells to cure the heart, brain, pancreas, white lungs, spinal column and other. Stem cells are these cells which are progenitor for all other cells in the organism. They are cells which have the capacity to regenerate.

Training has an alternate region where specialists utilize foundational microorganisms for treatment, one of the present remedial applications is: blood and invulnerable framework issue. Transplantation of bone marrow, containing hematopoietic stem cells has been used for over three decades in the treatment of disorders of the blood cells production system. Children with immune deficiency have been successfully treated by bone marrow transplantation for 50 years. The other group is metabolic diseases [4].

In 2008 more of the diseases which investigators try to cure with stem cells were on the experimental level.

On the level of the experiment was the treatment of Multiple Sclerosis.

The fundamental features of the disorders are that the individual's own immune system attack and destroy the myelin sheath that normally surrounds nerve fibers and provides them with the equivalent of electrical insulation. Some of the destroyed myelin regenerates spontaneously, although it is not clear which cell type is responsible for producing this myelin. The scientists still work and test new methods for treatment.

Other scientists use stem cells to treat patients with Parkinson's disease. The disease is caused by the death of dopamine-secreting cells in the brain and is a prime candidate for cell-based therapies. The first experimental treatment gives hope.

Scientists received better result in treatment of patients which have Spinal cord injury [4]. When they implant the stem cells into the injured brain the cells can migrate great distances to the site of disease or injury. Once there, the cells differentiate into appropriate cell types and integrate into the tissue. The implanted cells can elicit protective or regenerative responses from the local cells. They may be used as vectors for gene therapy or for the delivery of therapeutic proteins and growth factors.

The scientists use stem cells to treat Retinal Degeneration. Work on animals- the system has shown that transplanted cells can migrate into a diseased retina and they can differentiate in a manner appropriate to their location.

Millions of people in the World suffer from diabetes. Scientists have been successful in getting the stem cells to differentiate into functional cells capable of producing insulin; it has been difficult to direct them to react appropriately to the body's signaling mechanisms that dictate the level of insulin production. Some investigators have been using genetic engineering approaches to coerce adult stem cells into producing insulin.

The ability of stem cells to migrate through the body and through normal tissues can be used from scientists to developed radically new types of cancer treatment, especially for tumors that infiltrate the brain so extensively that they cannot be effectively removed by surgery or chemotherapy. In such cases, it may be possible to use the homing ability of stem cells to deliver chemotherapeutic agents accurately and exclusively to the tumor cells [4]. Right now I did not discovered data which is true in every expectations, however researchers are still working on it. Stem cells therapy helps in case of Cardiovascular Disease.

Stem cells therapy has been proposed as a means to replace and regenerate functional cardiac muscle, rather than just prevent further damage following a heart attack. This could be achieved either by stimulating the proliferation of the patient's cardiac stem cells or by implanting stem cells from a donor. Animal studies have already shown that injected bone marrow or fetal liver stem cells can regenerate heart muscle and improve circulation to the damaged area, suggesting that stem cell transplantation is feasible and may have beneficial effects [1].

Stem cells can be used to treat patients, which have osteoporosis, metabolic diseases etc.

The investigators have solved the problem about providing the stem cells, through therapeutic cloning. They take a somatic cell from the patient. When the embryo is on phase blastocyst (five days) when the number of stem cells are enough for the patient to be treated by cells which are not refused from his own immune system. Heart muscle cells derived from embryos could be used to treat a damaged area of heart tissue. There would be a real advantage in using cells that were genetically identical to the patient's so that

they do not have to take immunosuppressive drugs. Here arises a moral problem, because there is opinion, that embryo is "human being", since the moment of conception. Every person knows the discussion it is the same between opponents and proponents of abortion. Part of the people accepts that after conception the embryo is a human being, who has right as all other people. They are opposite to abortions and using the blastocyst for stem cells. The others think that the embryo is a human being after appearing of brain cells and brain activity. They accept abortion to the moment when no brain activity and they accept using the blastocyst for stem cells. What is more moral to destroy blastocyst or to rest to die, person?

The person first must be alive and second to confess any views. Every autonomous person has the right to informed consent about cloning the blastocyst from a somatic cell from him. He has right to choose how to cure him. The decision of this moral conflict may give the Japanese research and physician Shinya Yamanaka. He used in his investigation “Induced pluripotent stem cells”. In 2012 he was awarded the Nobel Prize in Physiology or Medicine for his discovery that adult cells can be reprogrammed into pluripotent cells. By introducing the genes for four factors, that turn genes on and off, he induced the skin cells of adult mice to become like embryonic stem cells, which he called introduced pluripotent stem (iPS) cells. This iPS cell technology represents an entirely new platform for fundamental studies of developmental biology. Rather than using disease models made in yeast, flies mice or other animals, iPS cells can be taken from patients with a specific disease. As a result, they contain a complete set of the genes that resulted in that disease representing the potential of an almost perfect disease model for study disease development, new drugs, and treatments. iPS cells are somatic cells in which certain factors were induced, thus converting them to a pluripotent state. iPS cells have the ability to proliferate indefinitely and differentiate into just about any type of cells in the human body. Since the original creation of iPS cells, scientists have discovered multiple ways to generate them, but with these different methods come different levels of properties, safety, and efficiency. The scientists still need to learn about the fundamental mechanisms to iPS cells creation. These matters are crucial when considering global standards for the application of iPS cells to new medicines and therapies. Professor Yamanaka and his team have established a generation method that lowers the risk of cancer and a feeder-free culture system.

In 2006 they found and published four factors which are needed to reprogram somatic cells into the embryonic state in the mouse. In 2007 they worked over human iPS cells and another lab- Thomson's announced in "Science” that they had also succeeded in making human iPS cells using a different set of four factors and other somatic cells. Prof. Yamanaka thinks that with the ability to differentiate into virtually all types of cells, iPS cells have enormous, potential for pharmaceutical and clinical application [13]. Patient-specific iPS cells can be used to produce diseases model cells in which the pathological process is being studied. The medicines can be tested over the iPS cells from every patient and to find the best for the patient. Now his lab works over blood cells donated by healthy people, turn them into iPS cells and give them to the hospitals which work over transplantation. In his lab 250 scientists work here for the new innovation from the University of San Francisco and Honoris. This will be in the practice in the second part of this century. They will cure new generations of people. At the moment they take 10%-12% of the medical practice (generally-assisted reproduction). This generation of people must live healthy because the new technologies are on the level of experiments.

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