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**ETHICAL PROBLEMS IN BIOTECHNOLOGY
(ЕТИЧНІ ПРОБЛЕМИ БІОТЕХНОЛОГІЇ)**

Квасниця А. – здобувач вищої освіти групи БТ 1/1

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В статті розкривається сутність етичних і соціальних проблем сучасної біотехнології.

***Ключові слова:** клонування, генетична дискримінація, технологія розмноження, трансгенні організми, фармацевтика, біотехнологія, етичні проблеми, соціальні проблеми, економічні фактори.*

In the article the ethical and social problems of modern biotechnology are represented.

***Keywords:** cloning, genetic discrimination, reproductive technology, transgenic organisms, pharmacy, biotechnology, ethical issues, social issues, economic factors.*

Biotechnology is the use of organisms or their parts or products to provide a valuable substance or process.

In medicine, ethical dilemma that arises from biotechnology is cost and access to new treatments. Such drugs as tissue plasminogen activator, used to break up clots that cause heart attacks and strokes, and erythropoietin and colony-stimulating factors, used to restore blood supplies in cancer patients being treated with chemotherapy, are extremely expensive. Although insurers often cover the costs in the United States, people in many other nations cannot take advantage of these drugs [1].

Another objection to biotechnology is that it interferes with nature, but so do traditional agriculture and medicine. However, the changes that biotechnology can introduce are usually quite unlikely to occur naturally, such as a tobacco plant that glows thanks to a firefly protein, or cloning a human. We place limits on some biotechnologies, but not on others, based on our perceptions and on the intents of the interventions. The glowing tobacco plant was done as an experiment to see if a plant could express a gene from an animal, but many countries ban human cloning because it is seen as unnecessary, dangerous, and unethical. Still, time can change minds. When Louise Joy Brown, the first baby conceived using in vitro fertilization, was born in 1980, objection to “test tube baby” technology was loud. The procedure is now routine. In general, it seems that a biotechnology will eventually be considered ethical if evidence accumulates demonstrating that it does no harm.

Biotechnology that by its very definition causes harm is bioterrorism, especially when genetic manipulation is used to augment the killing power of a naturally occurring pathogen. Bioterrorism dates back to the Middle Ages, when Tartan warriors hurled plague-ridden corpses over city walls to kill the inhabitants. The British used a similar approach in the eighteenth century, when they intentionally gave Native Americans blankets that carried smallpox virus. Efforts in the former Soviet Union to create bio-weapons from the 1970s until the 1990s introduced genetic modifications. For example, they engineered plague bacteria to be resistant to sixteen different antibiotic drugs and to produce a toxin that adds paralysis to the list of its effects. International efforts to ban bio-weapon development in the wake of the attacks on the World Trade Center in New York City on September 11, 2001, might put an end to this subversion of biotechnology [2].

Stem cells are the core of much biotechnical research. Because the stem cell lines can grow into any human tissue, they are invaluable for research into medicines and medical treatments, without putting people at risk. Eventually,

scientists believe that stem cells may be used to grow new organs and reverse paralysis.

Almost all stem cells are the result of embryos fertilized in vitro and placed in frozen storage. Couples choose to use the embryos for implantation, though only a fraction of the embryos is ever implanted. As the cost of storage grows, couples must decide to destroy the embryo or donate them.

The use of stem cells, especially in the United States, is one of the most controversial issues in biotechnology. Supporters argue the embryos used to generate stem cell lines were going to be destroyed, and using them for research has the capacity to save untold numbers of lives. Opponents believe creating new lines from embryonic stem cells is akin to abortion, and the destruction of any embryo for research purposes is an ethical violation. Both sides have come to a partial agreement on the use of adult stem cells over embryonic cells, but the adult cells offer far fewer options and less promising research.

As medical and biotechnology grow, so do the pressures for companies to bring new products to the market. The FDA's new drug pipeline is clogged with thousands of drugs making their way toward approval, though only about 12 percent will ever see mass production. The approval process can take up to 10 years, and the financial stress of seeking FDA approval is too much for many companies.

One of the biggest problems with the FDA approval process is the amount of time that drugs must spend in human clinical trials. Estimates show that a new drug can spend as long as seven years in human trials. Even when the drug completes the trial, it may not receive FDA approval.

Pharmaceutical companies are calling on the FDA to speed up the clinical trial portion of the approval process, greatly reducing the time spent in the drug pipeline and increasing the profits to be made. Reducing the approval time is a double-edged sword. Medications that work will begin helping patients much sooner, but rushing through the process removes safeguards put in place to keep the public safe [3].

Scientists and technologists are able to play real games with God/Nature, manipulating the building blocks of living things at will. It is a dangerous game, its purported anticipated benefits notwithstanding, in which they are being encouraged, aided and abated, supported and funded by powerful industries and corporations, for motives of profit (Tangwa 2004). The newly developed molecular techniques of gene identification, genetic engineering, and artificial reproductive procedures represent a quantum leap in our ability to manipulate life itself, a domain long held by culture and religion to be the province of a divine agency. Religious scholars have criticized the use of biological techniques to expose the privacy and dignity of human being. Some religions have taken the issue of stem cell technology very serious. As according to them research on embryonic stem cell is like to kill the human. Similarly the criticism of religious scholars on human genome project was very severe. It is often argued by religious people that biotechnological interventions are not natural, or that they go against some divine or natural order of things. But human beings are also natural---natural products of evolution. Our technological development is no less natural than the mud wasp's construction of a nest. Thus, it might be concluded that genetic engineering is a natural phenomenon, akin to the "genetic engineering" that takes place in nature every time a gene crosses over on chromosomes, a gene mutates, or a bacterial plasmid migrates from one species to another. There is an important difference between "natural evolutionary processes" and "natural genetic engineering." Natural evolutionary processes do not make a choice, they do not deliberate with the intention of Scientists and technologists are able to play real games with God/Nature, manipulating the building blocks of living things at will. It is a dangerous game, its purported anticipated benefits notwithstanding, in which they are being encouraged, aided and abated, supported and funded by powerful industries and corporations, for motives of profit (Tangwa 2004). The newly developed molecular techniques of gene identification, genetic engineering, and artificial reproductive procedures represent a quantum leap in our ability to

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important difference between “natural evolutionary processes” and “natural genetic engineering”. Natural evolutionary processes do not make a choice, they do not deliberate with the intention of achieving an end. What distinguishes natural evolutionary processes is that they are not goal directed, whereas human actions are always goal directed. To argue that genetic engineering is simply an extension of natural evolutionary processes does not morally justify the practice. With this line of reasoning, any biotechnological intervention could be justified as simply a natural process. But clearly not every intervention is good. It can only be determined to be good based upon a moral deliberation that takes into account its risks and benefits and the appropriateness of intervening in the first place [4].

Література:

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