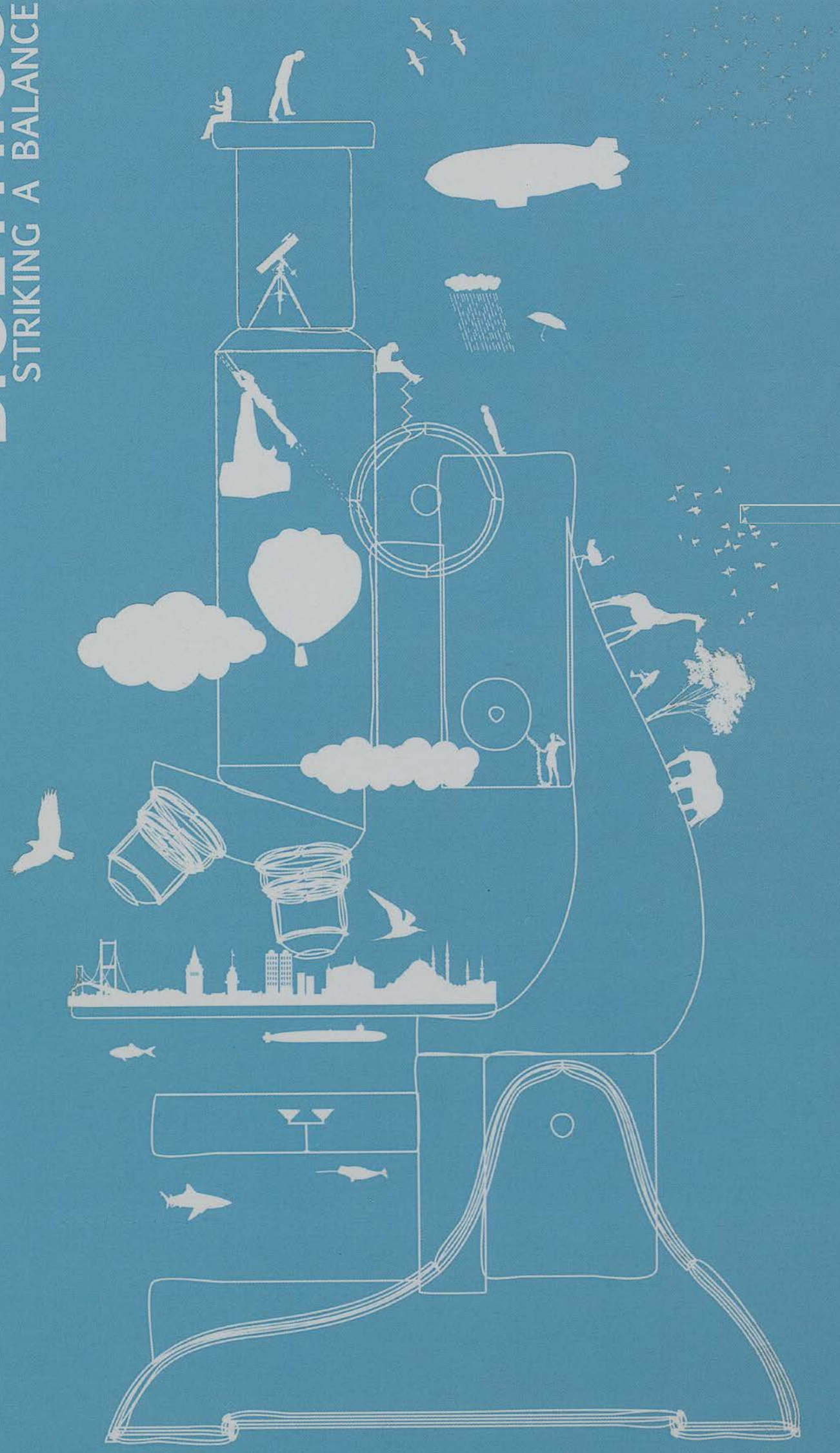
THE 34TH ANNUAL
UNIS-UN STUDENT CONFERENCE WORKING PAPER

BIOETHICS
STRIKING A BALANCE



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BIOETHICS
UNIS-UN

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FOREWORD

The advancement of medicine, technology, and biology brings about procedures and uses for medicine that are capable of both benefiting and harming the natural world. Bioethics is concerned with the controversy and debate regarding the ethical implications of these developments. There are many contrasting opinions and ideas that not only question how medicine is use, but also how medicine and biology relate to our lives and the basic moral code on which we operate. As we attempt to establish the correct manner with which the many conflicting facets of science are approached, we face many challenges in distinguishing right from wrong.

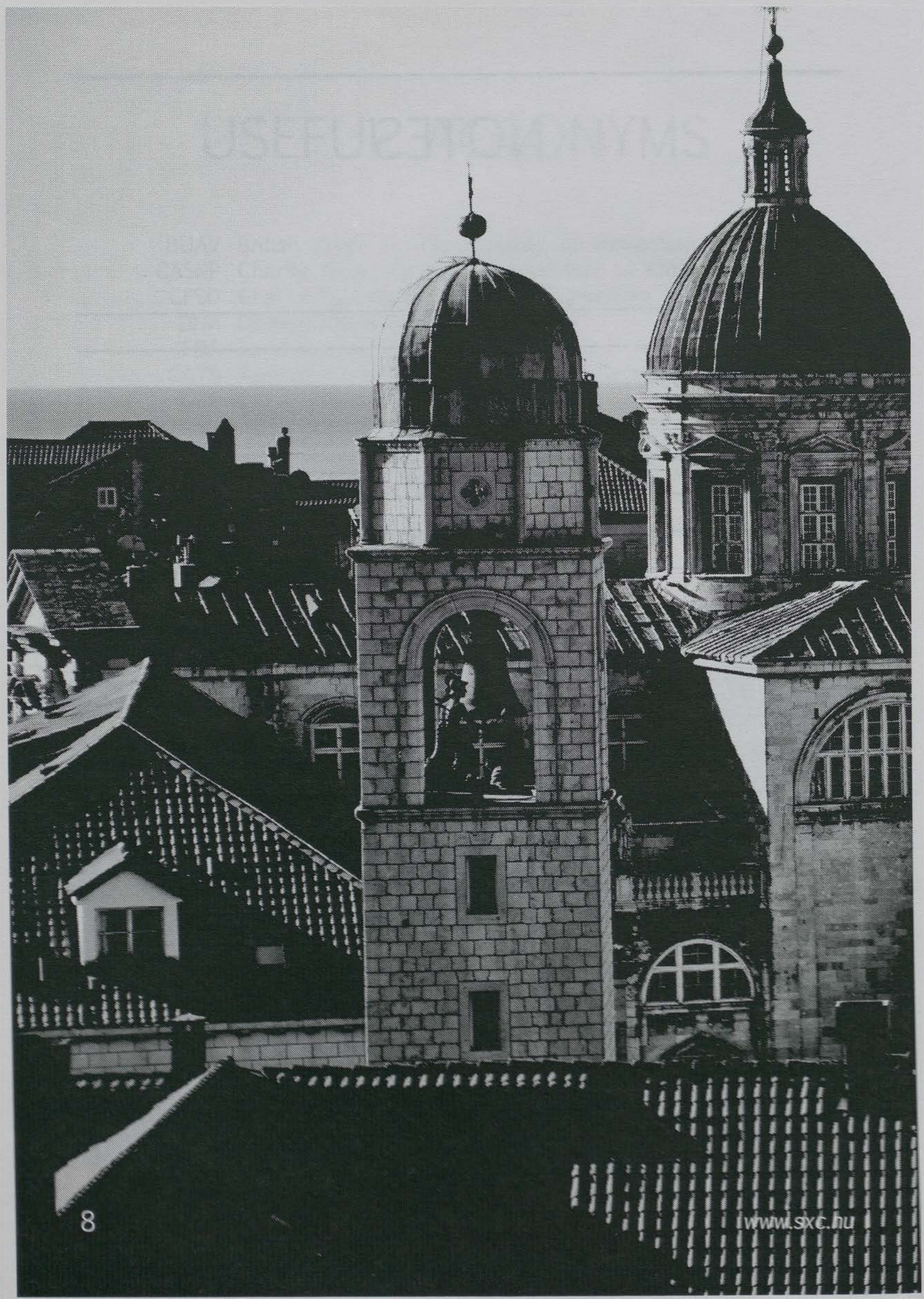
Bioethics manifests itself in every aspect of life whether it be political, moral, or religious. The topic touches on sensitive issues ranging from the role of the corporation to the use of new technologies that both serve the military and are deemed a direct violation of human rights. In addition, many queries are raised: does anyone have the right to choose to die? What constitutes the abuse of drugs and vaccinations and how can one regulate it? When developing new technologies that may be incredibly beneficial, one must often experiment by carrying out risky procedures. However, not all procedures have been perfected and some who have undergone such a procedure have died as a result. Despite the promise that certain technologies hold for future knowledge and development, we must decide whether we value advancements for the future at the cost of lives in the present.

The UNIS-UN Organizing Committee of 2010 recognizes the complexities presented by Bioethics in our world today and hopes to highlight as many aspects of this topic as possible in the conference. Our intention, through the numerous editorials and articles contained in the working paper, is to present how the rapid advancement in medicine has led to new ethical concerns. The inevitable nature of these advancements makes it increasingly necessary to consider their effects on society in both economic and cultural spheres. There are numerous benefits that accompany this progress such as life-saving vaccinations, effective medications and greater insight into devastating diseases. However, with these benefits comes power, and with power comes responsibility. We are now capable of impacting not only the human race but also the environment and the world as a whole. The dangers associated with taking this power too far, as well as the possibilities of improving the well-being of the planet, place matters related to bioethics in the forefront of issues facing us today. ■

USEFUL ACRONYMS

BUAV	British Union for the Abolition of Vivisection
CASKP	Charity Association for the Support of Kidney Patients
CFSD	Charity Foundation for Special Diseases
DNA	Deoxyribonucleic Acid
FDA	Food and Drug Administration
GATS	General Agreement on Trade and Services
GDP	Gross Domestic Product
GM	Genetically Modified
iPSCs	Induced Pluripotent Stem Cells
NGO	Non-governmental Organization
UN	United Nations
WHO	World Health Organization

NOTES



THE ROLE OF RELIGION AND TRADITION IN MODERN MEDICINE

For centuries, science and religion have witnessed numerous conflicts, whether over the shape of the earth or the origin of humankind. However, as medical science continued to grow and advance, clashes between political institutions and cultural traditions began to occur far more frequently especially in fields such as abortion, contraception, HIV/AIDS and stem cell research.

In his interview in spring of 2009, Pope Benedict XVI sparked off heated debates when he mentioned that abstinence, not condoms, was the solution to the HIV/AIDs crisis in Africa. His statement was criticized immensely by doctors, medical journals and numerous countries from the European Union, who protested that condoms are one of the easiest and most effective defenses against HIV, an infection that affects around 22 million people in Sub-Saharan Africa alone. The spokesperson for the French foreign ministry, Eric Chevallier stated that "such comments are a threat to public health policies and the duty to protect human life." Likewise, the German Health Minister, Ulla Schmidt, denounced the Pope's comment as "irresponsible". The Vatican's derision of condoms, however, is nothing new. Contraception has long been viewed as sinful by the Catholic Church, as it "denies the sovereign role of God in the transmission of human life". Nonetheless, for the millions of Catholics living in Africa, abstinence is not a realistic deterrent to HIV infection.

The Vatican's perspective on contraception clashed with medical science in other areas as well. Objections to abortion and stem cell research are rooted in a very similar doctrine as it is considered immoral to destroy potential life. Since a procedure in stem-cell research involves the extraction of cells from embryos that eventually develop into fetuses, it is considered by some as a direct violation of this doctrine. Many scientific researchers and doctors argue that first, embryos are physiologically far from humans and second, that the potential medicinal benefits of stem-cell research far outweigh the costs. As progress is rapidly being made in deriving stem cells from adult tissue, the issue has become less publicized. Nevertheless, the debate over abortion remains highly controversial and sensitive, especially when considering issues involving the separation of church and state.

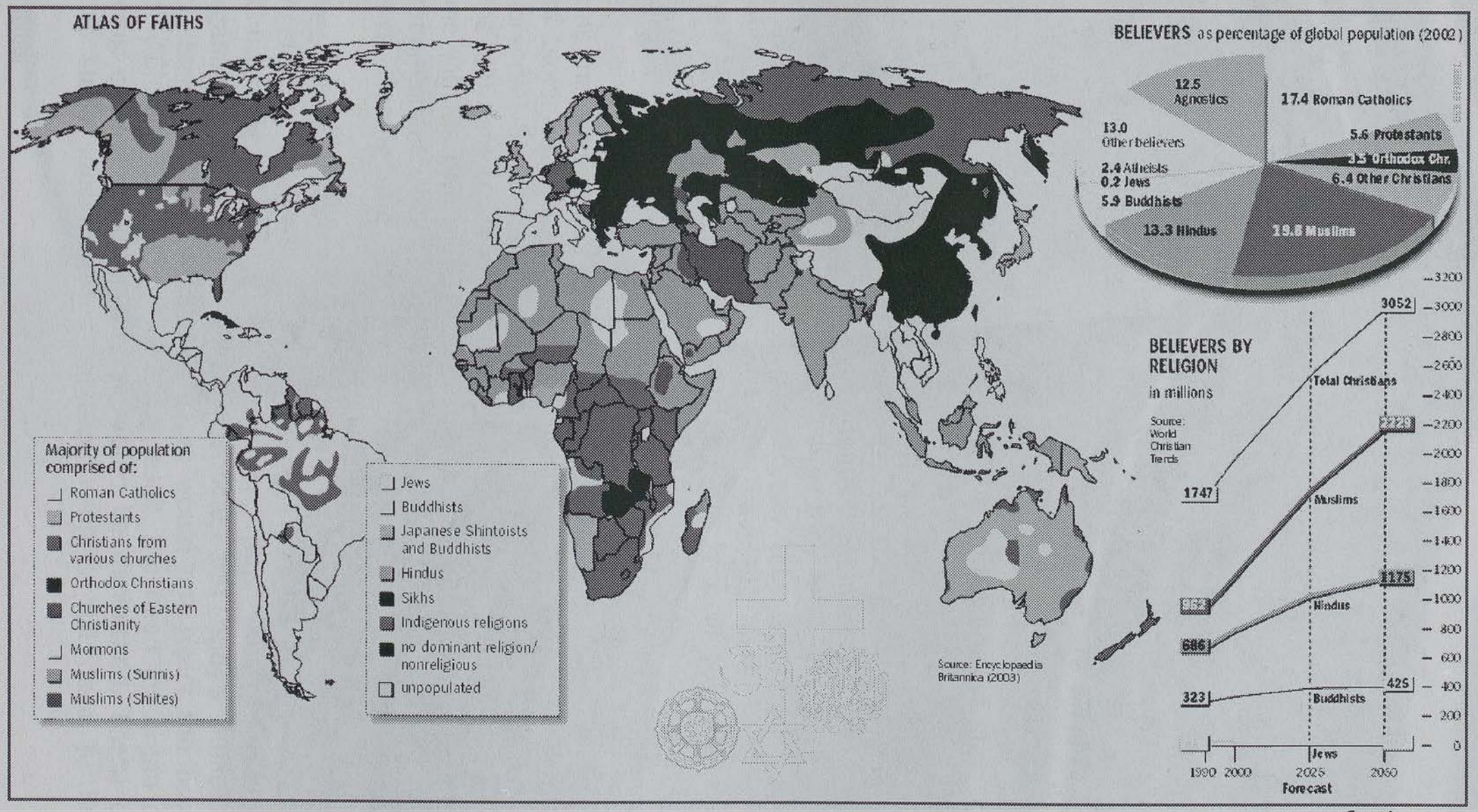
In the rural areas of many developing nations, tradition plays a

vital role in everyday life. Although it is a problem more closely associated with the "witch-doctors", superstition based on medicine and diagnoses still causes major problems across the globe. In rural areas in Tanzania, many believe that the organs and skin of albinos have a mystical power capable of making those who harvest them instantly rich and cured of any illness. As a result, hundreds of Tanzanian albinos are killed. Similarly, in Taiwan, the tradition that tiger bones have immense curative properties, has catalyzed the illegal trade of tiger bones. In 2005, 140 kilograms of tiger bones were confiscated at the Kaohsiung International Airport, Taiwan. The shipment originated from Indonesia and was intended to be used as medicine for the strengthening of human bones and as a cure for joint pain.

The implications of cultural practices on society's health extend to other parts of the globe. In non-Arabic speaking North African countries, with the exception of Egypt, female circumcision has persisted as a tradition for centuries. These cultures believe that the masculine soul of the woman is located in the clitoris and in order to have healthy gender development, the soul of the male has to be removed from a woman; therefore, circumcision is considered mandatory for the transition of a girl into womanhood. Also derogatorily referred to as female genitalia mutilation, female circumcision involves the removal of the clitoris and may extend to the removal of the entire external genitalia. This practice is deemed, by some, as traumatic and detrimental to female health as it is often conducted without anesthesia and under unhygienic circumstances by practitioners who have little or no knowledge of the human body and medicine. Over time, increased awareness of the importance of hygiene and sanitation has improved the conditions in which the circumcision is performed. However, as female circumcision, along with numerous other similar traditions, is likely to remain an integral part of the culture. Hence, criticisms of the practice rarely rouse any significant changes.

Continued progress in science and technology has led to persistent conflicts between tradition and progress, nationalism and globalization, and the roles of religion and state, especially by questioning the health and civil liberties of individuals. For many people, their culture, religion and tradition play a vital role in the moral reasoning that is often associated with reaching decisions regarding suffering, illness, medicine and technology. As a result, despite the common secular associations with professional bioethics, it is important to realize that religious and traditional models and values inevitably subsist in the arena of bioethics due to the vital role they play in our understanding of morality and healthcare. ■

WORLD RELIGIONS



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CHAPTER 2 THE WORLD OF GENETIC SCIENCE

CLONING

Cloning has been the main theme of countless books, television shows, and science fiction movies, but only recently have humans developed technology that actually allows us to clone organisms. Cloning is the process of producing genetically identical copies of a biological entity. In today's world, cloning is no longer an idea of science fiction; it is real, and as a result, it has become a source of heated debate as its ethicality comes under close scrutiny.

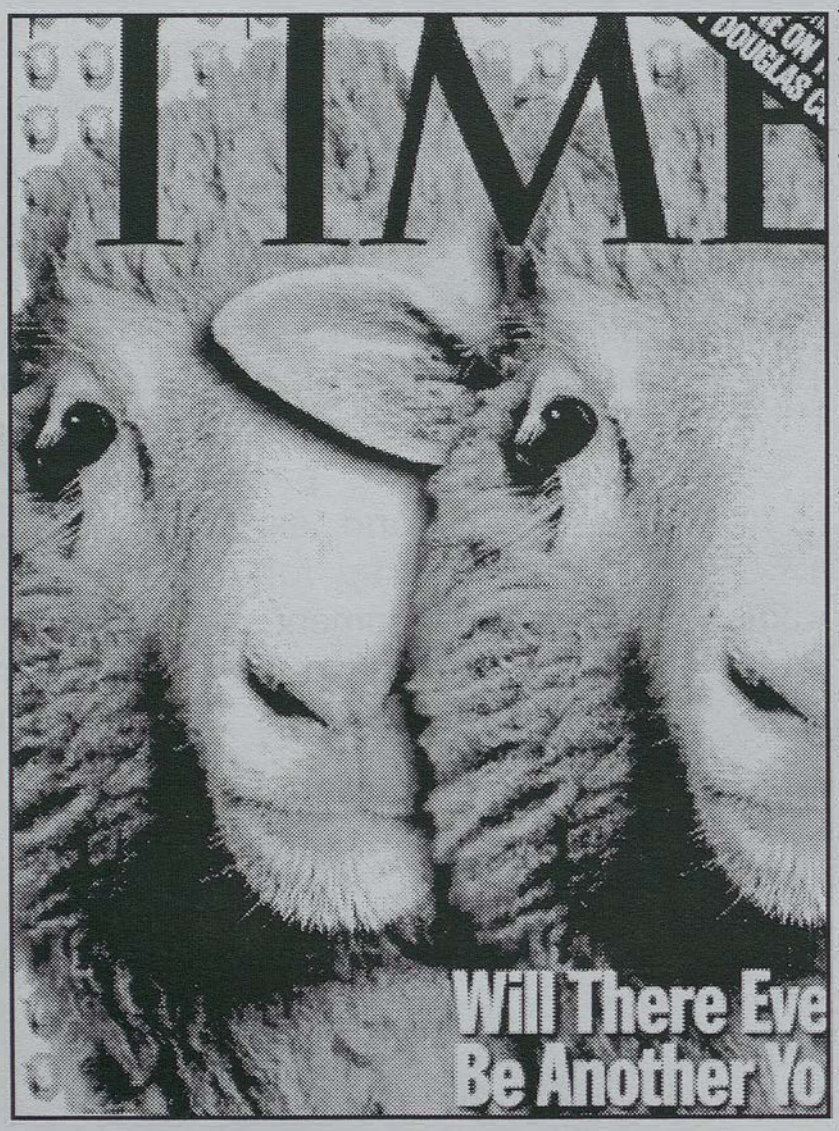
Cloning is considered a form of asexual reproduction since the offspring's genes only come from one individual instead of two parents: "The term cloning is used by scientists to describe many different processes that involve making duplicates of biological material" ("Cloning/Embryonic Stem Cells"). There are three different types of cloning, each one with its own methods and aims: recombinant DNA cloning, reproductive cloning and therapeutic cloning.

Recombinant DNA technology, or DNA cloning, is "the transfer of a DNA fragment of interest from one organism to a self-replicating genetic element such as a bacterial plasmid" ("Cloning Fact Sheet"). This practice is commonly used by scientists to study specific genes; for example, an area of specific interest is bacterial plasmids which can produce multiple copies of the same gene.

Therapeutic cloning and reproductive cloning are major causes of controversy. Therapeutic cloning is the use of cloned human embryos for the generation of stem cells. In this process, the aim is to isolate and extract the stem cell that is vital for the study of human development. Stem cells are essential because they have are not yet specialized, so they are pluripotential, ie: they have the ability to differentiate into any type of cell, and they can replicate themselves through cell divisions. These stem cells can be used to treat diseases like cancer, Parkinson's disease, and Alzheimer's by replacing diseased cells with new ones. This can also be used to make new tissues and organs. Scientists hope that therapeutic cloning could one day be used to create organs for transplants. Therapeutic cloning would be especially helpful since the DNA of the new tissue would be cloned from DNA of the diseased person, thus the DNA would be identical, and body's immune system would not reject the tissue. As a result, the need for organ donors would be diminished. These cloning technologies still need further de-

velopment, but they have great potential for the future of science and medicine.

Therapeutic cloning can also be used in xenotransplantation, or the transfer of cells or organs from one species to another. Through cloning, it is possible to create genetically modified pigs or baboons, which have similar organs to humans. If these animals were genetically altered so that certain amino acid sequences were identical to human sequences, then their organs can be harvested and transplanted into humans. Many animal rights groups are against xenotransplantation, since it involves killing an animal for human gain.



"Reproductive cloning uses the cloning procedure to produce a cloned embryo which is implanted into a female's womb with intent to create a fully formed living offspring—a clone". The process is called SCNT or somatic cell nuclear transplantation cloning, and animals that were generated using SCNT are not identical copies of the donor animal, but the chromosomal, or nuclear, DNA is the same between both animals. The only mammals that have been successfully cloned are pigs, sheep, cattle, mice, rabbits, and cats. The first mammal to successfully be cloned was Dolly the Sheep, who was cloned by means of reproductive cloning. Dolly was the only embryo to survive out of 277 and even though Dolly only lived to be six years old, half the age of the average sheep, she was a great accomplishment for science. As success rates increase, cloning could be used to repopulate endangered species. Dolly the Sheep was not a complete success, however, and by the end of her life, she developed lung cancer and arthritis. This is not uncommon in cloned animals, as 90% of cloning attempts fail. Many clones die in utero, and those that are carried to term tend to have poor health and die young. Despite this, Dolly the Sheep remains an emblem of progress and potential in the realm of cloning.

Advances in cloning have

made the process both less complex and less expensive. This new accessibility has given hope to people who want to recreate their deceased pets. Businesses have sprung up to establish gene banking facilities where pet owners can now pay to have some of their pet's cells preserved until pet cloning becomes a viable and safe option. Recently, a healthy kitten clone playfully nicknamed CopyCat, or CC, was born at Texas A&M University. CC has given hope to many pet owners who wish to clone their faithful companions.

However, there are many problems, including the dangers and risks of animal cloning and the issue of pet overpopulation, which have cost millions of dollars and lives of animals every year. Pet cloning might only add to this overpopulation, but more significantly, pet cloning leads into the issue of human cloning, a concept that is considered by many to be extremely unethical. Reproductive cloning of humans is illegal in most countries as it is considered a violation of human dignity. On the other hand, although embryos deserve respect, utilizing embryos for research may develop potential cures for diseases. Another dilemma in cloning is funding; should there be federal funding, or only private? In 1996, the United States Congress prohibited researchers from using federal funds for human embryo research, and since cloning is so expensive, it will take enormous funding and time for true advancements to be seen within the field. Cloning opens up doors for us, unexplored worlds where we must be mindful of the implications of our actions; the field is controversial and new, but the potential is great. ■

HUMAN GMOS

Beginning early in the twentieth century, understanding what genes are, how they work, and how they can be manipulated, have been major topics for scientific research. However, as our scientific knowledge develops and our technology evolves, so does the potential for large-scale ethical dilemmas.

Human GMOs are human genetically modified organisms using genetic molecule techniques. Some of those techniques include protein engineering and gene cloning, which is when a gene not native to the organism is attached to its genome. Usually the gene added would be somewhat modified as well to work in concert with the new organism host. GMOs have a plethora of uses that have the ability to be both beneficial and detrimental for future generations. The most common GMOs are crop plants, but new technology has been applied to other forms of life such as animals, bacteria, and humans. Germline genetic engineering involves targeting the genes of very

Germline genetic engineering involves targeting the genes of very early embryos and altering every single cell in the body; as a re-

sult, the changes are passed to all subsequent generations. This technique is thought to be necessary for couples who want to prevent passing down genetic diseases to their children, such as Huntington's Disease, sickle cell anemia, cystic fibrosis, Tay-Sachs disease, cancer and other genetically linked diseases. However, there are alternative choices such as adoption, embryo donations and pre-implantation genetic diagnosis (PGS). The last procedure is far simpler than germline engineering and results in the child to be free of the genetic disease that one of the parents may carry. During this procedure, healthy embryos from the mother are selected and tested, giving rise to the possibility of recognizing which genes encode for genetic diseases. Then, only the healthy eggs are implanted artificially into the mother's uterus.

Other than preventing genetic diseases, couples could also choose to use PGS for reasons such as behavioral traits, sex, or other non-disease related features of the child. However, by using PGS, one would only get a minimal effect: while using PGS could alter certain traits of the baby, those traits must already exist within the genes. This limits certain traits to only what the couple's genes contain. If a couple wished to completely alter their child's traits, they would need to use germline engineering, which differs markedly from PGS as it can potentially create traits that do not exist within the embryo's original genes. This allows for new traits of character, looks, and sex to be created from within one generation. These genetically modified babies are known as "designer babies." At the moment, apart from the fetus' gender, it is possible to identify the dozen or so most serious genetic diseases in the earliest stages of development.

Within the next couple of decades, researchers are hoping to discover means to determine the child's body type, hair color, eye color, and even IQ along with personality traits.

Predetermination of the child's gender has come under close scrutiny. However, many argue that sometimes the choice of the child's gender is not necessarily for preference, but for health purposes. For example, a couple may opt for a girl in order to protect their child from X-linked hydrocephalus—a disease that is passed on genetically. X-linked hydrocephalus usually affects boys and is characterized by the presence of water in the brain. To choose the gender of a child, doctors have utilized a method practiced on livestock. Since a woman has two X-chromosomes, the decision of the sex is made by what chromosome is in the sperm cell from the father, X or Y. Y-chromosomes have slightly less DNA than X-chromosomes. To identify the type of chromosomes contained in the father's gametes, doctors place a nontoxic light-sensitive dye onto the sperm cells. The

dye sorts the sperm cells for the doctors; scientists are then able to choose which sperm cell to fuse with the mother's egg cell.

Lucidly, there is a fine line between choosing an embryo that is free of a genetic disease, and choosing one with the cosmetic traits the parents wish their child to have. While one affects the child's life seriously, the other is an optional and rather superfluous component of the child's life. Having a child with a genetic disease not only makes the life of the child arduous, but possibly also the lives of other children and immediate family members. However, by using human GMOs, that chain can be stopped. Meanwhile, cosmetic traits are not a matter of life and death; instead they catalyze the hedonism of already media-driven societies. On the other hand, some parents believe that altering a child's physical traits will make their child's life "happier". However, besides the qualitative nature of beauty, cosmetic traits may give rise to unforeseen physiological defects. Nonetheless, the effect of designer babies on society remains far more debated than the consequences of "tweaking" genes to eradicate genetic defects. ■

GM AGRICULTURE

According to the Biotechnological Industry Organization,

Only 10% of the world's land is currently arable

and by the year 2050, 50% of that land will be used for other purposes. The decrease in cultivable land coupled with the increase in population, which is expected to rise by 50% in 40 years, and unpredictable weather patterns are all potential instigators for high inflation in food prices. Many people believe the best solution to this daunting prospect of a food shortage is GM agriculture.

GM food was first sold in the market in the early 1990s. The process of genetic engineering to obtain the modified agricultural products commences with the use of enzymes to identify and isolate the genes that produce desirable traits. Subsequently, a recipient plant or animal is selected and the gene is incorporated into its genome using a "gene gun". Once the newly inserted gene has entered the recipient's genome, it is regulated in the same fashion as the organism's other genes.

According to a study conducted in 2005 by the International Service for the Acquisition of Agro-Biotech Applications, 8.5 million farmers in 21 different countries are currently yielding GM crops. These include USA, Argentina, Brazil, Cana-

da, China, Germany, France, Australia, Iran, India and Romania. The varieties of GM food include: soybean, corn, cotton, papaya, tomatoes, potatoes, canola, sugar cane and rice. The benefits of GM food are particularly highlighted in developing countries to overcome famines and food shortages associated with a rapidly growing population.

Proponents extol the myriad of benefits that runs in tandem with GM agriculture. First, GM crops require fewer applications of herbicides and pesticides, thus significantly reducing the damage to the environment and the superfluous economical costs. Also, GM plants can be made resistant to disease and drought so that they require fewer environmental resources and can overcome common ecological obstacles encountered by crops around the world. GM food could even serve nutritional and medicinal purposes by replenishing vitamins, vaccines and other medication that may be incorporated into their genome. Furthermore, these desirable traits in GM food could be extended to increase nutritional value of staple foods such as potatoes that can be made to absorb less fat when fried. Bioengineering would also allow us to create faster growing plants and animals resulting in greater yields with longer shelf lives and possibly higher consumer and producer surplus.

Even though it is a technique that is increasing in popularity and efficiency, genetic modification still remains controversial. While GM agriculture does offer an apt solution to a number of the world's problems, especially regarding the food crisis, it does have numerous drawbacks as well. Some scientists argue that GM food is unnecessary in abating food shortages because the problem we encounter today lies in the misallocation of an already plentiful supply of food.

On average, an American consumes as many calories in one day as 300 Tanzanians, and in the USA, 200 billion calories are unnecessarily consumed—enough to feed 80 million people.

Furthermore, it has been found that GM food has a greater tendency to provoke allergic reactions. Also, there is the risk that the genes from GM food can be unwittingly transferred into the cells of a human being, which, if it were

some gene related to antibiotic resistance, could have adverse effects. Finally, governments, communities and farmers fear that cross-pollination between GM and non-GM crops could damage or genetically alter the conventional crops and have a negative effect on food security. To make matters worse, GM seeds are patentable and farmers whose crops are cross-pollinated by pollen from GM crops could face legal consequences—cases that are commonly associated with the Monsanto food company.

International agencies such as the World Health Organization (WHO) and the Food and Agriculture Organization (FAO) constantly evaluate GM food in order to determine its effect on global health. The WHO conducts a risk assessment that evaluates the characteristic of the food and the possible ecological effects the foods could have on the environment where it is introduced. Meanwhile, the FAO regulates the production and labeling of all genetically engineered foods and thus works in tandem with the FDA that requires all developers to submit scientific and safety information on all bioengineered foods at least 120 days before they are marketed. Furthermore, the marketing of GM food is made transparent to the public by national governments that also evaluate them before introducing them commercially.

Ideally, one would hope that GM foods and organic or conventional foods could co-exist because they are apparently a leading solution to food shortages, famine and the continuously escalating rise in demand for food. Although there have been no reports of injury or illness due to their use, the absence of any insight into the long term effects of GM agriculture has, however, staggered the proliferation of GM crops. ■

STEM CELLS

Stem cells are the heart of an epic debate concerning whether or not it is moral to utilize them. There are two types of stem cells: adult and embryonic stem cells. These cells have the ability to modify themselves to become other cells so as to restore parts of the body that have been damaged by disease or can be transplanted from one person to another to medically aid the recipient.

Scientists and doctors believe that stem cells can cure diseases such as cancer, Parkinson's and Alzheimer's.

Others believe that it is immoral to harvest stem cells because of the destruction of the human embryo.

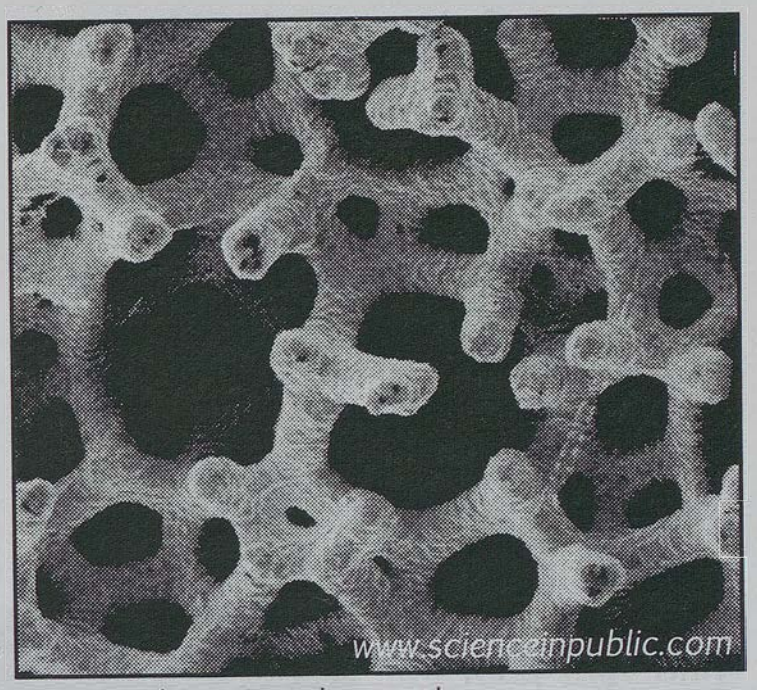
The two primary types of stem cells have a single distinguishing characteristic. Adult stem cells, such as blood-forming stem cells in bone marrow called hematopoetic stem cells (HSCs) are the primary type of stem cells used to treat human diseases. HSCs are used to revive the immune system when it has been damaged through chemotherapy to combat leukemia, lymphoma or various other blood or autoimmune disease. An adult stem cell is an undifferentiated cell that has the property to develop into other types of cells. It is located in a group of differentiated cells within a tissue or organ that can renew itself like the hair, skin and follicles. The principal function of an adult stem cell is to maintain and fix the organs and tissues in which it is located such as the brain, bone marrow, skeletal muscles, liver, ovarian epithelium and testes. The cells remain in a specific area of the tissue called a "stem cell niche".

Embryonic stem cells, as indicated by their name, are only present in embryos. Most originate from eggs fertilized by the in-vitro method and are donated for research with the donor's consent. The embryos from which human embryonic stem cells are harvested are usually four to five days old, in the form of a blastocyst—a group of 70 to 100 cells in early development. Embryonic stem cells have the potential to become any cell in the body, be it muscle, skin or bone. As a result, scientists and doctors can use them to treat degenerative diseases and cancer to replace cells that the disease causes to die and in the latter, stem cells are used to regenerate damaged tissue or blood after chemotherapy treatment.

Despite the claimed benefits and potential uses for an embryonic stem cell, there are many people who oppose the use of embryonic stem cells. Pro-lifers have the idea that the destruction of a human embryo is morally wrong, whatever the alleged benefits. A human life begins at the moment egg and sperm are united. The benefits to others, whatever they may be, cannot justify the destruction of a human life. In short, they believe that it is ethically wrong to destroy an organism that has the potential to become a human being. Proponents of embryonic stem cell research argue that it is for the greater good to use embryonic stem cells, and that just a single embryo can teach us enough to help cure people suffering from sickle cell anemia, immunological diseases, and metabolic and hematologic disorders.

Pro-lifers claim that if harvesting embryonic stem cells is permitted, then many more "unethical" measures may be taken in scientific research where issues of morality and decency may be diluted as people start to constantly push ethical boundaries. As Nicholas Wade points out in the NY Times, science has discovered an alternative method of harvesting embryonic cells: "The medical benefits of embryonic stem cells are overstated but, in any event, could be obtained by using

adult stem cells instead." However, scientists have argued that adult stem cells are not nearly as prolific or flexible as embryonic stem cells and do not have the same capabilities as the embryonic stem cells. This debate attempts to create a balance between ethics and scientific as well as medical benefits. A compromise between the two is increasingly established through the use of Induced Pluripotent Stem Cells (iPSCs) to help increase efficiency and explore capabilities of stem cells. iPSCs are often thought of as man-made stem cells, and are reprogrammed adult stem cells that have been induced to function as an embryonic stem cell. Reprogramming of adult stem cells is caused by allowing only specific genes in the cell to be expressed. However, much research and experimentation remains to be conducted to explore the extent of the uses of iPSCs: it is still unclear whether iPSCs are capable of replacing certain cells like those lost in chemotherapy.

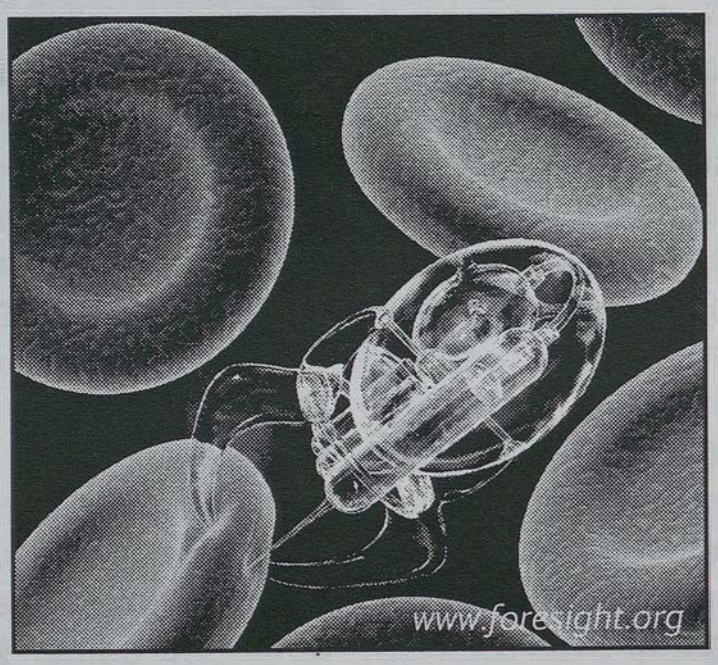


Research on stem cells can create a revolution in science and medicine once enough information is discovered concerning the capabilities of embryonic stem cells, adult stem cells, and iPSCs. Until that time, the debate regarding the use of embryonic stem cells still rages over whether or not it is moral to "kill" a potential baby to help another individual. ■

SYNTHETIC BIOLOGY

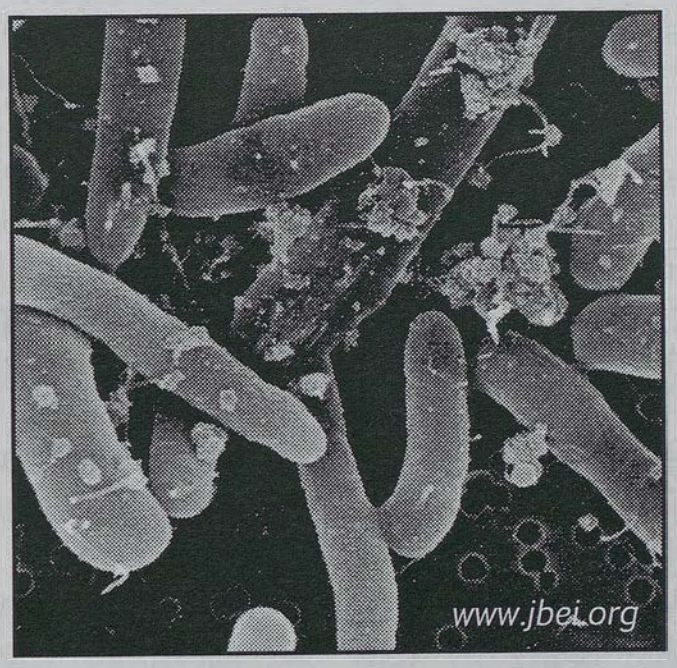
Synthetic Biology is the concept of designing and fabricating artificial biological mechanisms that are not found in the natural world, as well as the re-creation of existing biological systems. Jay Keasling a professor of biochemical engineering at the University of California at Berkley, defines synthetic biology as "synthetic biology, which—by combining elements of engineering, chemistry, computer science, and molecular biology—seeks to assemble the biological tools necessary to redesign the living world". Such a feat is made possible by the manipulation of genes. Synthetic biology uses gene-sequence material and synthetic DNA to reconstruct the metabolic codes of cells to execute new functions. DNA is made of four different nitrogenous bases, or nucleotides, adenine, cytosine, guanine, and thymine, and comes in the

sequence of these nucleotides that determines the differences between species, and at least in part, individuals within a species. Over the years, decoding long genome has become much easier; present day machines can now process genetic information in a matter of seconds. Before 2008, scientists were only capable of deleting and inserting fragments DNA Into already existing DNA. This editing of the genome results in mutations similar those caused by the natural mistakes made by enzymes DNA replication, except these man-made mutations are carefully controlled and calculated. In 2008, scientists made a breakthrough and reduced a virus called Mycoplasma genitalium down to only the few genes that were completely necessary for life. With these basic genes, it became possible to build completely new forms of life. For example, artemisinin, a malaria drug, is very expensive and difficult to produce, but using this new concept of building life-forms, it can be more efficiently manufactured.



Synthetic biology can be used to turn specialized molecules into small, self-contained factories, which scientists believe can beused to make cheap drugs , clean fuels, and new organisms to drain carbon dioxide from the atmosphere. Here we can return to the malaria drug, artemisinin; through DNA modification, scientists can create an amorphadiene 'factory' (amorphadiene is a artemisinin precursor, like L-Dopa is a precursor to dopamine) in a microbial cells. Manufacturing artemisinin, normally a very difficult process, then becomes a simple matter of slightly modifying the harvested amorphadiene produced from these cells so that it can be given as a treatment. Future prospects for synthetic biology are wide and promising. Modified cells could be used to track down and kill cancer cells, develop new vaccines, and detect cancer in its early stages by measuring the exact life cycle of a cell. Scientists believe that with enough research and knowledge, they will eventually be able to make programs to control genetic mechanisms. These programs would allow them to not only make small changes in the genome, but change nature and guide human evolution. When life first emerged from the 'primordial soup', two characteristics helped it survive and adapt to its surroundings. Charles Darwin wrote his book, The Origin of Species, on this principle of adaptation, these basic genes, it became pos-

sible to build completely new forms of life. For example, artemisinin, a malaria drug, is very expensive and difficult to produce, but using this new concept of building life-forms, it can be more efficiently manufactured. Synthetic biology can be used to turn specialized molecules into small, self-contained factories, which scientists believe can be used to make cheap drugs, clean fuels, and new organisms to drain carbon dioxide from the atmosphere. Here we can return to the malaria drug, artemisinin; through DNA modification, scientists can create an amorphadiene 'factory' (amorphadiene is an artemisinin precursor, like L-Dopa is a precursor to dopamine) in microbial cells. Manufacturing artemisinin, normally a very difficult process, then becomes a simple matter of slightly modifying the harvested amorphadiene produced from these cells so that it can be given as a treatment. Future prospects for synthetic biology are wide and promising. Modified cells could be used to track down and kill cancer cells, develop new vaccines, and detect cancer in its early stages by measuring the exact life cycle of a cell. Scientists believe that with enough research and knowledge, they will eventually be able to make programs to control genetic mechanisms. These programs would allow them to not only make small changes in the genome, but change nature and guide human evolution.



When life first emerged from the 'primordial soup', two characteristics helped it survive and adapt to its surroundings. Charles Darwin wrote his book, The Origin of Species, on this principle of adaptation, and postulated natural selection, the idea that only the individuals of a species best suited to their environment will survive. Today, we call this Darwinian Evolution, or Darwinism. As we collect more information that supports this theory, we are beginning to understand the string of mutations and alterations that led to the creation of new species from others, and the origins of life itself. By using synthetic biology to artificially alter DNA, we could change the course of evolution by promoting certain traits and suppressing others. Synthetic biology has the potential to increase the lifespan and quality of life of the human race, disregarding the natural process that has been in play for millions of years.

Bioethicist Arthur Caplan, believes that mutating and improving the human race through science is

like playing god. Drew Endy, a synthetic biologist and a professor of biological engineering at Stanford University, made a statement concerning the effects of synthetic biology on evolution: "What if we could liberate ourselves from the tyranny of evolution by being able to design our own offspring." However, with this enormous potential and power, comes responsibility; changing the course of evolution would not only impact human beings, but would also have a profound effect on other species.

All of these scientific developments have serious ramifications, and it is becoming increasingly important that we research both synthetic biology and its potential effects. Presently, synthetic biology is a vague field that has many potential outcomes and unknown promise. Some uses that have already been tested are: artificially making drugs (artemisinin), using proteins to keep cells alive (extending life), and finding and killing cancerous cells. On the other hand, synthetic biology has many potentially crippling consequences. Bioterrorism will increasingly become a major threat if synthetic biology is proliferated, despite prestigious scientists, such as Steven Brenner of the Foundation for Applied Molecular Evolution in Gainesville, Florida, asserting that it will be a long time before dangerous bugs can be manufactured in labs. The effectiveness and the safety of manipulating and synthetically creating life is also a major issue. There are risks involved in synthetic biology, as Endy acknowledges. He compares the prospective hazards of building a bridge to synthetic biology: "If you build a bridge and it falls down, you are not going to be permitted to design bridges ever again. But that doesn't mean we should never build a new bridge. There we have accepted the fact that risks are inevitable." The cost is an additional problem many people are asking about: who will sponsor the research and testing? Moreover, who will be in control of this technology? These are questions that still do not have complete answers.

While using synthetic biology to artificially improve humans is considered an ethical issue by most, the medical implications are astounding. The ability to rapidly produce rare drugs and fight resilient diseases like cancer is an epochal change in the standard of medicine. A major positive aspect of using synthetic biology is that the quality of medical care will improve tenfold. Synthetic biology is a major topic for discussion. The New Atlantis newspaper says that "practitioners and policy analysts are beginning a wide-ranging debate about how best to guide synthetic biology in a safe and socially useful direction without smothering it in the cradle." Synthetic biology is a field of infinite possibility, so new and broad that it opens countless doors for us, but we must be ready to face what we encounter on the other side, ready with guidelines, solutions and creativity. ■

EDITORIAL: FOR EUGENICS

As Francis Galton once said, "All creatures would agree it was better to be healthy than sick, vigorous than weak, well fitted than ill-fitted for their part in life." Positive eugenics, or the promotion of re-producing healthy, intelligent people, could greatly benefit civilization. Eugenics is infamous for being associated with the Nazis and the extermination of Jews; however, this is an example of negative eugenics, and the distinction between positive and negative eugenics is vital. Many people have a very limited understanding of eugenics and are therefore opposed to it, but if they were properly informed and had a thorough understanding of it, they would probably support a positive eugenics program. The definition for eugenics from Francis Galton, who coined the term, is "The science which deals with all influences that improve the inborn qualities of a race; also with those that develop them to the utmost advantage." The goal of eugenics is to help a race evolve positively in a hereditary fashion, and therefore prevent disease and other problems.

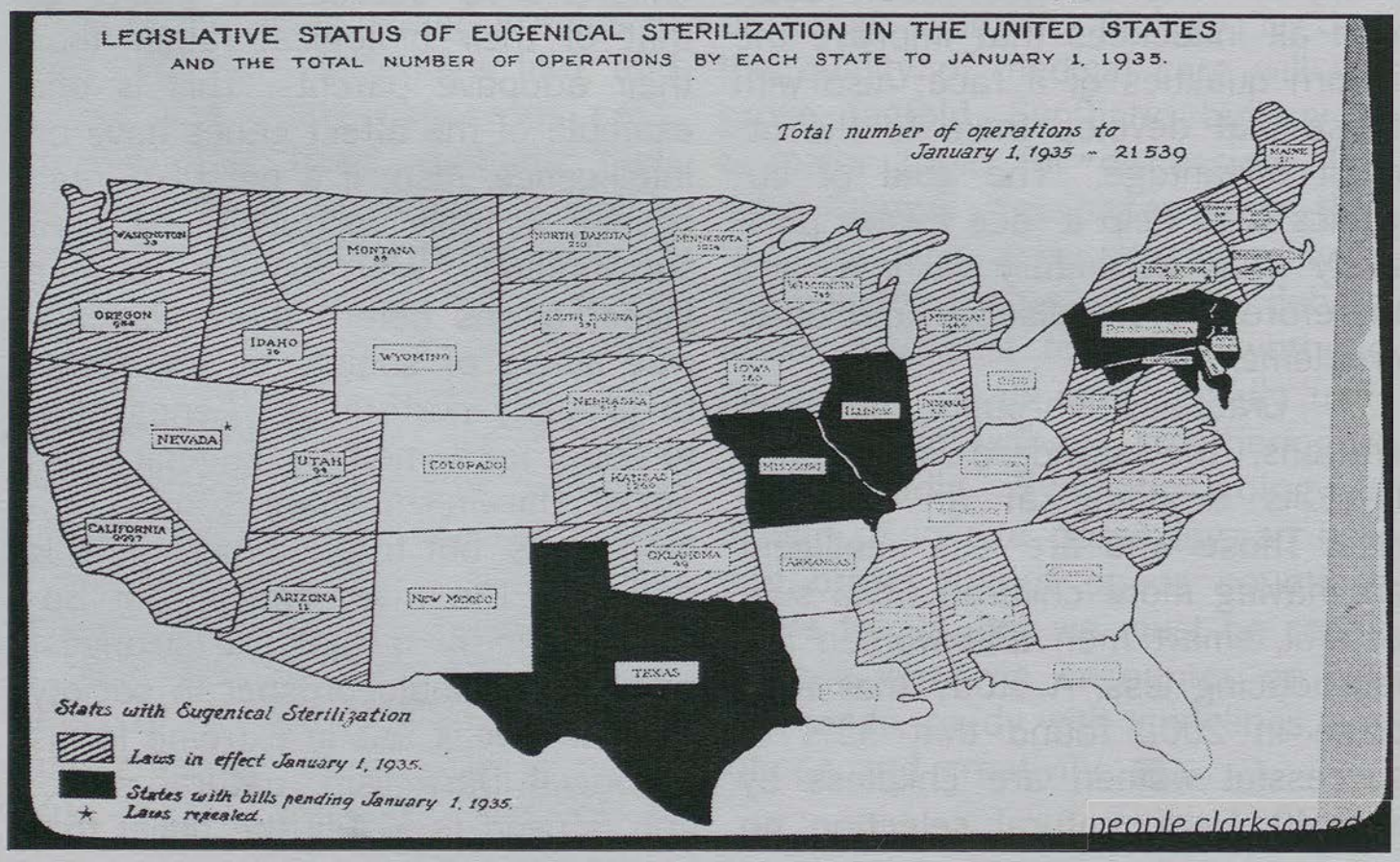
Gradually, through the generations, the standard intelligence level is dropping at an alarming rate. Those who are less intelligent are having more children while successful, smart men and women are reproducing less. A study that took place in 2002 found that 33% of successful women are childless by age 40. Here, natural selection no longer applies while evolution, a natural and incessant phenomenon, continues to take place, but moves in the wrong direction. Eugenics can both increase the intelligence of the general population, and simultaneously minimize mental and physical disabilities. For example, if the average IQ was raised by five points, there would be twice as many people at least three points above the mean, and half as many mentally-retarded people.

In the classic and age old dispute, nature vs. nurture, many argue that environment has a greater effect on a person than their genes. Consider a study done in 1989 by Loehlin, horn, and Willerman which showed that unrelated adopted siblings tested at ages 13-24 had no similarities between them. Adopted children's IQ scores are closer to that of their biological rather than their adoptive parents. This is one example of the effect genes have on intelligence. Also, if a person's intelligence is only increased by their surroundings, why did we develop bigger brains before there was any true sense of society or civilization to properly nurture us? Genes have to count for something. Eugenics and Social Darwinism share some common ideas, but their ultimate goal is different. The main concept of Social Darwinism is that the strongest and fittest should prosper in society while the weak fail. In extreme forms of Social Darwinism, natural selection is used to justify the belief that

it is morally correct to succeed at the cost of the weak. Another belief condoned by Social Darwinism is that assisting someone weaker than oneself is detrimental to the human race, because it gives them the chance to survive and reproduce. The idea of eugenics, on the other hand, is to use genes for the good of society and civilization without causing harm to any citizens. While they both use aspects of natural selection, Social Darwinism attempts to recreate what you would find in nature while eugenics promotes a better future for humanity both as a race, and as individuals.

Eugenics would improve human beings, making us happier and more confident while increasing and bringing out our natural abilities. In a study where two percent of a sample population was mentally impaired; 36% of the next generation was mentally retarded. This exponential increase in those with mental disabilities could have been prevented by eugenics, reducing the percentage of people who had to suffer from such diseases. With eugenics, all types of painful and detrimental genetic diseases, from hemophilia to cystic fibrosis could be contained and might eventually disappear. We could drastically decrease the amount of people affected while saving money that would otherwise be spent in other areas, such as healthcare.

Several aspects of modern medicine work favorably with eugenics. The legalization of voluntary abortion has lowered the crime rate because the women most likely to raise criminals, such as teenage mothers or mothers who have been raped, have a higher rate of abortion. Also, selective abortion, which allows the mother to choose to abort based on genetic character-



istics, lowers the number of children born with Down's syndrome or other genetic disabilities. The stress of parents caring for these children intensely affected them and often deterred them from having more children.

While eugenics is not a very popular notion, the controlled use of positive eugenics through methods such as selective population control can improve civilization economically, socially and culturally, allowing us to progress as a race.

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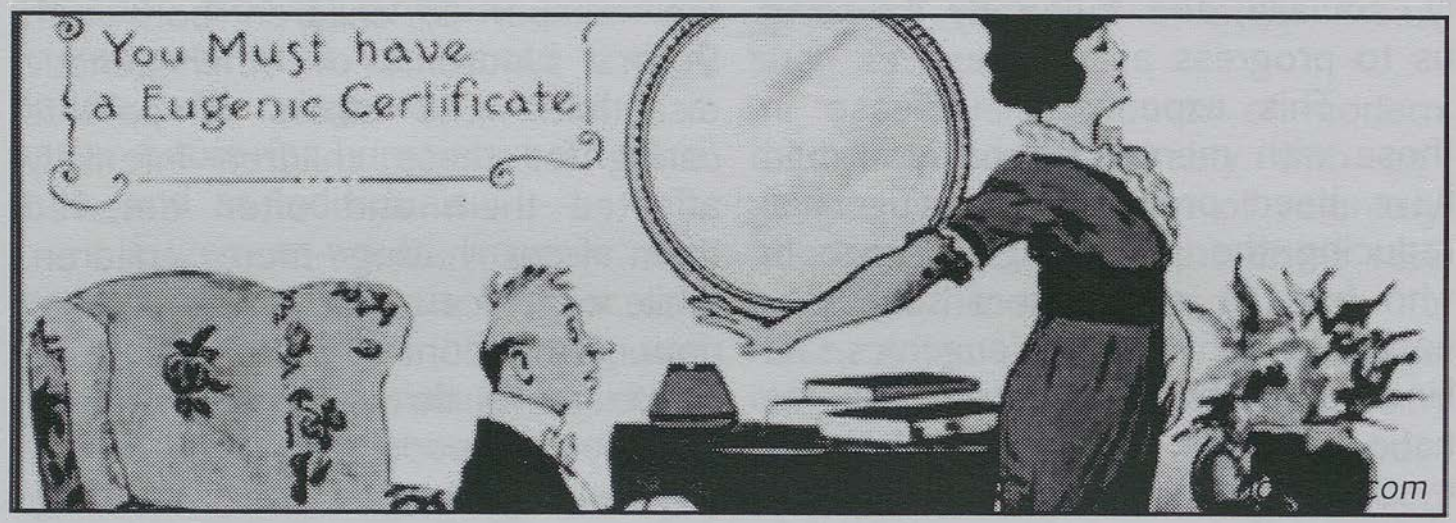
EDITORIAL: AGAINST EUGENICS

Eugenics, according to the Encyclopedia Britannica, is "the organic betterment of the human race through wise application of the laws of heredity." The purpose of eugenics is to eliminate certain racial, religious and cultural groups from the human race so that society will become more productive, attractive, and, essentially, perfect. The practice of eugenics is wrong both morally and politically. It undermines the belief in human egalitarianism and consideration for disadvantaged members of society. Despite its claim to improve society, eugenics inflicts harm upon society.

It fosters a mindset of intolerance and superiority which, if allowed to develop further, will give way to laws such as the Virginia Law, which require the sterilization of patients in mental institutes. This intolerance will eventually culminate in another Holocaust.

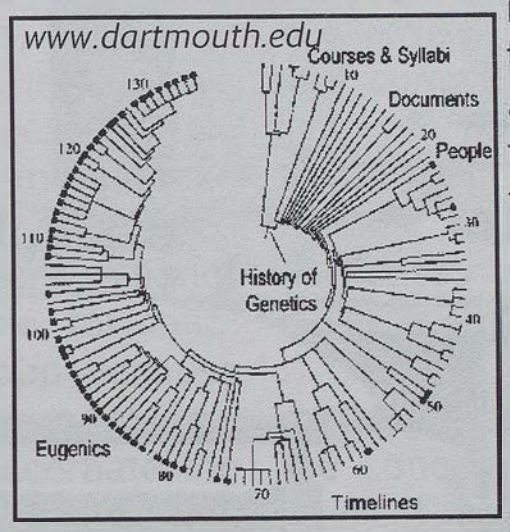
The study of eugenics allows scientific selection to eliminate the weakest of mankind in order to obtain a utopian and wholly productive society. Two present day examples include "designer babies" (where parents are able to choose the genetic characteristics of their baby, from susceptibility to diseases to eye color), and abortions targeted at fetuses with genetic diseases. If eugenics were implemented throughout the world, societies would begin to view those with physical imparities, mental complications, incurable genetic diseases, and even "unattractive and unintelligent people" (who could have been 'improved' by means of various forms of eugenics) as inferior and subordinate solely due to the fact that they were born naturally without the help of genetic manipulation. Should societies choose to fully employ modern means of eugenics, the constantly reinforced belief that all human life is equal – no matter what race, gender, ethnicity– would be reversed.



Although the hypothetical future suggested above may appear to be exaggerated or unrealistic, historical uses of eugenics have proven to be just as horrible, if not worse. Some specific cases include the sterilization and denial of marriage to those with potential to transfer a genetic dysfunction. For example, the California law of 1909 required sterilization and marriage restrictions on those whom the state deemed 'unfit' to reproduce– mainly people in mental institutions. The most famous case of eugenics, where ideas of Nordic and Arian supremacy caused those who were decided 'unsuitable' to live to be taken to camps and slaughtered. This is known today as the Holocaust. As a result of the law passed by the California Court in 1909, eugenicists prohibited the marriages of approximately 10,000 people, denied the victims social services, and sterilized approximately 65,000 innocent people. The target victims of this law included prisoners (as they were supposedly more likely to produce criminal offspring) and the mentally ill. Some even went so far as to target Native Americans, African Americans, the deaf, and the blind. The state was able

to do so because it was defended by the claims of famous scholars from reputable universities such as Harvard and Yale, who manipulated the race theory and science data to support their beliefs that stupidity and other negative traits are passed down solely through genetics; using statistics and lofty ideas of improving the human race.

As frightening as the California sterilizations and prohibitions may seem, they do not even compare to the horrors of the Holocaust and the Nazi's use of eugenics to justify the mass genocide they committed. Under the veil of Social Darwinism (the concept that the strongest and the fittest will survive and flourish, while the weak and inefficient are bound to deteriorate and eventually die out), one of the most heinous massacres in history was carried out. The Nazis claimed that there are people whose very existence is immoral and that they should therefore be eliminated. Millions were murdered through starvation, gassing and raw violence, based solely on their races, nationalities, beliefs, and disabilities. What supposedly began as an effort to improve the general well-being of the German populace quickly transformed into an excuse to kill those that were 'harming' society. Gradually the citizens of Germany were convinced that to progress, they needed to rid their country of those who didn't meet a (government decided) standard. Their solution: the systematic and chilling extermination of seventeen million innocent people. This is evidence that what is often termed as eugenics merely masks the true face of racism and discrimination, and ultimately leads to death, bloodshed and inequality.



If eugenics were to be legalized, it would mean replacing natural selection and evolution with a man-made alternative, a process that would most certainly lead to many dilemmas. One of these might be the fact that if everybody were to be intelligent, then naturally, according to the theory of 'survival of the fittest', the most intelligent people would receive the professions requiring high levels of intellect, which would leave the moderately intelligent population to perform laborious duties, instead of being able to perform well in a higher paying line of work. Moreover, the legalization of eugenics would present many questions: would everyone undergo eugenics? If so, how would the government fund it? Eugenics is a pseudoscience that has a history of abominable bloodshed, as well as a future that encompasses discrimination against those with physical, mental, and other imparities. On the whole, eugenics would fundamentally damage society. ■

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PROFESSIONAL ETHICS

The topic of professional ethics arises when there is a dispute concerning how a professional's specialist knowledge should be governed when providing a service to the public. Professionals, especially those in medicine and science, have many moral responsibilities because their training allows them to make informed decisions. An untrained person, on the other hand, cannot be held fully responsible for inaction in a medical situation because they do not know what is necessary and what would only exacerbate the situation. Even for a professional, these decisions can be difficult and perplexing, and in the event that a wrong decision is made, there is an insurance that protects the professional. Professional liability insurance, or professional indemnity insurance, protects doctors and other medical practitioners against negligence claims filed by their patients. This type of insurance encompasses not only negligence claims, but also misrepresentation, inaccurate or misguided advice, and violation of good faith, ie: violation of confidentiality.

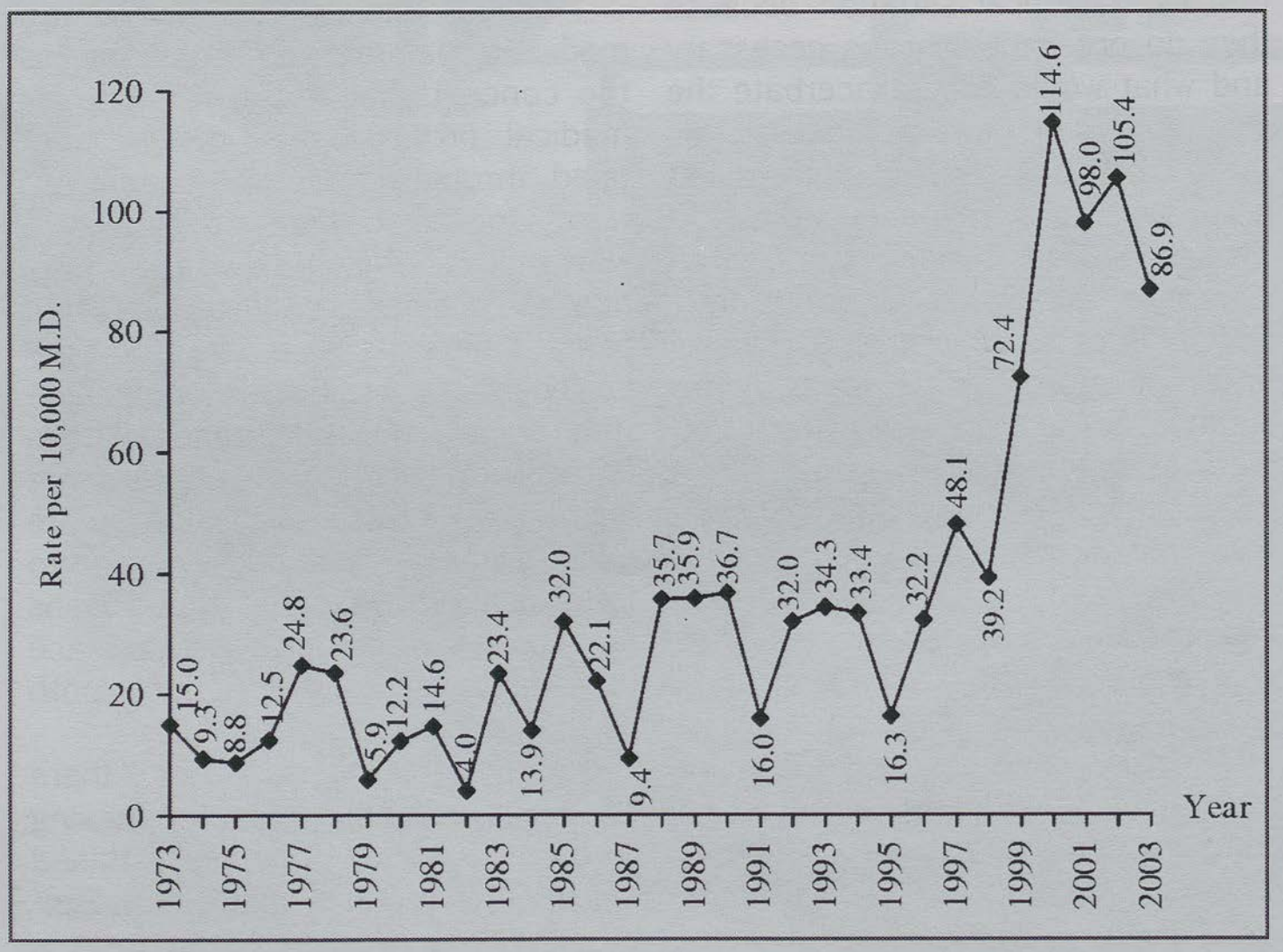
Many case studies document the medical malpractice and the compensation dissatisfied patients receive. Stephensons, a legal firm, describes on their website the story of a client whose wife died due to supposed medical negligence. The hospital was sued for £400,000 because doctors "failed to identify material changes in the echocardiogram readings, and as a consequence did not advise on the available options and complications that could arise." However, not all medical malpractice and negligence cases end in this fashion; roughly 10% of malpractice cases are litigated; the rest are never even taken to court.

One striking concern with medical malpractice litigations is the concept that mistakes made by medical professionals can be rectified through monetary compensation. One case study describes a woman with spinal damage, who, due to surgical complications, had to have her legs amputated. She received about £65,000 in compensation, but the question remains: does this money succeed in replacing her legs? Body parts and money are not equitable. This money can go towards therapy, or prosthetic limbs but it cannot account for or replace the well-being of the patient, both psychologically and physically.

In the United States, there are three primary bases for making medical malpractice claims. Based on the Hippocratic Oath, a hospital or doctor is required to treat a sick patient; if they fail to do so,

they can be sued for negligence. Similarly, the doctor or hospital fails to provide a satisfactory standard of care, they are liable. The third and most crucial basis for making a medical malpractice claim is when damage is caused. In other countries, the bases for liability claims are nearly identical. For example, in Germany, the most common reasons to make a medical malpractice claim are wrong diagnosis, defective treatment, wrong medication, lack of disclosure, and damages/losses suffered. Usually, a refund of the cost of treatment, rehabilitation or long-term care is awarded in a medical malpractice case.

Today, medical malpractice litigation is sometimes used by opportunist patients seeking monetary gain. Patients enlarge and dramatize small mistakes made by the doctor, in order to claim benefits and compensation. However, this presents an enormous challenge: how can legislation determine which cases are legitimate and genuine, and which are over-exaggerated? Because doctors can be penalized for the smallest of mistakes, they need medical malpractice insurance, which is extremely expensive. As a result, they must raise their fees, making it increasingly difficult for patients to afford basic healthcare. ■



RATE OF MEDICAL MALPRACTICE CASES FILED WITH THE THAI MEDICAL COUNCIL, 1973–2003 SOURCE: THAI MEDICAL COUNCIL)

PHARMACEUTICAL COMPANIES

In today's world, businesses have more power and capital than ever before, and large pharmaceutical companies are highly scrutinized within the field of bioethics. Many are skeptical of the profit-driven corporations, and worry over companies putting profit over curing and helping patients. These companies are using human test subjects, a topic that has come under close moral and ethical examination.

Using human test subjects is a controversial issue because even though the subjects have some idea of the risks they will be exposed to, they can never fully know the side effects of the drug they're taking if the said risks are not advertised by the company. An advertisement from a major United States pharmaceutical company, Parexel, was aired in Britain in 2006 and it publicized an opportunity for healthy volunteers to participate in medical testing. The ad stated almost nothing about the risks of the drug, but stated almost all the positives: good pay, free food and medical care, and "plenty of time to read, or study, or just relax, with digital TV, pool table, video games, DVD player, and free internet access." This is hardly the type of advertisement that conveys to the viewer how serious the effects of a drug can be. Six of these British subjects, who were healthy men, ended up in the hospital in critical condition. They experienced acute organ failure and had agonizing pain after being exposed to a substance that was supposed to work against some cancers. Many doctors were outraged that the study even took place after both animals and humans had experienced the same life threatening symptoms when testing similar substances earlier.

Another problem associated with human drug testing is the process of selecting those who are tested. Nowadays, many of these tests are conducted on people below the poverty line. These people are poor and willing to submit themselves as experiment subjects, even if it means putting their life on the line. In the U.S., medical testing has become a multi-billion dollar industry, leading to the following question: is it acceptable to make a profit by playing with people's lives for the advancement of science?

Pharmaceutical companies in the United States have to abide by the guidelines and regulations set and enforced by the FDA (Food and Drug Administration). This is meant to protect both the quality of the drug and the consumer. However, the FDA can sometimes be "cozy with drug companies", as Senator Chuck Grassley of Iowa claims. For example, in 2000, the popular Vioxx pill, an anti-inflammatory drug for chronic pains like arthritis, was shown to cause heart problems. The FDA did not immediately take the

drug off the market, but instead changed the funding plan for drug companies, so that they were required to spend more money on hiring drug researchers rather than researching the flaws and limitations of the drug itself. As a result, the problems and side-effects of Vioxx were not identified or fixed for another four years. Meanwhile, the FDA claimed that the side-effects caused by Vioxx were not dangerous enough to merit discontinuation of the drug. However, eight years earlier, a popular allergy medicine was suspected of causing heart problems similar to those caused by Vioxx. The company that produced the drug researched its effects, and pulled it off the shelves. Dr. Jerry Avorn, a professor at Harvard Medical School and the author of "Powerful Medicines," said, "This is not just about dollars. It's a cultural issue in which the agency feels it can't pressure drug makers [to pull it off the shelves]."

Not only are the drug companies reluctant to get rid of potentially harmful drugs, but they are also hesitant to produce drugs for people with rare diseases. One can only assume this is because of the small patient population; if fewer people suffer from the disease, fewer will buy medicine for it, and there is less potential for profit. However, in 1983 the U.S. passed the Orphan Drug Act, which is meant to encourage drug companies to create medication for 'orphan diseases' (An orphan disease is defined as a rare condition that affects less than 200,000 in the U.S.) These companies are allowed to sell the drug without competition for seven years and may get clinical trial tax incentives. The European Union (EU) has enacted similar legislation in which companies that develop pharmaceuticals to treat rare diseases are given tax breaks and federal protection. The EU's definition of an orphan disease is wider than that of the USA; covering not only diseases with small patient populations, but also some tropical diseases that are found primarily in developing nations.

Finally, there is the issue of the price of pharmaceutical drugs. The costs of medicinal drugs have skyrocketed in the last few years, making them too expensive for some patients to buy. The pricing of drugs is primarily based on how much they cost to manufacture. Thus, the most effective ones are also the most expensive. In 1999, it was estimated that America spent over 20 million dollars on research and development of brand name drugs. These high production costs make it increasingly difficult for patients to afford medication they need to alleviate pain and even extend their lives.

Pharmaceutical companies often allow money, rather than ethics, dictate how they manage the drugs they sell. This is an enormous dilemma, as the influence of drug companies impacts more than just business; it affects human lives. ■

PATENTS

During the past few years, there have been many disputes over whether patents on pharmaceutical drugs are necessary or productive in today's world. Pharmaceutical companies use patents to protect their discoveries in the research and development of medicines, but today, patents are so wide-spread that the global pharmaceutical industry has reached a state of conflict. Many researchers and economists believe that patents help cover the exorbitant costs of developing drugs, and argue that without these patents, a company whose innovation leads to a breakthrough will not have time to recuperate and regain the monetary cost factors of research before other companies take advantage of the new information. On the other hand, companies can exploit patents by using them to create monopolies and raising drug prices. The use of patents raises many global issues, both in the world of finance and in medicine.

When an inventor or scientist patents their creation, they are given exclusive rights to the product and no other company or individual is permitted to recreate, use, sell or import it for twenty years. Patents allow the inventor to cover the cost of the research and still make a profit. This profit acts as an incentive, and encourages investors to allocate funds for the development and improvement of patented drugs. Not only is the patent holder rewarded for his or her hard work but funding for research becomes more easily obtained so progress and innovation are promoted.

However, the process of patenting a drug is neither easy, nor short. In the United States, a drug must first be approved by the Food & Drug Administration (FDA), tested for adverse side effects and put through several trials before it can even become a marketable product. The process itself can take up to ten years, which means that the drug companies are left with very short patent lifetimes in which to profit from their investment. The amount of research and money that goes into the creation of medicine is so exorbitant that pharmaceutical companies and researchers are dependent upon patents to make even a small profit. As the prices of manufacturing rise, so do the actual drug prices. When the patent on a drug expires, any pharmaceutical company can then manufacture and sell that drug. Since the drug has already been tested and approved, the price of simply manufacturing the drug becomes a fraction of the original cost of developing it. By the end of the year 2009, brand pharmaceutical companies will have to defend numerous patent challenges, and popular drugs such as Zyrtec and Clarinex will lose their patents, facing competition from manufactur-

ers of generic drugs over their highest grossing drugs.

Some people believe that legalizing perpetual patents would increase the quality and profit made from approved drugs. Others contest that competition is necessary to keep prices low and to encourage progression and improvement. Perpetual patents would never end, and would allow the holders to keep their competitors at bay and focus exclusively on enhancing their product. While this is undoubtedly profitable for the patent holders, perpetual patents would give companies monopolies on certain drugs and would prevent some companies from using information discovered by others and improving upon it. Scientists use previous knowledge as a platform to make new discoveries. For example, atom theory was reworked and added to by many scientists from Democritus to Rutherford to Bohr; perpetual patents would foster not only a hoarding of profit, but also a hoarding of information. This would hinder the speed and progress of research. Also, if one company controlled a drug completely, it could increase the price at will without other companies to compete against.

Regular patents are significantly less controversial; most people recognize the advantages of some protection and reward for the innovators without completely ruling out any competition. The single best selling drug in the world is Pfizer's Lipitor. It is a cholesterol-lowering drug and a member of a class of drugs called statins. There are at least seven other statins on the market, all patented, including well-known drugs such as Crestor and Zocor. There are also several classes of drugs for lowering blood pressure, including beta blockers, ACE inhibitors, and angiotensin II inhibitors. Just within the ACE inhibitors, there are no fewer than nine marketed drugs all of which have or had patent protection. Medicine for cholesterol and blood pressure are but two examples that show that patenting does not put complete restraint on other companies, and leaves the market open for competition.

There is also a concern with patents that some pharmaceutical companies use a legislative loophole to maintain their monopoly on drugs. During the time a patent is active, the patent holder can continue developing their product. After the term expires, they can then reapply for a patent for the same product but with minor adjustments from the original. Companies also frequently withhold patented information from the public until they predict the demand for the product would be most profitable. This is a source of worry because it shows that companies would let the sick suffer without necessary medication just so that the drug can be released at a time most optimal for them. "We must put an end to a tug-of-war that repeatedly threatens the source of medical progress," says Miles White, chairman and CEO of Abbott Laboratories. He was quoted

when defending the benefits and restrictions of the patent system.

Patents assist industrial growth and encourage the development of new drugs. However new patents catalyze price increases of newer drugs, and are therefore unavailable to poorer or developing nations. The right of corporations to withhold information can result in the loss of many lives, as there are countries that are unable to obtain a license for the domestic manufacturing of certain drugs, reducing the availability of necessary medicine. Developing countries are also unable to obtain the medicine they need because of the high prices pharmaceutical companies impose on the export of their patented products.

There are real obstacles because of the patent system and solutions are being sought to make it more effective. President Barack Obama comments on reforming the United States Patent System. By "Giving the USPTO [United States Patent and Trademark Office] the resources to improve patent quality and opening up the patent process to citizen review," he continues, "will reduce the uncertainty and wasteful litigation that is currently a significant drag on innovation."

Time is running out on the global patents for many of the most popular brand-name drugs. Unless these original, strict dates are somehow extended, over the next several years, generic versions of many well-known best-selling drugs will become available. Patents for many drugs will begin expiring at a rapidly in 2010 and will continue to expire for the next few years. Drug companies, faced with increased competition from generic drugs, financial issues, and the international demands will start to develop new pipeline drugs and devise new strategies to hold onto sales for drugs that are close to expiration. Although this expiration is of concern to pharmaceutical companies, progress can accelerate and prices can fall once a patent ends, both of which are beneficial for potential recipients of said drugs. ■

ORGAN ALLOCATION

When a healthy human being dies, their family has the option to donate their organs to others whose organs are failing and need replacements. Although the families may choose to donate the body parts, they have almost no control over who gets them. Organs are distributed based on how critical the situation of the receiver is, the location of the donor and receiver, and the medical history of both. After all these criteria have been considered, there is one last thing: first come, first serve.

In the USA there are about one hundred thousand people waiting for an organ.

The 'first come, first serve' system is commonly used in medicine, but when allocating organs, some cases must have take priority. For critically ill patients, an immediate organ transplant could be the difference between life and death. Those who typically have priority are patients waiting for heart, liver, lung, or intestine transplants. After the priority cases, the organs go to people who have registered at a hospital and are on the waiting list.

In some countries the process of organ allocation is long, complex, and strictly regulated while other countries try to keep their system simpler and freer. A patient in England must first register with the National Transplant Database in order to be considered for an organ transplant. Then, decisions on which patient to give an organ to are based on regulations developed by medical professionals, in consultation with health professionals, the Department of Health and special advisory groups. Other standard factors such as blood type, age, and size are also taken into account and used to find the best match for the recipient. In China, on the other hand, there is no national database or waiting list for organ allocation. Instead, hospitals draw up their own lists of who needs an organ, and then try to procure the organs themselves. Transplant centers are free to share organs amongst each other, and such trades are usually caused by need and surplus. Although organ allocation is not widely practiced in China, a survey was conducted and found that over 70% of young adults thought that organ donation was beneficial, and that they would consider donating an organ.

In organ donation, age is an important factor, and there has been widespread debate over who should receive the organ—the adult who has to take care of their family, or the young child with their entire life still in front of them? On one hand, a child can live a full and normal life with an organ transplant and children often have higher survival rates. For example, a child who needs a kidney transplant must be constantly connected to a dialysis machine, which functions like a kidney. Because of this machine, the child cannot attend school and lives a restricted life. Adults on the other hand, are generally in more critical condition than children and oftentimes, have a family to provide for. If they have children to support, mortgages to pay and bills piling up, they need a transplant to continue working. However, adults have sometimes poisoned their own organs by smoking, drinking, and abusing drugs whereas young children have had no part in the failure of their organs.

The efficiency and method of allocating organs affects hundreds of people, and can determine for a patient, the difference between life and death. In one case, three children were born to two parents and each of them had cystic fibrosis. In 2007, their son, aged 18, died while waiting for a lung transplant, and only a year later, their daugh-

ter died at the age of 16. She was scheduled for a transplant operation in only a few weeks. The couple's oldest and last son is still alive, but without a transplant there is a good chance that he too will die. As of right now, organs are donated, based on location and the urgency of the situation. In the U.S., the Clinton administration sought to change this, by making the organs be donated based on need rather than location. However, even with these reforms, the debate over organ allocation is still heated. ■

POPULATION CONTROL

The past century has witnessed marked changes in the global demography as a result of improved public health. Infant mortality rates have been reduced by 60% over the last 40 years and life expectancy has risen from 46 years in 1960 to 53 years today. As a result, world population has increased exponentially to six billion and is expected to rise to about eight billion in 2020. However, innovations and alterations in public health standards have also negatively impacted the planetary ecosystem and the biosphere. These problems include but are not limited to rapid exploitation of the quantity and quality of food and water as well as dangerous levels of atmospheric pollution.

The debilitating effects of rapid population growth have made population control efforts ever more crucial. These involve government programs used to limit or slow population growth. Some strategies include birth control, raising education levels and awareness, using contraceptives, and promoting economic incentives. Such interventions have shown to decrease maternal mortality rates and the number of unwanted adolescent pregnancies whilst promoting gender equality rights and curbing overpopulation.

Methods such as abortion terminate pregnancies whereas the pill, hormone implants, intra uterine devices (IUDs), condoms and sterilization prevent them. That being said, the most absolute way to avoid unwanted pregnancy is abstinence; its importance was highlighted in 1997 when the Abstinence Education Program was established in the USA to educate young Americans. Educating the youth about methods of population control would lessen the number of unwanted pregnancies among teenagers. Moreover, research has shown that women with more education usually have their first sexual experience later, are more likely to use contraception, marry later and desire smaller families.

Although population control can involve measures that improve people's lives by giving them greater control of reproduction, stabilization of the world population stimulates debates of moral, ethical and religious dimensions. Consequently,

many people remain hesitant to use contraception or to limit their family sizes. One of the principal reasons for this attitude is certain individuals' religious beliefs that encourage them to have large families and to refrain from using contraception. It is feared that a reduction of family size could have an impact on cultures.

Despite the female empowerment characterized by birth control, some argue that those responsible for making the decision or undergoing the abortion have to carry an unfair burden. Additionally, some societies feel that their freedom has been curtailed as the government intrudes on private lives. Others feel that population control methods such as medicinal interventions for women and abortion are cruel. Such opinions arise from the possible abuse that population control may lead to, for example, there have been many cases when sterilization was performed on women without their consent, thus rendering them incapable of having a child. These mishaps in methods of reducing population have impacted women in several negative ways. In China, where the population has been skyrocketing, some women's menstrual cycles are monitored with an eye on abortion. Some argue that such interventions are harsh while others say that they are needed in the world.

Moreover, China's one-child policy permits one child to be born to a household in urban areas, and two in rural areas. This policy has been very controversial since its implementation in 1979. Although it helps control population growth, it takes away the freedom to have as many children as one wishes. Also, female babies are most often the ones who are given up for adoption, aborted, or even victims of infanticide resulting in a disproportionate ratio of boys to girls. These and other consequences, which include an aging population and an increasing number of young males potentially unable to find brides, have forced China to reconsider and possibly reverse the one-child policy. Some population control programmes have ignored the wider needs of women and the coercive practices involved have led to distrust in family planning. In the 1950's, India, the first developing country to adopt population policy, over-emphasized demographic targets and 'contraceptive acceptance rates'. Later, in the 1970's under Indira Gandhi, more coercive methods were pursued. In their "Fertility Control and Politics in India" research paper, Panandiker and Umashankar stated that "the government focused almost entirely on use of sterilization to reduce fertility; IUD and condom use showed little increase". Pressure on health workers to meet the overzealous sterilization targets resulted in the falsifying of reported figures, along with widespread discontent and violence among the public. Consequently, Gandhi's party lost the subsequent general election in 1977. The Janata Party that came to power swiftly instituted a voluntary popula-

tion control policy.

Individuals have the right to freely and responsibly decide the number and spacing of their children and to make these decisions free of coercion or violence. This makes educating the youth about their rights and choices increasingly vital. Moreover, rather than placing blame on one another with regards to population issues, nations should examine their own behavioural patterns and make necessary changes following thorough evaluation of intended programs. Although it is essential to have improved standards of living, without careful consideration and coordination it would cause unrestrained population growth or unpredicted consequences. ■

EDITORIAL: FOR UNIVERSAL HEALTHCARE

The current period of economic uncertainty has led to drastic increases in unemployment rates. Consequently, fewer people can afford private health insurance and the universality of healthcare has become a markedly pertinent issue.

In fact, a recent article from CNNHealth attributed 65% of all bankruptcies in 2007 to increasing medical costs.

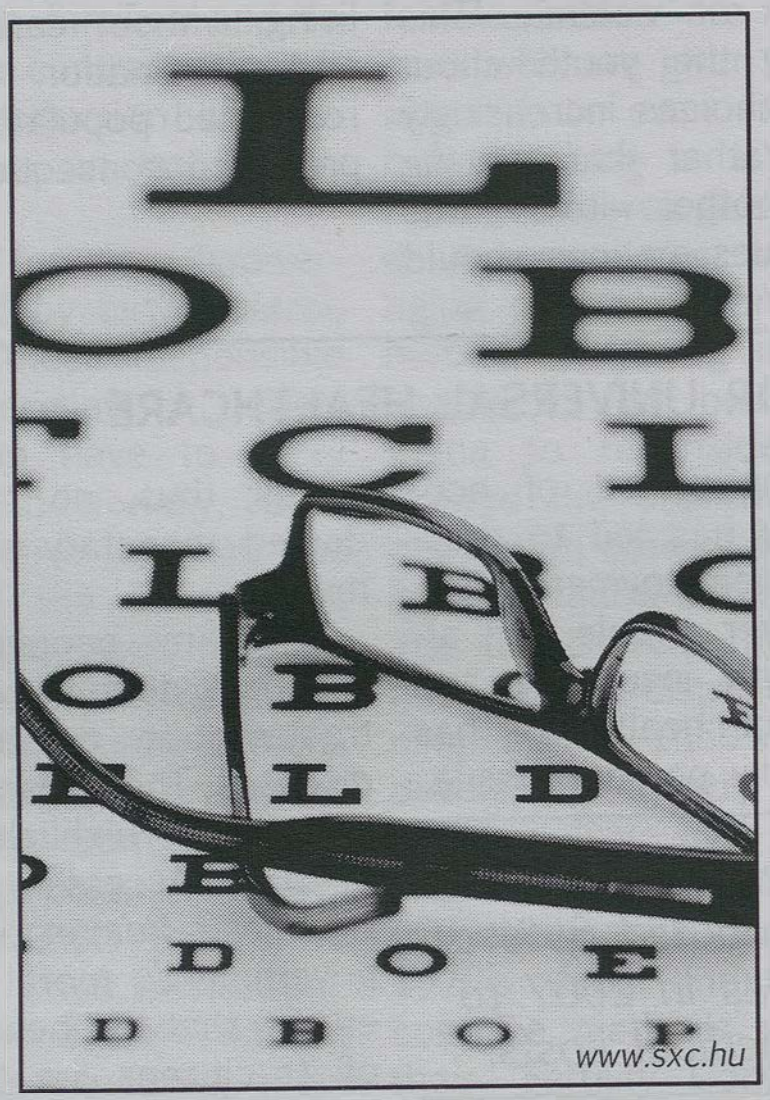
One may then ask, "What can be done to ensure that all people have access to adequate healthcare?" The answer: universal healthcare (UHC).

UHC is generally publicly funded and administered by local governments. Such systems can be either completely socialized or comprised of a combination of government and insurance-based support. As suggested by its name, this form of healthcare is available to all residents of the country, regardless of their socio-economic or employment status; thus, no individual can be denied monetary support for treatment.

Many people are unable to secure a doctor's visit or a specific treatment for curable infections and diseases. The consequent and avoidable deaths highlight the importance of UHC. Access to good healthcare is a basic human right and it is the government's moral responsibility to ensure that the health and wellbeing of its citizens are taken care of to the best of its ability. In order to accomplish this, a universal healthcare system is essential to provide every citizen with acceptable, affordable healthcare.

Thomas Jefferson, the third president of the United States and a co-author of the Declaration of Independence, famously underscored that everyone has a right to health care, "Equal rights for all, special privileges for none." If this is the case, then how can the US still continue with a privatized system that denies its citizens the basic right to

accessible healthcare? More importantly, the quality and cost of one's healthcare should not be based on one's monetary assets or susceptibility to illness. Rather, equal healthcare should be provided simply because it is the right of each individual. These arguments are exactly what mold the premise of President Barack Obama's argument for the implementation of a universal system in the United States, where 47 million people do not have access to healthcare.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A crucial difference between privatized and universal systems is their respective philosophies and approaches towards healthcare. A universal system prioritizes the patient's health whereas a privatized system is comprised of insurance companies whose main aim is to make a profit, run a good business, and provide benefits to their investors. The universal system reduces the incentive of making profit through wide-spread healthcare. This means that instead of investors, it is the people who are involved in the rounding up of their country's patients and residents who are paid well. As a result, less of the industry's money is used to compensate shareholders and award insurance company executives their bonuses.

Additionally, UHC enables more efficient and effective diagnosis and treatment through the creation of national databases, which allow doctors to access a person's medical records with permission. A database also gives scientists the opportunity to analyze a larger sample size and a broader data range so that they can conduct medical research with greater accuracy while working effectively to find solutions to current health problems.

The benefits of UHC affect not only residents of the country, but also businesses and the entire economy. At present, company-provided health insurance premiums in the United States are 131% higher than they were ten years ago. This means that many companies have to cease offering health insurance or even lay off employees because of the limited amount of funda that

they can invest on health benefits. A universal system would help control these costs even if it is of "shared responsibility" between the government, companies, families and residents. The government support would improve the financial situation of companies by reducing costs enabling them to keep more of their employees and revenue.

The effectiveness of the universal health care can particularly be illustrated when juxtaposing the current healthcare system in France and the former one in the Unites States. The US, under its privatized healthcare system, spent 16.5% of its GDP, whereas France, with universal healthcare system, spends 10.7% of its economy. According to the WHO, in 1999 the US ranked 37th for its "overall health system performance" while France ranks first. Moreover, in a survey taken in 2000, it was found that only 40% of American citizens, as opposed to 65% of French citizens were satisfied with their health system. These figures provide evidence that a universal system is relatively more successful than a privatized one. France has been able to attain healthcare goals to a higher standard and level of satisfaction with a lower economic cost than the US did. This notion has been further buttressed by the fact that most industrialized countries today already use universal systems. The immense support for universal systems persists and rises because it values human lives over businesses, an attribute that is reversed in a privatized healthcare system. ■

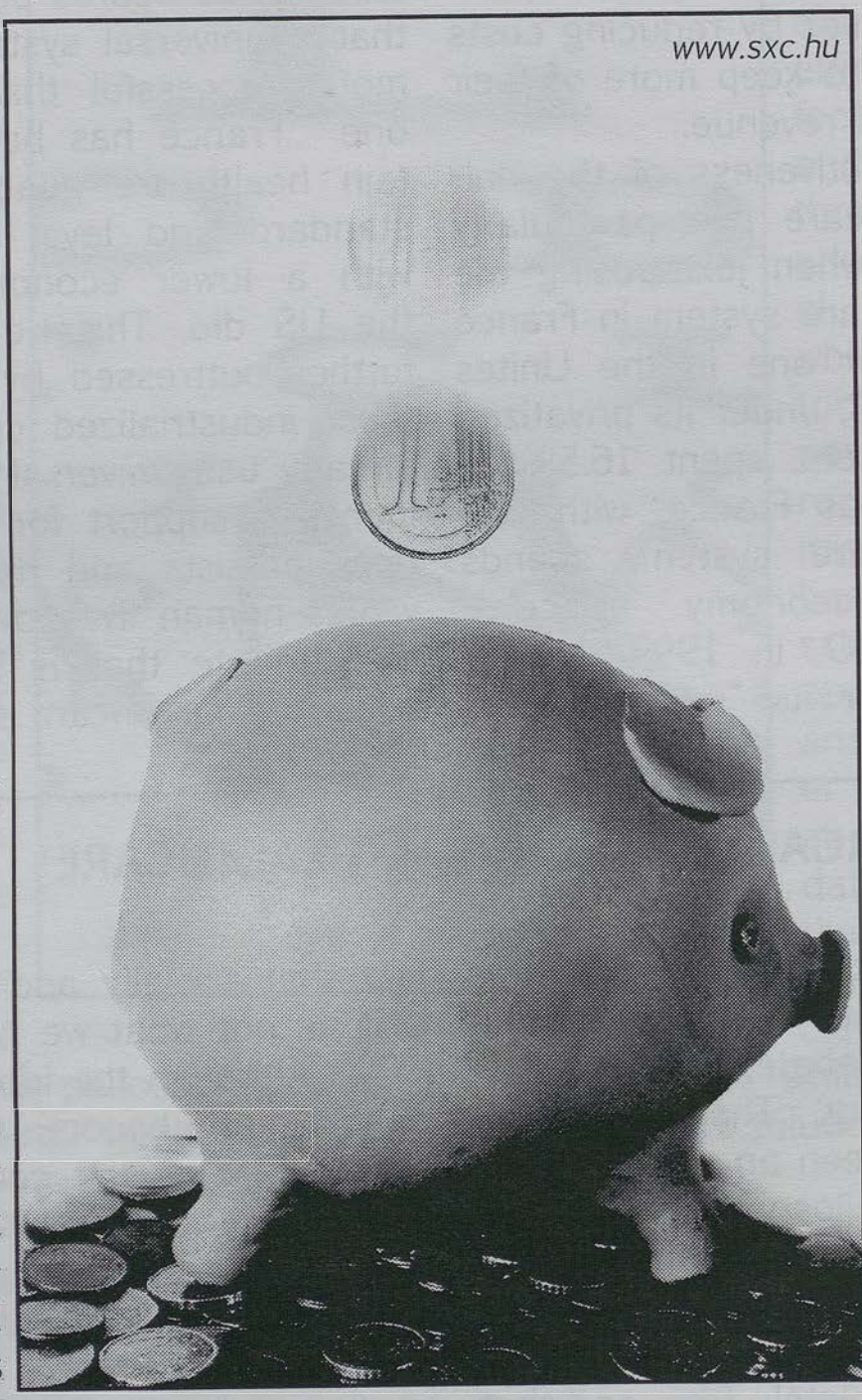
EDITORIAL: AGAINST UNIVERSAL HEALTHCARE

In recent times, UHC has become a contentious topic and brought much debate, but very little analytical thinking. The controversy over UHC has been an argument for or against its philosophical ideology, instead of a dispute strictly about the facts. If it was a fact that every person has the ability to receive medication completely free, and that the world's governments would have enough money to fulfill the people's needs, I would embrace UHC with open arms. Although this is the general concept of UHC, it is not reality. The evidence demonstrates the fact that socially and economically, UHC is not what we need.

Although the idea of UHC has only recently become popular in the eyes of US, many countries in Europe, such as the UK and France, have utilized the system for decades. However, contrary to what UHC supporters like Michael Moore would have you believe, the system has countless flaws. In the British UHC system, named the NHS (National Health Service), there is constant frustration about the commonly long waitlists. One wait list made 230,000 people wait eighteen or more weeks

for hospital treatment. Another wait list had seventy two percent of disabled children wait three to six months for an electric wheel chair. In an Internet poll conducted by the BBC, people were asked to comment on their opinions of the NHS. One individual stated that his father had to wait two years for a surgical procedure under NHS care, while he only waited six hours for the same procedure under the care of a private insurer. More evidence demonstrating that privately owned insurance companies work more efficiently is a statistic from 2005; forty one percent of British patients waited four months or longer for elective surgery. In contrast, less than ten percent of Americans under the care of private insurance companies care, had to wait this long. If the idea of UHC is for the people, why is it that the people have to wait that long for the government to act?

Another country that has used UHC for a lengthy time is France. Although the French government loves to boast about inexpensive prescriptions and hospital visits, they do not publicize the low wages some highly qualified doctors receive at their clinics. It is troublesome that these physicians earn approximately a third of what doctors in the US receive. The reason for this disparity is that government-run insurance establishes a national fee schedule, which sets the amount of money a doctor receives after treating a patient. The standard reimbursement for a routine check up gives a doctor less than €50, with salaries remaining low, around €40,000 a year, compared to the average American doctor, who makes around €101,000. If the French government funds their



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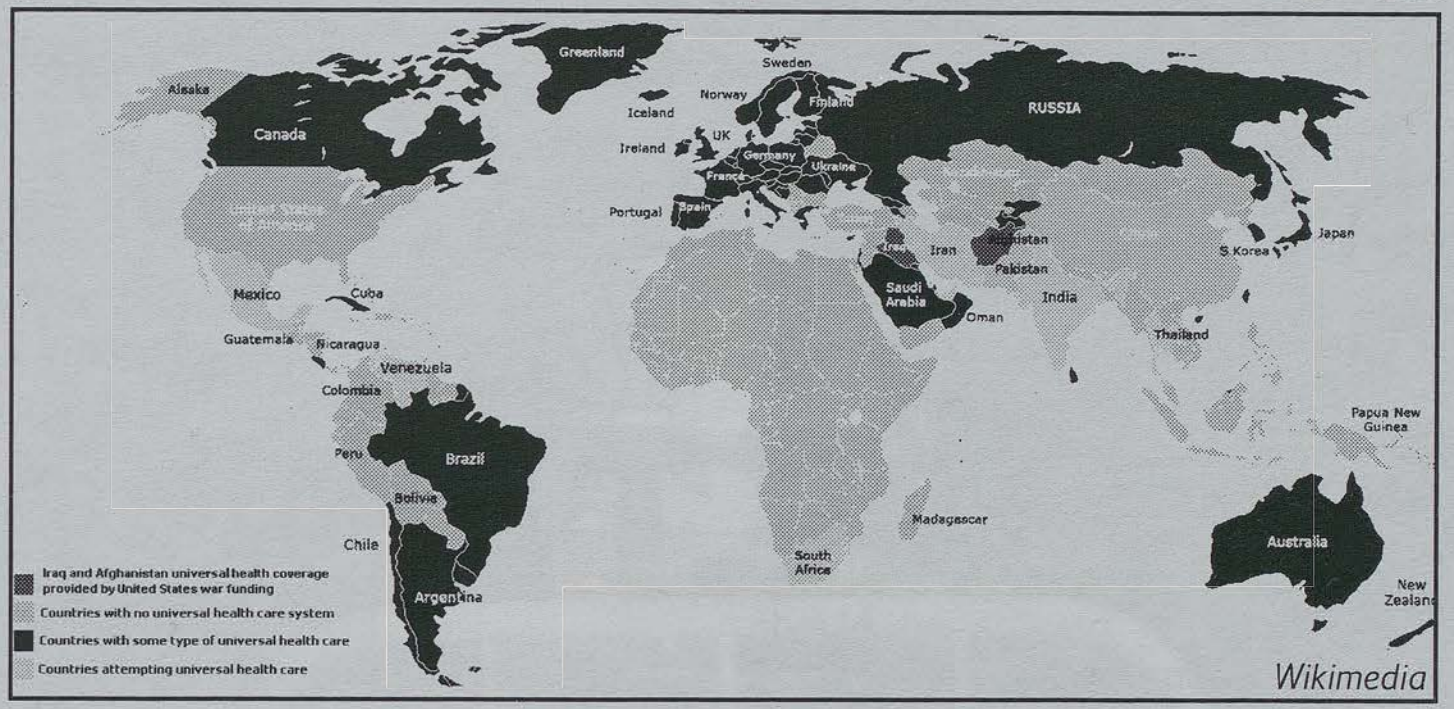
UHC services as well as they claim, shouldn't the doctors who are saving lives be better compensated?

Another of the so-called perks of UHC is that it is "free"; yet the system, when looked at more closely, is far from free. Citizens must pay extra taxes to fund the systems. For example, the NHS charges individuals an 11% tax for its services on any weekly income higher than £84. Although this may seem very cheap, think about all the ridiculously long wait lists. In France, people have to pay more than one fifth of their salary for a social security tax, including mandatory and supplemental health insurance and retirement benefits. These taxes, as high as they are, don't seem to be enough for the UHC systems to run. This is shown blatantly by the French health care deficit of 49 billion Euros after the government created cost efficient targets. One reason why there is such a large deficit may be purely psychological. If a person knows something is free, they use it much more than if it costs them something. The cost cuts have hit UHC systems all over Europe. An example of this is in Switzerland, where government hospitals have had to lose beds and merge hospitals to support themselves, directly drawing the taxpayers into a vicious cycle.



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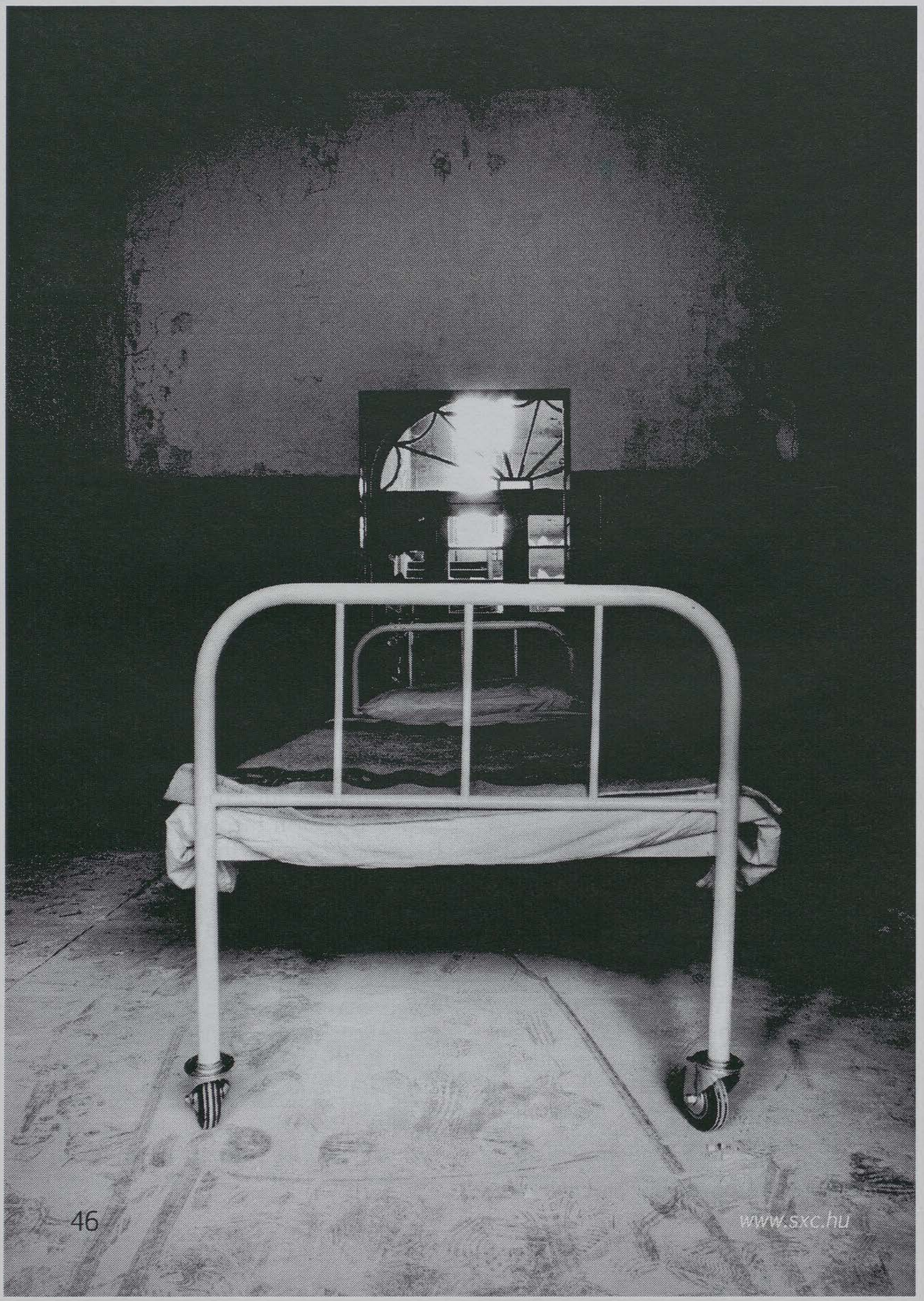
Although universal healthcare is a seemingly attractive system, it only works well in theory. Conceptually, no one pays for the service, but the practicality is that citizens must pay huge, crippling taxes. Theoretically, these taxes would be enough to sustain the system, but in reality, the number of patients walking through the hospital doors creates huge deficits. These deficits make it harder for hospitals to care for all the patients and hire qualified doctors. ■



CHAPTER 4 CONSENT

CONFIDENTIALITY

With advances in medicine augmenting at lightning speed, society is now facing a much bigger challenge in keeping medical records confidential. In the United States, the Privacy Act, passed in 1974, is outdated and unable to keep up with new discoveries in science, and the dangers that accompany them. The release of medical records, which involves breaking confidentiality agreements, is sometimes considered necessary, but is not entirely ethical.

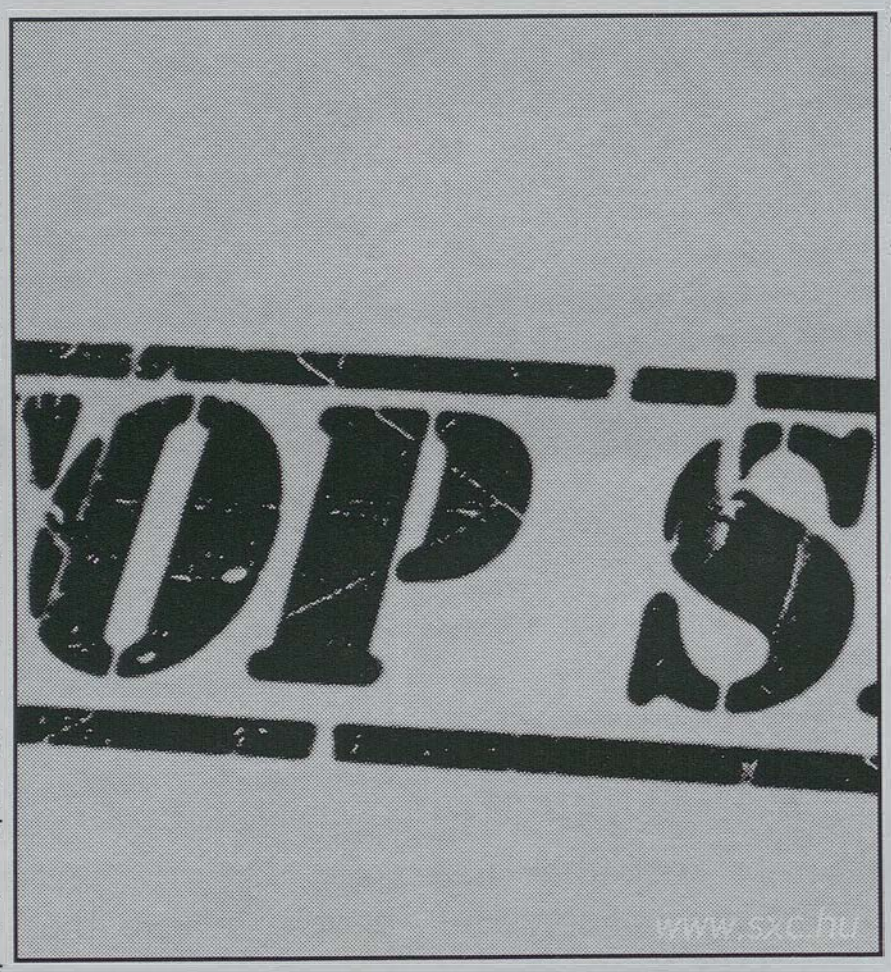
Good patient-doctor relations are essential to ensure productive medical visits. Breaches in confidentiality can severely inhibit these relations, as trust is crucial between doctors and their patients. To cement this trust, doctors are required by most countries to keep their patient's medical history private. Unless under dire circumstances—for instance a case in which a murder has been committed and the medical records are necessary as proof to convict the culprit—the medical records stay between the doctor, the patient, and whomever the patient wishes to share them with. However, computerized patient records have greatly endangered this fragile connection because of hackers, viruses, and other threats to privacy.

There are many arguments as to whether or not the government should be allowed to access medical records. Since the Privacy Act of 1974, anyone who wants access to the records must receive written consent from the patient. Still, many who are against sharing these records believe that the aforementioned patient-doctor relations are uninfringeable and should not be tampered with by anybody, including government organizations. Also, it is argued that the patient should be able to make the decision of whether or not the government should have access to their records. This would entail a much more complicated system, however, so most concede, and believe that the government should either have total access or none at all.

On the other hand, some people believe that the government should have full access to the medical records of its population. They argue that the government should not have to share their reasons for needing the records or need the patient's permission, because ideally they won't be using the records inappropriately. Certain disclosures of medical information are considered necessary. For example, when a patient is handicapped in speech or expression and there is a need to notify family members and spouses.

Similarly, in crime cases such as a murder or assault, medical information might be vital in indentifying the perpetrator.

In certain situations, the decision to breach confidentiality is a difficult one to make. However, in the end, it is a shared decision made by the patient, the doctor, and in some cases the government. Breaching medical confidentiality can be done if there is a credible threat of significant harm to an identifiable third party, and although it is not always ethically acceptable, it is sometimes necessary. Compromise between parties is essential in the making of these decisions. Some say, for example, that if a patient is considering getting married or having sex, their partner or spouse to-be should be able to access their medical records directly from a doctor, in order to eliminate possible sources of fraud. This would limit the spread of sexually transmitted diseases such as HIV/AIDS, oral and genital herpes, gonorrhea, syphilis, chlamydia, and more. It is arguable that in such cases, it is necessary for the health of the human race to breach confidentiality and share medical records, even if the patient won't want to share their medical history.



Another issue entirely is whether the law should be changed in order to allow the contravention of medical confidentiality. Current laws seem satisfactory: if the record is needed by the government for a legitimate reason, express handwritten permission from the necessary party should be required in order to access it. However, if the party is incapable of giving such permission for whatever reason, a predetermined second party should be responsible for the decision. This choice should be made beforehand to prevent any objections. Confidentiality is a controversial issue concerning a patient, doctor, and sometimes the government. Morality, integrity, honesty, and respect face off with duty, justice, and health. In the end, the decision to breach medical confidentiality lies with those who are directly concerned with the situation. ■

ABORTION

Abortion can be defined as the termination of an unwanted pregnancy by removal or expulsion of the fetus or embryo from the uterus. As a matter that pertains to human rights and human existence, abortion is a controversial subject. The human rights involved include the rights of women to control their own body and the unborn child's right to live. The line drawn between the two is fine and volatile; the time at which a fetus is considered a living being is highly debatable.

Many women, especially in the U.S., do not disregard the development of the fetus as a factor in their decision to get an abortion. For example, the developmental factor of a fetus is relative: according to a Senior Lecturer at Harvard Medical School, Daniel Callahan, the fetal age correlates positively with the value of its life. Nonetheless, there has yet to be a clear definition of the stage at which a fetus may be considered a human being.

Beyond disregarding the rights of the fetus, there are many controversies surrounding other factors that could contribute to a woman's decision to have an abortion. Some examples include failure of contraceptives, congenital defects and whether the child was a result of rape. With regards to cases of rape, the Society for the Protection of Unborn Children states that it is wrong to abort a fetus because its father was a rapist—someone the mother neither knew nor cared for. Pam Stenzel, a child of rape, firmly stipulates that the rights of a child should not be violated because of the actions of the father. "My biological father is a rapist. But I am still a human being and I still have value. My life isn't worth any less than your life because of the way I was conceived. And I did not deserve the death penalty because of my father." Here the child is presented as a harmless by-product of a crime committed by the father against the mother. The mother is caught between having a child she may not love, and taking a life by aborting the child she was forced to be impregnated with.

This gives rise to views that abortion should only be performed for therapeutic medicinal reasons. Such reasons include saving the pregnant woman's life, preserving the woman's physical and/or mental health and avoiding a newly born having a potentially fatal congenital disorder. Consequently, a request for abortion on the basis of elective reasons is frowned upon, that is for reasons other than for the improvement of maternal health or the eradication of fetal disease.

Proponents of abortion bring to light cases where the child may have a debilitating congenital defect. Children with crippling defects who are not aborted may possibly be

subjected to a life of suffering, sickness, and misery. Additionally, the dearth of parents' substantial finances may be an adversity when paying the medical bills for costly treatment of their child's genetic defects. According to a poll taken by the National Opinion Research Center in 2006, 70% of Americans said they believe that a woman should have the right to abort a fetus if there is a strong chance of it having a serious birth defect.

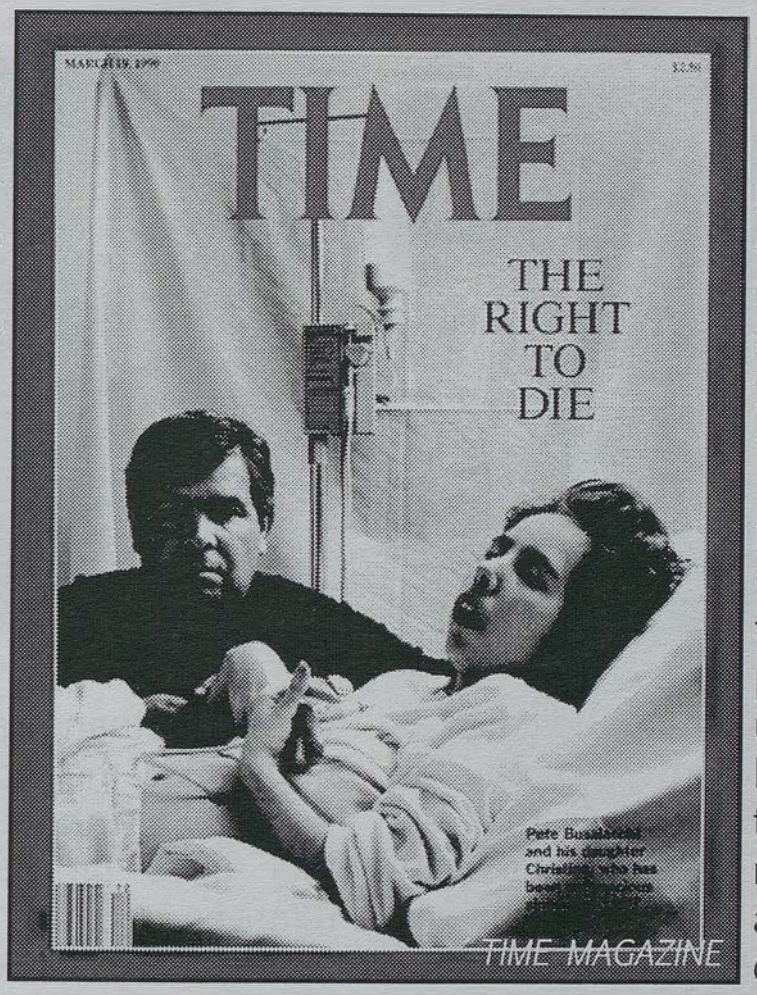
Opponents argue that abortion has led to disparities between the birth rates of male and female children in China, India and South Korea with preference to male children. Technologies such as sonography and amniocentesis (diagnosis of fetal abnormalities by extracting and analyzing amniotic fluid of a pregnant woman) allow parents to determine sex before birth which has led to sex-selective abortion, or to targeted termination of female fetuses. These are exacerbated by cultural expectations and assumptions: for instance, in India, the costs associated with dowries and a Hindu tradition, which dictates that funeral rites must be performed by a male relative, have led to a cultural preference for boys. In China, historic preference for sons persists upon the one-child policy. This has led to an increased disparity in the boy/girl sex ratio as parents attempt to outwit the law through sex-selective abortion.

Recently, there have been an increasing number of discussions on the decriminalization of abortion. The issue that follows this measure is that women will go to unprofessional 'back alley' abortionists to have their fetus removed. These operations, performed in substandard conditions, and occasionally performed by the woman herself, usually result in an incomplete abortion where sepsis, hemorrhage, and damage to the internal organs of the mother can occur. This is a huge public health issue. Out of the approximate 50 million abortions performed per year in the world, 40% are conducted illegally.

To health activists, whether pro-abortion or anti-abortion, the controversy over abortion remains sensitive and difficult to resolve. The difficulty in finding common ground between these two persists due to implications concerning religion, morality and general health, the rights of the woman and the unborn child. ■

EDITORIAL: FOR EUTHANASIA

Euthanasia has been a very controversial topic for many years. While it is very difficult to consider taking somebody else's life or assisting him or her in the process, there are many reasons why numerous people and nations around the world continue to support the legalization of euthanasia.

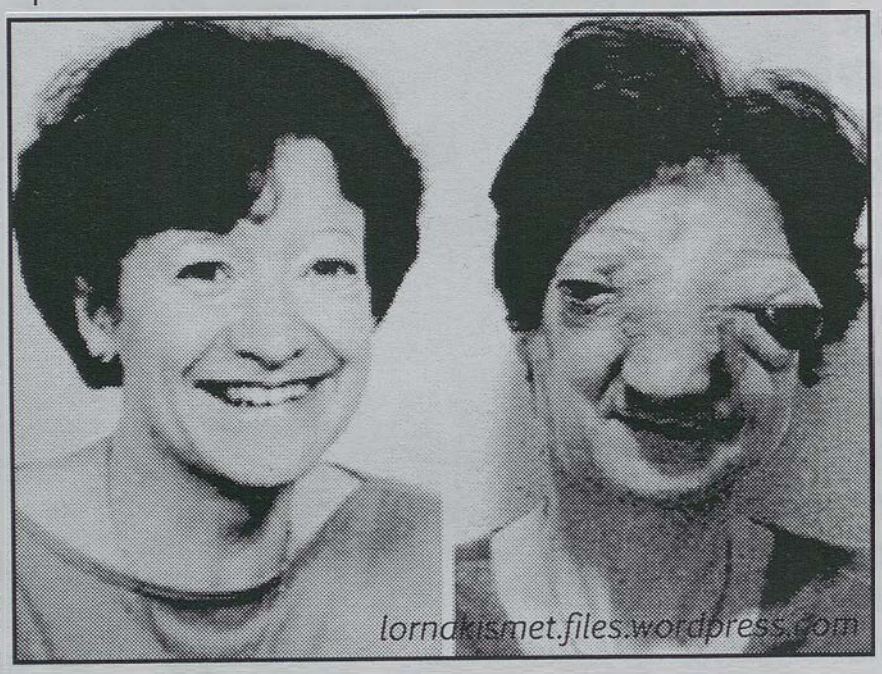


The different types of euthanasia bring to light various concerns. Active euthanasia involves a doctor causing the death of a patient through direct means after consent from the patient is given; whereas passive euthanasia allows patients to die by cessation of medical treatment that is vital for their survival, such as life support. Either way, one of the primary reasons for the employment of euthanasia is its economical benefits. Studies from 1993 showed that 15% of Medicare dollars are spent in the last 60 days of a person's life. Some of these people are in vegetative states with no chance of emerging out whole again. This implies that the demanding costs for medical treatments that serve to extend the lifespan of somebody in intolerable pain by only a few months would be better applied to surgery or medication for a person who has a greater chance of recovery.

Furthermore, euthanasia can relieve the suffering of patients with unbearable pain by giving them their deserving right to peace and dignity in death instead of prolonging their anguish. Performing euthanasia is facilitated by very efficient euthanasia techniques, such as injecting lethal fluids into the bloodstream of the sufferer. This causes no pain to the person but rather helps the individual to die a dignified, painless death. Human beings have the freedom to make their own decisions; consequently, a person should have the right to decide on the means to end his or her life.

Various case studies have illustrated the importance of legalizing euthanasia. In France, Chantal

Sebire, was suffering from esthesioneuroblastoma, a rare form of cancer which causes tumors to start in the nasal passages and eventually spread to the brain. No pain medications could provide relief from the constant pain that she endured. In addition, Mrs. Sebire felt that the pain and her conspicuous physical deformities were rapidly corroding what little remained of her "quality of life". As a result, she requested medically assisted suicide in order to end her life in dignity. She knew that she would ultimately end up in a coma and did not wish to burden her family. Despite her petition, the French government refused to change the assisted suicide laws forcing Mrs. Sebire to continue living with unbearable pain. Sarah Wotton, from the Dignity in Dying Association remarked that "it is simply wrong that terminally ill people not just in France, but also in the UK, who are suffering unbearably, are not being given the choice to die with dignity".



The Netherlands, which was the first country to legalize euthanasia in 1984, requires euthanasia to be administered only to a patient who is "in a medically futile position of constant and unbearable physical or mental suffering that cannot be alleviated, resulting in a serious and incurable disorder caused by illness or accident". Furthermore, euthanasia can only be performed with written consent from a patient who has an extremely low "quality of life" with no chance of improvement. Belgium shares the same prerequisite laws that attract patients in extremely poor medical conditions from countries where euthanasia is illegal. They hope that they can end their lives peacefully without triggering any further opus on their family, friends, relatives and any medical resources that could be better utilized elsewhere.

Euthanasia should thus be openly and objectively legalized so that people like Mrs. Sebire, who are living their life in permanent pain and have no chance of alleviating it, can be allowed to die with dignity. In this way, patients will be able to maintain and extol the quality of their lives. People deserve the option to end their lives as they wish regardless of whether they choose to exercise this right or not. ■

EDITORIAL: AGAINST EUTHANASIA

Eugenics, according to the Encyclopedia Britannica, is "the organic betterment of the human race through wise application of the laws of heredity." The purpose of eugenics is to eliminate certain racial, religious and cultural groups from the human race so that society will become more productive, attractive, and, essentially perfect. The practice of eugenics is wrong both morally and politically. it undermines the belief in human egalitarianism and consideration for disadvantaged members of society. Despite its claim to improve society, eugenics inflicts harm upon society.

The study of eugenics allows scientific selection to eliminate the weakest of mankind in order to obtain a utopian and wholly productive society. Two present day examples include "designer babies" (where parents are able to choose the genetic characteristics of their baby, from susceptibility to diseases to eye color), and abortions targeted at fetuses with genetic diseases. If eugenics were implemented throughout the world, societies would begin to view those with physical imparities, mental complications, incurable genetic diseases, and even "unattractive and unintelligent people" (who could have been 'improved' by means of various forms of eugenics) as inferior and subordinate solely due to the fact that they were born naturally without the help of genetic manipulation. Should societies choose to fully employ modern means of eugenics, the constantly reinforced belief that all human life is equal – no matter what race, gender, ethnicity– would be reversed.

Although the hypothetical future suggested above may appear to be exaggerated or unrealistic, historical uses of eugenics have proven to be just as horrible, if not worse. Some specific cases include the sterilization and denial of marriage to those with potential to transfer a genetic dysfunction. For example, the California law of 1909 required sterilization and marriage restrictions on those whom the state deemed 'unfit' to reproduce– mainly people in mental institutions.

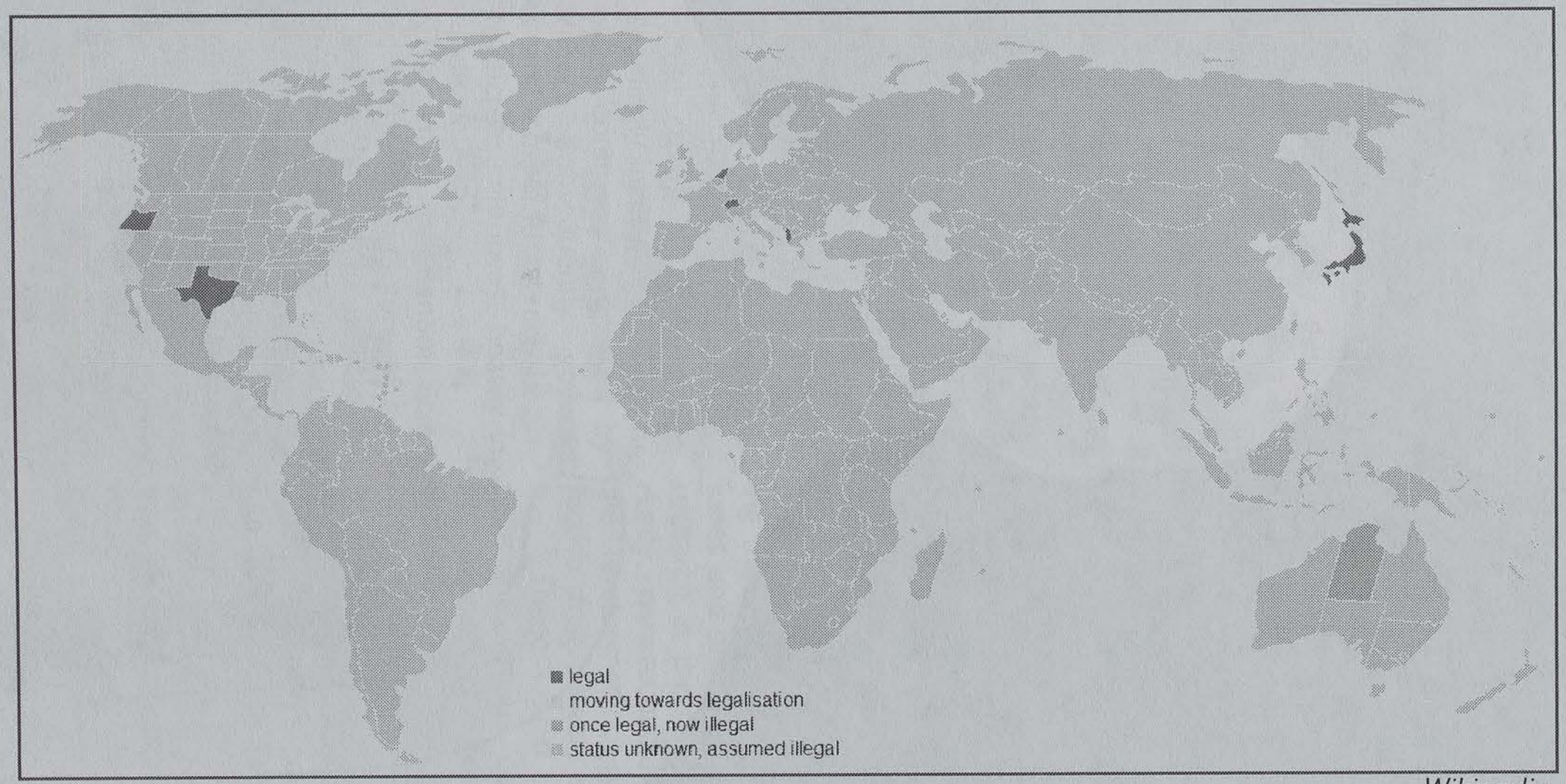
The most famous case of eugenics, where ideas of Nordic and Arian supremacy caused those who were decided 'unsuitable' to live , were to camps and slaughtered.

This is remembered as the holocaust. As a result of the law passed by the California Court in 1909, eugenicists prohibited the marriages of approximately 10,000 people, denied the victims social services, and sterilized approximately 65,000 innocent people. The target victims of this law included prisoners (as they were supposedly more

likely to produce criminal offspring) and the mentally ill. Some even went so far as to target Native Americans, African Americans, the deaf, and the blind. The state was able to do so because it was defended by the claims of famous scholars from reputable universities such as Harvard and Yale, who manipulated the race theory and science data to support their beliefs that stupidity and other negative traits are passed down solely through genetics; using statistics and lofty ideas of improving the human race.

As frightening as the California sterilizations and prohibitions may seem, they do not even compare to the horrors of the holocaust and the Nazi's use of eugenics to justify the mass genocide they committed. Under the veil of Social Darwinism (the concept that the strongest and the fittest will survive and flourish, while the weak and inefficient are bound to deteriorate and eventually die out), one of the most heinous massacres in history was carried out. Millions were murdered through starvation, gassing and raw violence mainly because on their races, nationalities, beliefs, and disabilities. What supposedly began as an effort to improve the general well-being of the German populace quickly transformed into an excuse to kill those that were 'harming' society. Gradually the citizens of Germany were convinced that to progress, they needed to rid their country of those who didn't meet a (government decided) standard. Their solution: the systematic and chilling extermination of millions of innocent people. This is evidence that what is often termed as eugenics merely masks the true face of racism and discrimination, and ultimately leads to death, bloodshed and inequality. Eugenics were to be legalized, it would mean replacing natural selection and evolution with a man-made alternative, a process that would most certainly lead to many dilemmas. One of these might be the fact that if everybody were to be intelligent, then naturally, according to the theory of 'survival of the fittest', the most intelligent people would receive the professions requiring high levels of intellect, which would leave the moderately intelligent population to perform laborious duties, instead of being able to perform well in a higher paying line of work. Moreover, the legalization of eugenics would present many questions: would everyone undergo eugenics? If so, how would the government fund it? Eugenics is a pseudoscience that has a history of abominable bloodshed, as well as a future that encompasses discrimination against those with physical, mental, and other imparities. On the whole, eugenics would fundamentally damage society. ■

EUTHANASIA LAWS ACROSS THE WORLD



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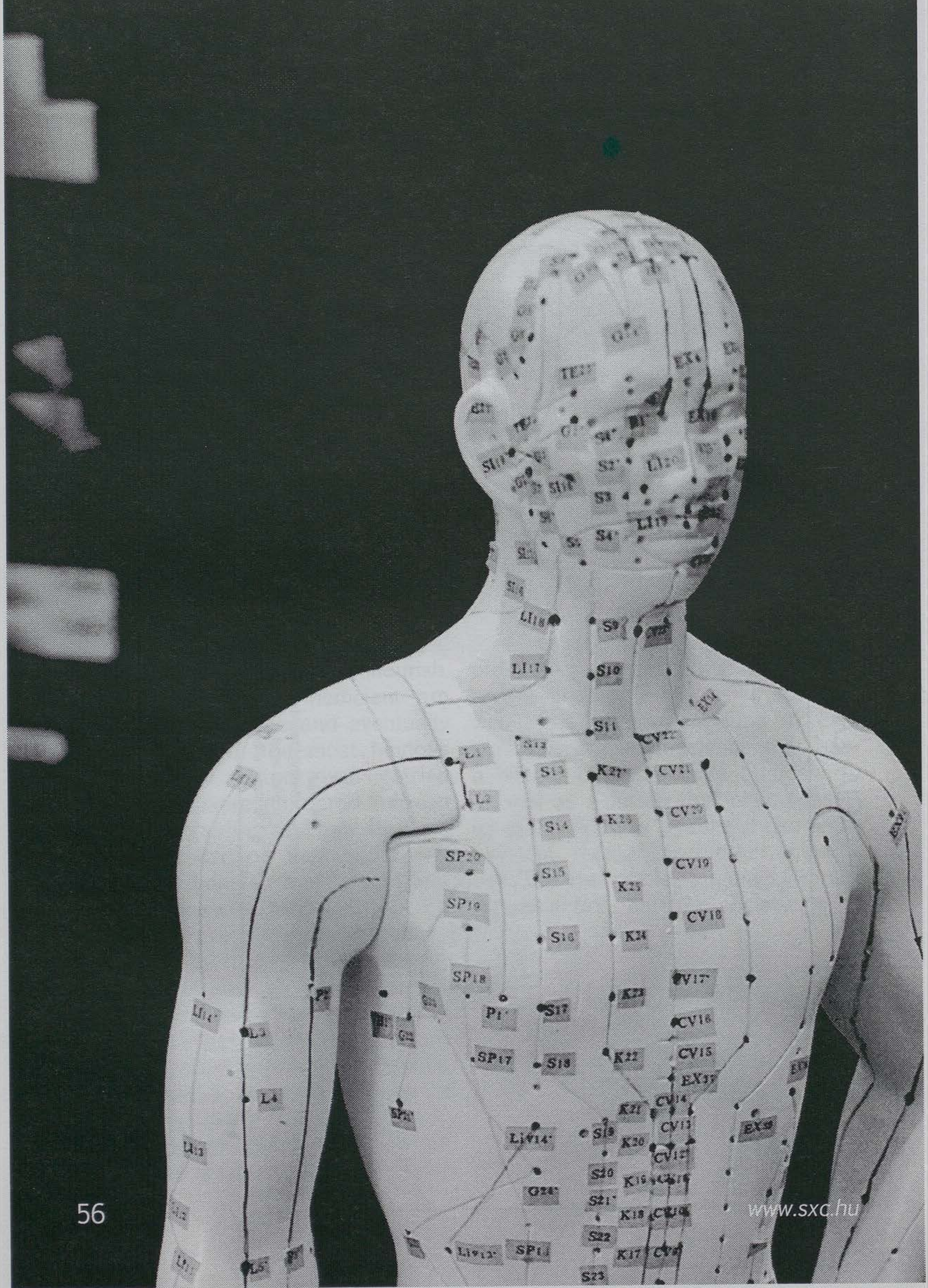
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CHAPTER 5 MEDICATION—THE LIMITATION

NANOMEDICINE

Nanomedicine is described as the observation, restoration and control of the biological system in human beings at the molecular level. This manipulation of single atoms and molecules that are only a few nanometers (1/80,000 of the diameter of a human hair) in size appropriately results in the naming of this scientific field. Research shows that nanoparticles—particles produced in nanomedicine processes—allow treatment to target specific regions in the body. Promoters of nanomedicine state that it may potentially be able to cure cancer and aid in the prevention of further breakouts of AID. The belief that nanomedicine could create cures for otherwise seemingly incurable diseases or injuries is commonly supported by researchers. Subsequently, governments and corporations are beginning to increasingly invest heavily in nanomedicine.

The study of nanomedicine has led to the manufacture of systems and technological devices of molecular size. Nanotechnology is believed to identify diseases at the cellular stage, allowing researchers to accurately study the development of a cell. This would make it possible to eventually eradicate certain diseases. Vladimir Zharov, the director of the Phillips Classic Laser and Nanomedicine Laboratories at the University of Arkansas for Medical Sciences, stated that "nanomedicine holds the promise to solve many challenging problems of fundamental biology and clinical medicine".

He adds that $2.3 million of nanomedicine grants are spent on the treatment and prevention of lethal cancer metastasis.

Consequently, the medical possibilities of nanomedicine, including the treatment of spinal cord injuries and brain tumors have caused research in the field to develop. Already, nanotechnology has led to the development of efficient and effective drug delivery systems.

These rapid advancements belie the various concerns involving deleterious effects that nanomedicine may have on the human body. If nanomedicine is to become a common industry, nanoparticles and nanoscopic atoms that are procured in factories could cause what has appropriately been coined as "nanopollution". In 1941, scientists at Johns Hopkins Hospital realized that nanoscopic atoms that were inhaled could be transported to the brain and subsequently cause adverse effects. Moreover, this expo-

sure to nano-pollution could be one of the factors resulting in coronary heart disease. A study from UCLA showed that inconspicuous nanoparticles cause more plaque build-up in arteries than larger particles. Andre Nel, the Chief of Nanomedicine at UCLA declared that: "the smaller particles are the particles that are present in the highest number, penetrate deeper into the lung, are retained with a higher degree of efficiency than larger-sized particles [due to their...] huge surface area". Another study conducted on rats to investigate possible consequences of the nanoparticles on humans showed that rats were susceptible to contagion from nanoparticles that could damage the olfactory tract when they inhale. However, Nel also remarked that there is technology available to "monitor ultrafine particle levels" and "by making use of drugs or foods that boost antioxidant defense...we may be able to have a more rational way of reversing the adverse effects of air pollution".

The impact of nanoscopic atoms also pertains to the environment. Mineral nanoparticles have been found in rivers in Britain. Studies of fish that were exposed to these particles have indicated that the nanoscopic atoms may have infiltrated their brain and nervous system. Proponents argue that these particles were not given a protective coating, which is usually applied to the molecules before it is disposed or given directly to a living organism. Additionally, Vicki Colvin, the director of the Center for Biological and Environmental Nanotechnology at Rice University, states that: "We're exposed to multi-ton quantities of incidentally created nanoparticles". Colvin believes that the damage that these nanoparticles cause to the biosphere is relatively benign when compared with the harm caused by common pollutants, such as exhaust fumes.

Measures are nonetheless being taken to eliminate the possible harm that nanomedicine can cause. The National Institute for Occupational Safety and Health (NIOSH) is a federal agency of the United States that conducts research and composes proposals for the deterrence of work-related injuries or diseases. In 2007, NIOSH announced a possible screening for people working in areas where they could be subjected to nanoparticles. Consequently, any health-related problems could be closely monitored with such screening tests.

Although nanomedicine has numerous medicinal advantages, the inadvertent effects on the environment and humans are definite causes for concern, meaning that nanomedicine has yet to be perfected before being established as a general industry. However, once nanomedicine becomes a safer, more predictable practice, it may be able to control and eradicate diseases that are at the moment incurable. ■

VACCINATION AND ANTIBIOTICS

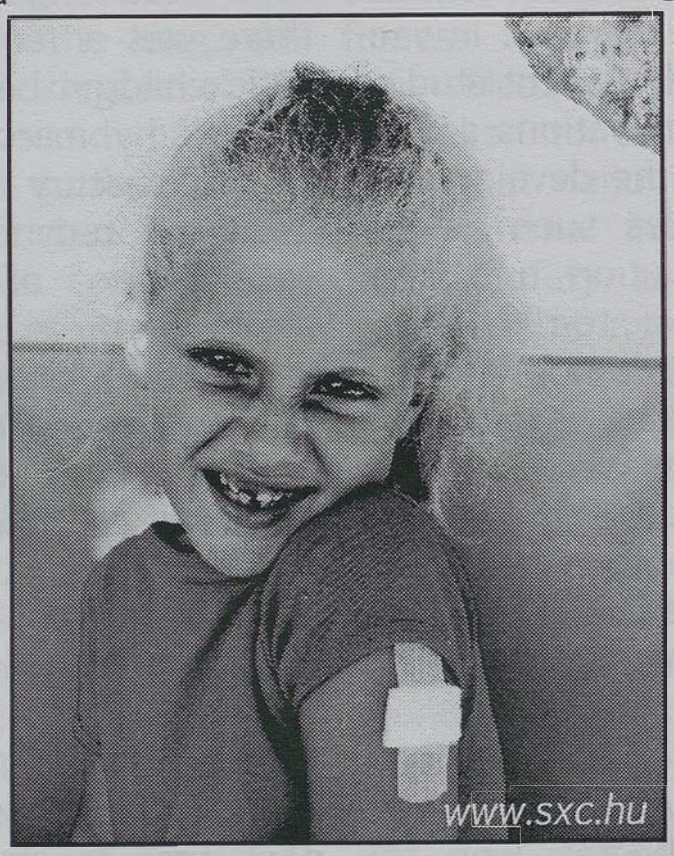
Vaccinations have become an everyday part of our lives; an ordinary and mildly painful ordeal we suffer when we need to travel to a foreign country or the flu season arrives. However, there are two main reasons to slow the increase in vaccination usage. Firstly, recent studies have shown that vaccinations are directly connected to the development of learning disabilities such as autism. Secondly, pollution and contamination can have terrible side-effects. On the other hand, research shows that vaccinations have proven to prevent many diseases, including polio and have saved thousands of lives. Immunity vaccines can combat against dangerous diseases such as tuberculosis and the recent swine flu.

Can vaccinations really lead to autism? A study done in Australia found that children who received vaccinations containing the preservative thimerosal (an organic compound used as an antiseptic for the skin and mucous membranes sometimes marketed under the trade name Merthiolate) were twice as likely to develop autism. Since 1930, when thimerosal was first used, there has been a fifty-four percent increase in the number of autistic children in California. One in one hundred and fifty children in California has a learning disability thought to be associated with a vaccine. This alarmingly large number is the result of inoculations containing mercury. All vaccinations that are comprised offifty percent or more of mercury can cause autism and should be avoided or applied with caution. From 1984 to 1994, there was a tenfold increase in autistic children believed to have been caused by mercury in vaccines. So why is mercury added to vaccines if it causes autism? Mercury preserves vaccinations, allowing storage and refrigeration, so that they can be used after longer periods of time. The dangers of mercury in vaccines seem to far outweigh any possible benefits as mercury not only may cause autism, but also plays a role in the development of asthma, allergies, autoimmune disease, diabetes, and obesity.

Within the last twenty-four years, there has been a tremendous increase in the availability of new inoculations (around forty new vaccinations, such as Gardasil and Haverix, which protect against human papillomavirus and hepatitis A, respectively) in only twenty-four years. Although many people find the increase in vaccinations positive, there is a troubling parallel growth in chronic diseases. In Denmark, one of these new vaccines, the MMR (measles, mumps and rubella) vaccine, was heavily advertised, promoted and recommended to parents because it protected against all three diseases. However, it had

a staggering and unexpected effect. They were widely distributed from 1991 to 1998 and resulted in more than 573,000 cases of autism. While progress is important and encouraging in the field of inoculation, proper testing and monitoring is vital to ensure that more people are helped, and fewer are harmed.

Pollution and contamination are among the issues that plague vaccination. For example, in the Philippines, vaccinations provided by UNICEF were contaminated and caused fertility problems in women. This not only creates health complications for the patient, but also fosters distrust in the medical industry and organizations trying to provide relief. In India, many lower class families refuse vaccination because they believe it is a government ploy to make them infertile and thereby limit population growth. This lack of immunization can result in the unnecessary death of thousands.



On the other hand, many people believe that vaccinations are useful, successful and that they save many lives. If a contagious disease spreads, it would be morally right for everyone to get a vaccination to prevent further proliferation of the disease. Vaccinations can be beneficial and reduce the number of deaths around the world.

Vaccinations are not the only preventative measures against illness with problems. Antibiotics are a kind of medication used to kill bacterial infections by blocking the metabolic pathway of bacteria. However, because viruses use the metabolic pathway of the cells they infect, it is impossible to kill the virus using antibiotics. The body's immune system achieves naturally much of what antibiotics accomplish. We often do not even know when we have a bacterial infection because our body has combated it before we even realized it was present. One concern with antibiotics is overuse, which can cause our immune system to weaken as our bodies become completely dependent on antibiotics to kill any bacterial infection. While antibiotics kill the majority of the bacteria, it is the body's responsibility to kill the remaining bacteria, a feat that over time, our bodies will be incapable of doing.

Using too many antibiotics can also be harmful in other ways. Over time, strains of bacteria that are killed by the antibiotics will die off, while mutated bacteria will stay alive. These mutated are not sus-

ceptible to the same kind of antibiotics used for the original bacteria, leaving them to continue to proliferate even after antibiotics have been used. For example, tuberculosis in its original state is relatively treatable, but with overuse of antibiotics, new strains of tuberculosis have become multiple-resistant, meaning that several kinds of antibiotics are needed at the same time to kill the bacteria. This treatment is expensive, has several side effects, and is not readily available. For this reason, death by tuberculosis is relatively common in places where extensive medical assistance is not readily available and people live in close quarters. The fear is that through overuse of antibiotics other diseases that are now easily treatable could become antibiotic resistant like tuberculosis, thereby making treatment more difficult and expensive.

Overall, there are repercussions in both using and not using vaccinations and antibiotics. Despite this, both methods of disease and illness control have shown to have positive effects on populations and if properly manufactured and dealt with, vaccinations and antibiotics are incredibly vital to maintaining one's health. ■

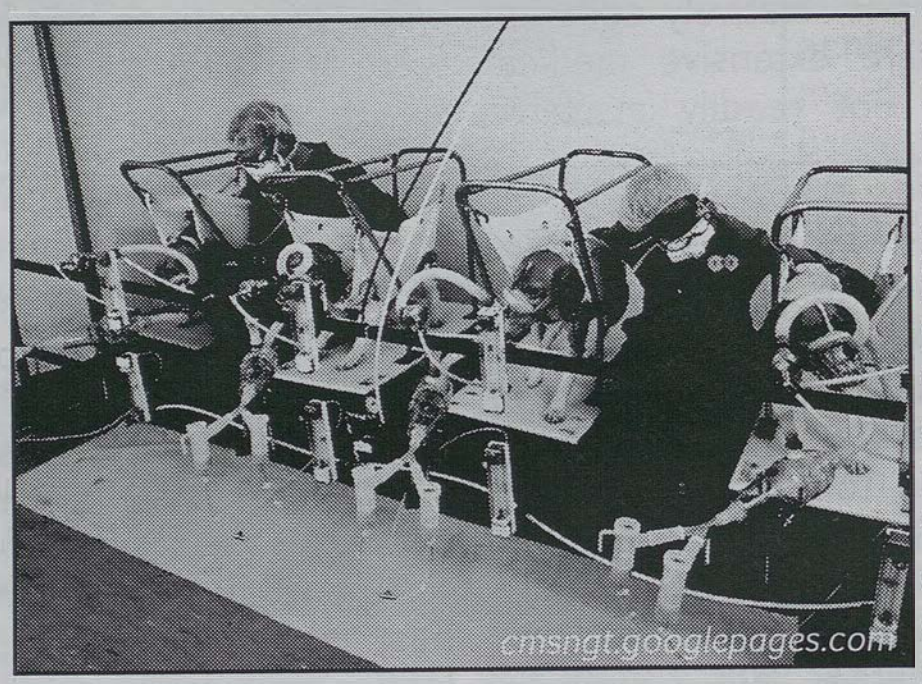
ANIMAL TESTING

Animal testing is the use of animals in experiments to examine the effectiveness of a drug, cosmetic product and toxicology tests. It has been a controversial issue for many decades. The majority of laboratory animals are purpose-bred but a small percentage are caught in the wild or supplied by dealers who obtain them from auctions. The of animal testing comprise of universities, medical schools, pharmaceutical companies, farms, defense establishments, and commercial facilities for purposes such as research in genetics, developmental biology and behavioral studies. These uses extend to applied research, which includes biomedical research, xenotransplantation, drug testing, and toxicology tests.

The widespread use of animals for testing purposes results from the absence of a substitute for the living systems needed to study interaction among cells, tissues and organs. Hence, animals are considered by some to be the best models because of their similarities to humans, both in structure and function of their organs and biological systems. Additionally, the short life spans of animals, like the two to three year life span of rats, allow scientists to study effects over shorter time periods. A more rapid rate of reproduction also allows for several generations to be studied in shorter time periods than in human life spans.

The British Royal Society, a supporter of this type of research, argues that "virtually every medical achievement in the 20th cen-

tury relied on the use of animals in some way". Likewise, the Institute for Laboratory Animal Research of the U.S. National Academy of Sciences remarks that even sophisticated computers are unable to predict interactions between molecules, cells, tissues, organs, organisms, and the environment making animal research necessary in various areas. Many people support animal testing for its contribution to major improvements in medicine. Animal testing is considered vital for ameliorating human health and it is for this reason that the scientific community supports its use. Not only does animal testing help discover new drugs and treatment, but more importantly it ensures the safety of meds. Scientists say that animal testing has contributed to the development of vaccines against fatal diseases such as rabies, polio, measles, mumps, rubella and tuberculosis. Theses vaccines have saved millions of lives in hundreds of countries and places. Take polio for example. This vaccine was developed with the help of animal testing. Within five years, from 1960 to 1965, the number of people with paralytic polio had plummeted significantly from 2,252 people in the United States to 61. By 1994, polio was eradicated in the Americas. In 1988, the World Health Organization took measures to eliminate polio around the world using the vaccine. In 2001, the vaccine had protected 575 million children in 94 countries. Vaccines are not the only products of derived from animal testing. Antibiotics, HIV drugs, insulin and other cancer treatments have originated from animal testing. Surgical procedures and operations have been revolutionized by testing carried out on lab animals. Although animal testing has proven worthy in the past, activists have maintained a different view. In animal testing, many of the species experimented on are killed after they have served their purpose. Others are injured and are forced to live the remainder of their lives disabled and in captivity. Furthermore, the majority of the substances tested on the animals do not receive approval for public use; consequently, neither humans nor animals benefit from futile experiments.



Some criticize the validity and reliability of the results obtained from experimentation on animals. The marked differences in human and animal physiology and chemical

make-up mean that the reaction of a drug in an animal's body might not be the same as in a human's. In addition, the animals are tested in an unnatural environment, under stress, which means that psychological effects may result in a different reaction than if the drugs were tested in the animals' natural state and environment.

The possible abuse and misuse that animals undergo in research have resulted in the development of various legislative measures so that the animals' care falls under federal laws, and regulations and guidelines governing biomedical research using animals. The "U.S. government principles for the utilization and care of vertebrate animals used in testing, research and training" is a set of principles developed in 1984 for all federal agencies that use or fund biomedical research. These principles ensure that the following requirements are met. Procedures involving animals must be relevant to human or animal health; the minimum number of animals must be used to obtain valid results. Alternatives to animals have to be considered. Animal pain or distress must be avoided or minimized. Living conditions for animals must be appropriate for their species, and research scientists and those caring for the animals must be properly trained and qualified. The apparently inevitable use of animals for research purposes means that these legislative measures will minimize if not eradicate any possible misuse and abuse of the animals.

To monitor such treatment of animals and animal rights' abuse, members of People for Ethical Treatment of Animals (PETA) sign up to be undercover investigators to report acts of cruelty to animals. If these watchdog organizations find acts of violation, they complete a description on the Stop Animal Tests' website. Animal testers who are also concerned about the welfare of animals report any situations and cases of animal abuse. Such reports have led PETA's undercover investigators and caseworkers to examine numerous scientific and government documents and expose to the public what occurs in laboratories. In addition PETA and other animal rights organizations such as The British Union for the Abolition of Vivisection, have various arguments against animal testing. They stipulate that it is a cruel scientific practice that is poorly regulated. In addition, they claim that medical progress is being held back by misleading animal models and outdated tests. They also emphasize that the outcome of these tests can never match the psychological and emotional suffering that the animals are forced to undergo. ■

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CHAPTER 6 IN THE WRONG HANDS?

HUMAN PERFORMANCE ENHANCEMENT DRUGS

Human performance enhancing drugs are substances that improve an individual's performance in activities ranging from athletics to military. There are two main types of these drugs: Physical and Mental Performance Enhancing Drugs. The usage of either one of these type of drugs has raised some major ethical controversies.

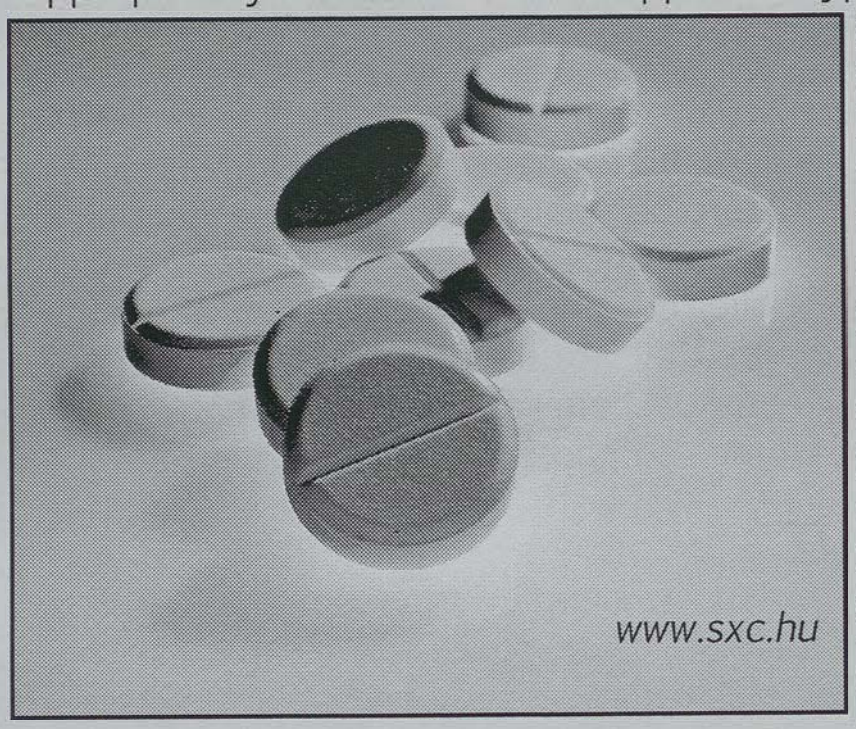
While there exist four major categories of physical performance enhancing drugs (steroids, painkillers, sedatives, and diuretics), the most frequently publicized one has been anabolic steroids that are used in sports and the army. Chemically, these have the same composition as testosterone and serve to increase the build-up of cellular tissue and muscles, increase stamina and strength, decrease body fat, improve bone density, and help catalyze the body's recovery process. In order to increase lean muscle mass, Selective Androgen receptor Modulator (SArMs) and growth hormones are used, while increased aggressiveness and alertness as well as reduced fatigue are augmented through the consumption of stimulants.

Many of these physical enhancements lure some athletes to use them as a means to gain an advantage over their opponents. However, these athletes subsequently face legal charges for using substances that are strictly prohibited from any sporting event. In addition, they risk having their awards revoked and their names tarnished publicly. In order to avoid the detection of their steroid abuse in drug tests during sporting events, athletes use other drugs that conceal the chemical indicators of steroid. Nonetheless, with rapidly advancing technology, devices and chemical tests are increasingly sensitive resulting in the detection of minute traces of the chemical in the athlete's blood or urine. Yet the public and political humiliation often belie the possibility of developing fatal medical conditions associated with steroid abuse. For example, blood clots in the liver or spleen or heart failure, the development of masculine characteristics in women, high levels of aggression, hypomania, tumors, jaundice disease, infertility and depression, which could lead to suicide.

Contradictory to the physically stimulating effects of the aforementioned drugs is the pain relief that is associated with analgesics, more commonly known as painkillers. They are known to reduce irritability and excitement as a result of using sedatives. In particular, narcotic analgesics affect the central

nervous system and allow users to compete without feeling pain from an injury and relieve anxiety before a competition. Although they have few side effects, sedatives can cause amnesia. Also, if taken in very large quantities, the consequences can be fatal.

Just as there are drugs that help improve physical abilities, there are nootropic drugs that are used to improve mental functions such as cognition, memory, intelligence, motivation, attention, and concentration. These are appropriately known as mental performance enhancing drugs, or "smart drugs". Examples of such drugs are Dilantin and Phenytoin, which enhance cognitive function, Oxiracentam which helps memory, and Selegiline increases intelligence. They are thought to work by altering the availability of the brain's oxygen supply or by stimulating nerve growth. These drugs have shown clear signs of helping individuals to focus and work more efficiently, but there are still some ethical questions raised.



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The most commonly used class of nootropic drugs are stimulants, which are classified into three categories: Amphetamines, Eugerotics, and Xanthines. All these are used medically to treat people with cognitive difficulties, such as Alzheimer's, Parkinson's disease, and Attention Deficit Hyperactivity Disorder, or to increase the productivity rate in certain factories. Specifically, amphetamines are a psychostimulant drug that increase wakefulness and focus. Their optimum effects are demonstrated in military campaigns when soldiers who consume them are able to remain vigilant and awake for longer periods of time. However, reduced appetite, hyperactivity, high blood pressure, sleeploss, dizziness, fevers and increased risks of heart attacks are all common side effects. Pilots in the military, especially German, Japanese and other allies in World War II, have taken methamphetamines (meth) to stay awake and to maintain alertness on long missions. However, to the military's dismay, after meth had been administered for long periods of time, the user's judgment became impaired and his inhibition levels lowered.

Whether or not nootropic drugs should be deemed acceptable in society remains an ethical dilemma. Although they are used formedical conditions, such as Dilantin for

epileptics, nootropics become a very controversial substance when they are used purely "to become smarter". Proponents for nootropics state that doctors should start children on a regiment: "...[the] minds churned out by our schools stand in need of safe high-octane mood-brighteners (nootropics) more urgently than cognitive-tweakers." However, while nootropics may enhance children's academic performance, critics argue that due to their close link with mood, they may harm a child's emotional well-being. in addition, due to the demanding school curriculums today, students may revert to a downward spiral associated with nootropic use. Work ethics could plummet too with decreased incentives to work harder. There may also be other unforeseeable biological long term effects associated with large groups of people all having enhanced mental function. Society could advance with new discoveries as a result of artificially enhanced creativity, or it could also take a leap backwards with the idea of prejudice: people that have not consumed nootropic drugs may be considered inferior.

The use of performance-enhancing drugs remains a double-edged sword: while their ability to make users both physically and mentally stronger, faster and even intellectually better has served as a reason for their medical use, the costs and problems of their usage are equally devastating. ■

BIOLOGICAL WARFARE

Biological warfare is the use of toxins and pathogens, such as bacteria, viruses, and fungi as weapons. In addition to guns, ammunition, and other forms of machinery, countries could also use armies of disease and sickness. This technology, in the wrong hands, could have devastating consequences.

A common concern is that terrorist groups might gain access to information which allows them to launch biological attacks on governments and civilians alike. Many fear that such groups would deliberately infect themselves with life threatening and highly contagious diseases, and cause epidemics. For example, in January 2001, in Oklahoma City, three men infected with smallpox walked into a store, dressed as maintenance, and they acted as though they were tending to plants. At the same time, two other groups of men did the same in malls in Atlanta and Philadelphia. Shortly after, there were 2,000 cases of the disease in 15 states, and Canada, Mexico and Britain, and the death toll increased to 300. This alternative use of warfare is a growing problem, one that threatens the safety of people all over the world. The pathogens that spread this biological warfare are called agents, and can be used to kill both small groups and masses of people.

Biological warfare is not a con-

cept; it has existed for quite a long time, and has been used in many wars. For example, in World War I, the German army used diseases such as anthrax, glanders, cholera and wheat fungus, to infect mules in St. Petersburg, Russia. During the Vietnam War, the Vietcong, also known as the National Liberation Front, used "needle sharp punji sticks dipped in faeces" to cause infections. When an enemy soldier was down and wounded. Biological warfare has been used in many wars, but it is now with advances in technology and rising tension in global relations, that it is rendered particularly important and dangerous.

The long term and short-term effects of biological warfare are amazingly unsafe, and a huge threat to society. Some long-term effects include dangers to the environment. Contamination of flora and fauna would severely impact the ecosystem, and some species could die out altogether. Also, a disease carefully crafted in a laboratory could develop a mutation. If a cure was simultaneously created, specifically designed for this disease, the mutation would render it obsolete. An example of a short-term effect would be a small break-out of an epidemic in a community. Biological warfare can be seen from two perspectives: an effective way of waging war, or a devastating and brutal means of annihilating not only armies, but innocent civilians. Some contest that the use of biological warfare would cause less bloodshed, while others vehemently disagree with the idea of killing others with pathogens. It is argued that countries would be reluctant to start wars, since more lives would be at stake. On the other hand, those against biological warfare are concerned by the long-term and short-term effects and remain

unconvinced that it could prevent war from occurring.

Treaties against biological warfare have been created and signed by many countries. The Geneva Protocol of 1925 was the first treaty banning the use of biological and chemical weapons in war. It was drawn up because of the horrible after effects of biological warfare used in World War I. Although chemical warfare was banned, the development, production, stock piling or transfer of such weapons was not halted. This treaty was signed and approved bymany nations, although some countries, such as Italy and France refused to sign, and some, such as Japan, withdrew.

Biological warfare remains a controversial subject; the dispute continues between those who believe it can minimize war and save lives, and others who argue that it opens the door for mass killing much bloodshed. This is a prolific issue, one that will continue to haunt the global spectrum for decades to come, and one that merits close scrutiny. After all, millions of lives are at stake. ■

ORGAN TRAFFICKING

The organ parallel market, also known as the organ black market, is a very profitable, lucrative yet illegal business for people of all socioeconomic classes. Although it can save the recipient's life and be very profitable for the donor, it is dangerous for both parties and crosses numerous ethical borders.

With over three million people living on less than $2.50 a day, it is of no surprise that many are lured by $10,000 that they may receive, on average, by donating an organ.

At the same time, it is inconceivable that people who can barely afford a single healthy meal a day are willing to pay the same amount to live. For most patients finding themselves on the growing transplant lists, the risks of illegally acquiring an organ are trivial compared to the prospect of dying. In addition, organ donors generally need the money offered to them.

Despite the safety assured by legal organ transplant organizations like the "Transplant Living and Donate Life", the popularity of the organ parallel market persists primarily because of the long waiting list. In addition, the specific requirements associated with being a "good candidate" are making the procedure of obtaining a legal organ transplant extremely tedious. The criteria are generally similar for most organizations: a very limited number of other medical conditions, prime age for recovery, etc. Those who continuously opt for life but do not meet the demanding requirements revert

to the organ parallel market. Clearly, they rely on the organ parallel market and forego or overlook the security offered by certified physicians who are capable of assessing the condition of the organ. These assessments ensure that the patient will not encounter any fatal consequences associated with the body organ rejection. Organ trade proliferates in so many nations that the WHO has formed a system to divide the nations involved (Argentina, Brazil, Cuba, Iran, Israel, Turkey, South Africa, the United States, the United Kingdom and India) into two categories: organ-exporting and organ importing countries. However, the laws relating to organ trade vary from nation to nation. In Iran, organ trade is legal and regulated by two NGOs endorsed by the government: the Charity Association for the Support of Kidney Patients (CASKP) and the Charity Foundation for Special Diseases (CFSD). CASKP works with pre-transplant conditions to examine the mental stability of each donor to make the initial connection between donor and recipient and to test their compatibility. However, CFSD works with post-transplant conditions and ensures that the government pay each donor 1,000,000 Tomans ($1,219) after the transplant has taken place. Nonetheless, despite the existing post-transplant care, recipients experience physical side effects such as palpitation, tremors, chest pain, backaches, nervousness and fatigue, as well as mental problems, including regret for the operation and thoughts of suicide.

The widespread nature of organ trade has led to the expansion of "organ transplant-tourism" whereby the recipient travels to a different country to undergo transplantation. This form of organ trade is legal under the World Trade Organization (WTO), formerly known as the General Agreement in Trade and Tariff (GATTS). An agent or health care provider usually organizes the transplantations that help the country achieve its external health goals. On the other side is the international organ trade which comprises of both the donor and recipient traveling to another country to undergo transplantation. In some cases this process includes human trafficking in order to harvest organs.

One example of such an organ trade ring is the St. Augustine Hospital in South Africa, where more than 100 kidneys were transplanted illegally from principally Israeli donors to East European and Brazilian recipients in 2001-2002.

The investigation conducted by South African police resulted in the arrest of Jeff Kallmeyer, MD, who worked part time at Durban's St. Augustine Hospital, and Lindy Dickson, the regional coordinator for organ transplants at the hospital.

Some countries are attempting to eliminate illegal organ trade by enforcing laws like the Human Organ

Transplantation Act of 1994, when India banned the trade of organs. Although this did not demolish organ trade in India, it did lower the rate at which it occurred and forced those in need of organ transplants to travel elsewhere where legal organ transplantation was more accessible.

A major concern about organ trade is that the people who are either poor or living in developing countries and in need of money allow themselves to get exploited for their organs. In 2002, 6,000 people died waiting for an organ, which, in terms of the organ parallel market, meant inadvertently foregoing 6 million dollars that willing donors from developing countries would have received at a rate of $1,000 an organ. Consequently, the organ trade remains as a profitable business that stirs serious ethical questions. It persists because it continues to save lives and enables those in financial dire straits to make money. Some argue that organ trading is as immoral as prostitution because they both consist of selling one's body for money. Yet there is never a high enough authority that can put a price on life. As a result, regulation of organ trade is deemed necessary to protect the most vulnerable from exploitation and human trafficking for organ harvesting. ■

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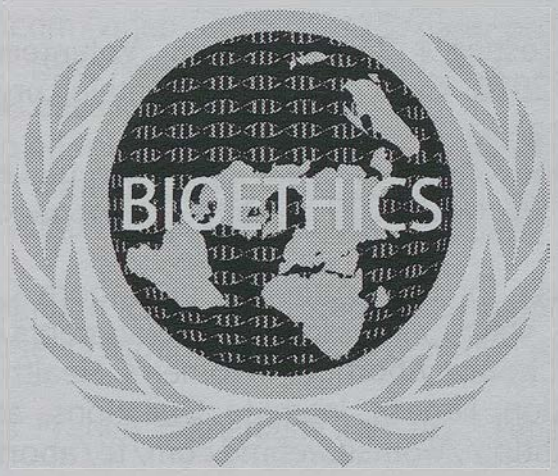
AFTERWORD



Bioethics is an immense issue, a current issue and an issue that merits thought and extensive discussion. Progress in medicine brings clear benefits, but theological, philosophical and political aspects of global society sometimes inhibit and challenge these advances. Still, these moral questions are important to consider because science has given us the power to affect not only the human race, but also the planet as a whole. New fields, from synthetic biology to nanomedicine, are blooming suddenly and rapidly. They are so new, so unknown, that it is difficult to predict and understand the effects of our actions. Here, it is important to pause and evaluate the technology and potential outcomes we are developing. The pace of scientific advancement is so swift, so punctuated by breakthroughs and incredible discoveries that we, in our haste to continue moving forward, forget to look at the wake we leave behind us.

We hope that through this working paper, and the UNIS-UN conference, we will help you create not only a portal into these much debated matters, but hlep you closely examine the effects of science and medicine in the world around us. Despite the debates that rage around controversial topics, it is important that we reach common ground, a platform upon which both sides are discussed fairly. This is what the working paper aims to be, an open forum through which we can explore these issues to the fullest while simultaneously becoming more aware of the changes and discoveries that are flooding medicine. With the knowledge gained from reading this, we hope that you can now evaluate and develop your own point of view, as well as appreciate the perspectives of others. Our aim is to illuminate the vast potential of bioethics without losing sight of the numerous concerns so that progress can continue without compromising morals.

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