Bioethics and Classical Education

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Introduction

People began to think about bioethics in the middle of the 20th century. At that time, there were many situations that led people to think about technology and biology in new ways, but I'll just mention two. In 1946, judges in Nuremburg, Germany tried Nazi doctors for conducting horrifically cruel medical experiments upon their captives, most of whom were Jewish. The judges needed laws by which to judge the actions of Nazi doctors, but it was not clear what national or international laws they should use. Nazi doctors claimed that their actions conformed to law and current research practice. The gruesome, shocking nature of Nazi medical experiments begged for genuine standards of accountability. The judges turned from laws to the foundation of laws: moral standards. They produced a set of moral standards called the Nuremberg Code.

The Nuremberg Code

You would recognize these standards even if you have never read the Nuremberg Code. You would have recognized them if you had lived in the 1940's and had received a classical education. They are based on ideas such as all human beings have equal dignity, are free to do what is authentically good, choose based on what they know, and have rights and responsibilities to care for their health. So before any researcher experiments on a patient, the researcher has to explain to the patient the experiment's benefit to society, the risks and the procedures. The patient has to be free to participate or not and to leave the experiment at any time. The researcher has to gain all the knowledge they can from sources other than human experimentation, minimize suffering and the risks to the patient and update the patient on developments increasing risk. Nazi doctors did none of these things, but these foundational ideas were widely known and could serve as credible moral standards. Thus the Nuremberg Code has become a seminal source for bioethics.

Organ Transplantation

The second example is organ transplantation. In 1954, doctors performed the first successful human kidney transplant. During the next few decades, the technology developed, and more patients had hope of extending their lives, but the increasing practice of organ transplantation raised serious ethical questions. Under what circumstances can doctors take organs from donors? If you transplant a kidney, the donor continues to live with just one, but if you transplant a vital organ like the heart, the donor would die. Does the transplant team have to wait until the donor dies or is the very end of the dying process good enough?

No, it is not ethical to cause death in order to harvest organs, but yes, we should think deeply about potential, ethical ways of transplanting vital organs. When people began to think about these ethical issues about seventy years ago, they did not invent new morality. They drew upon moral theories that humanity has been developing for thousands of years. After all, it did not take ancient ancestors very long to figure out the characteristics of human success and failure, and they are expressed in the wisdom literature of the Ancient Near East and Aristotle's *Nicomachean Ethics*.

When is Death?

Human thinking changes in response to technological advances across the ancient, medieval, and modern eras, but the fundamental dynamics of human life do not change. For example, organ transplantation raised a fundamental human question in a way that you might not expect. It raised the question "What is death and how do we know it has occurred?" for a very practical reason: doctors cannot wait very long after a patient has died to transplant organs because the organs begin to lose their functionality. And yet for a dying person to bequeath an organ to another person can be a great act of charity. The traditional way of determining death is to test for breathing and a heartbeat and wait until caretakers are sure that both had ceased. But you cannot use that method and successfully transplant organs.

Mechanical ventilators seemed to provide a way around this problem because if a patient dies while on a ventilator, the patient's organs could continue to receive oxygen and to function long enough to be transplanted. But how do you tell whether a patient has died on a ventilator?

Since the late 1960's, some people have argued that if a patient's brain had ceased to function, then the patient had died. To be precise, they mean the irreversible and total loss of brain function, including the brain stem. This standard seems to be a reasonably good sign of death because the brain integrates other bodily systems to such a high degree. Doctors follow protocols designed to detect with high certainty whether the entire brain has lost functionality. But some people, doctors and philosophers included, have questioned if the existing protocols reliably tell us whether the brain has irreversibly lost all functionality and even if the irreversible loss of brain function means the patient has died. The debate and the evidence on both sides has advanced our thinking not only about sound protocols for determining when death has occurred but also about what death actually is, and is not.

Answering the Question

Whether you are a researcher, a medical professional, a citizen, the family member of a patient, or a student trying to understand the issues, you need to know how to think in order to think fruitfully about these important questions. "Teach me how to think" is one of the most important goals of a classical education. In the same year that the Nazi doctors were convicted, Dorothy Sayers delivered a famous lecture entitled "The Lost Tools of Learning," in which she asked "Have you ever, in listening to a debate among adult and presumably responsible people, been fretted by the extraordinary inability of the average debater to speak to the question, or to meet and refute the arguments of speakers on the other side?"

Sayers meant that in order to think about the important issues they will face in their lifetimes, people must first learn to observe, read, think logically, speak and write clearly to different audiences, understand as many subjects as they can, and relate those subjects to each other. Bioethics is a perfect example. Assuming you can observe, read, and think logically, you should use philosophy to deeply understand ethics and human beings themselves, as well as politics and economics if you can. You also need math and science to understand the human body, the diseases that afflict it, and the treatments that could heal it. You must be able to speak and write clearly to different audiences and master the art of conversation because you will need to rely on the expertise of others, to listen to the views of others, and integrate all you know into the best responses you can give. You need to recognize your mistakes and limitations, those of others, and continue to hope for better outcomes and good luck despite serious obstacles.

The Classical Method

Let's try the classical method with bioethics. Start by defining terms. Bioethics is about the morality of people's actions regarding living things. Moral acts are those involving deliberation, choice, and implementation. If a person is deliberating, they are considering their options about what goals to pursue and what actions will accomplish the goals they choose. Once they try to implement their plan, they may or may not have a successful outcome.

Next, you need a basic method for evaluating different kinds of moral actions and cases that come up. People recognize immediately that for an act to be morally good, the individual or group involved must act with good intentions for a goal that would actually benefit people. But as soon as you mention good intentions, people immediately remember that good intentions are not enough. You also need good outcomes. In other words, you need circumstances that provide a reasonable chance of success without causing larger problems. At this point someone will object and ask what if a reasonable chance of success depends on lying, killing, stealing, or some other kind of action long recognized as immoral. In other words, can you do evil to bring about good?

This last objection explains many difficult and controversial bioethics issues. For example, if a patient experiences what they could consider unbearable suffering, should we end their suffering by ending their lives? That would be an act of killing called euthanasia. Stem cells have great potential to heal the body, but should we destroy embryos in order to use stem cells in therapy? That would be an act of killing that people often do not recognize as killing because the human beings are so small.

I would argue that we should not practice euthanasia or embryo-destructive research because both those practices fail to respect the inherent worth of individual human beings. But that same inherent worth moves me to work hard to alleviate suffering. So I need to distinguish euthanasia from allowing a patient to die a natural death. I have to clarify that it's wrong to act or withhold treatment so that the suffering patient dies, but it is not wrong to withhold treatments that have become burdensome and ineffective for a dying patient. I would need to say I am against destroying embryos but not against using stem cells derived in ethical ways. Holding the line against killing prevents scientists and medical professionals from settling on expedient options that cheapen human life and forces them to provide society with therapies in ways that do not involve killing.

So our method for approaching bioethics issues first asks whether the kinds of actions involved can ever be good. Next we would ask if the people involved proceed with a good intention. A good rule of thumb is to assume that they do and pay attention to circumstances, like conflicts of interest, that would compromise people's intentions. And finally ask if there is hope of success without causing greater problems.

This method is a sound, clear one, and using it gives us two kinds of clarity. First, it helps us distinguish different kinds of moral actions. For example, using steroids to increase muscle mass in an AIDS patient or reduce inflammation in an arthritis patient are the kinds of acts we would call therapy. They restore a lost or compromised functionality in the patient's body. But if an athlete uses steroids to increase muscle mass and tries to call it therapy, the crowd screams "Nope, you're doping." Doping is not therapy.

The method brings a second, more difficult clarity: clarity about what we do not know, what is ambiguous, and what is uncertain. For example, if we could correct the genetic causes of muscular dystrophy, we would do it. Naturally, we would treat them with the best genetic profile we know. Now if that genetic profile were based on a naturally occurring mutation possessed by a small fortunate population, including a world class athlete like Usain Bolt, we seem to have crossed a line somewhere between therapy and enhancement. But we have really and clearly seen that the concept of enhancement is not enough to work out the soundest moral thinking possible for this new technology.

Recognizing this ambiguity does not open the door to ethical relativism. We still recognize that some kinds of actions ought never be done and it is possible to define them so that moral standards and laws can prohibit them. We also recognize that scientific discoveries, new technologies, and difficult moral questions force us to improve our current thinking.

CRISPR

CRISPR is a good example that has received attention in the past few years. CRISPR is a technique of gene editing, and gene editing itself does not seem to be an immoral kind of action. We human beings have been taking action to influence the genetic profiles of plants and animals long before we understood genetic profiles. When the Augustinian monk Gregor Mendel described patterns of genetic mutations in the mid-nineteenth century, he deepened our knowledge about breeding, which humanity has practiced on plants and animals for thousands of years. By the mid-twentieth century, scientists could deliberately increase the rate of genetic mutation through radiation. Then they discovered techniques to replace a DNA sequence, first at random sites on a genome and then with precision but inefficiently. CRISPR is the first highly precise and efficient means to edit multiple genes simultaneously in just about any cell and organism.

CRISPR works by cutting a strand of DNA and supplying complementary DNA that the cell's natural repair systems incorporate into the genome. It is easy to imagine how gene editing research could proceed ethically. Researchers edit the genomes of a bacteria or virus, observe what happens, and gain knowledge. They use that knowledge to edit the genome of higher animals, such as insects, observe what happens, gain knowledge, and use that knowledge to experiment with more and more complex animals.

Applications of CRISPR

Some uses of CRISPR would be a highly effective form of breeding. For example, CRISPR promises to improve crop yields, drought tolerance and nutritional properties in plants. Its efficient, simple approach to gene editing in livestock may provide cheaper lean meat and alternatives to heat processed milk.

Other potential uses of CRISPR represent medical therapy. Gene editing may help cure diseases and may help regenerate tissues using adult or induced pluripotent stem cells.

Diseases like Huntington's Disease and Muscular Dystrophy are caused by genetic mutations that CRISPR may eventually correct in humans. CRISPR may help AIDS patients become more resistant to HIV. You can read in popular media that CRISPR may even alleviate chronic pain by altering genes to reduce inflammation.

Ethical Questions

To say that CRISPR can be used for good does not mean it is good however it is used. All these uses of CRISPR may have side effects to consider. Historically speaking, gene editing is still in its infancy, all medical treatments are currently hypothetical, and the first medical treatments may bring such side effects that no one would choose them.

Long term side effects raise some of the most important ethical questions. Scientists are currently researching the possible long term effects of genetically modified foods. If you correct the genome of a muscular dystrophy patient, any burdensome side effects end when the person dies. But if you correct the genomes in the reproductive cells of that person, then none of that person's descendants will inherit the genetic defect, but they would inherit any side effects too.

Modifying genes in reproductive cells is called germline editing, and it is one of the most controversial forms of gene editing. One strong argument in favor of limited germ-line editing is that what is good for one individual could be good for many. If we use gene editing to eliminate an individual's genetic disease, then we would use it for others. In germ-line gene editing, a single genetic modification would extend the benefit to the individual's descendents. On the other hand, germline genetic therapy would also carry any burdensome side effects to many more people over a longer period of time and would not be readily reversible.

At an ethical minimum, developing germline editing technology deserves the highest level of scrutiny for safety and effectiveness. Researchers might study the effects of gene therapy only on an individual to forecast the potential effects germ line therapy would have on descendents with as much certainty as possible. This method implies that gene editing would make it through animal experimentation and be found safe and effective enough to try in patients.

On the one hand, germline therapy affects all future descendants and involves a high degree of uncertainty. On the other hand, scientists have long studied how genetic traits spread in rapidly breeding animal populations. Currently, gene editing technology called a "gene drive" can accelerate the spread of genetic traits in successive generations. In the future, spreading genes for sterility in a species of mosquitoes might dramatically reduce malaria transmission in places where public health is poor and treatment difficult. Gene drives might remove invasive species in native ecosystems.

Using CRISPR for gene drives and germ-line therapy carry high degrees of practical and moral uncertainty. If we eliminate a species of plant or animal from an ecosystem, what will be the impact on the organisms related to it, what organism will inhabit the niche it occupied, and what effect will the new inhabitant have? And how will those outcomes affect the conditions that sustain human life? Like organ transplantation, these practices lead us to fundamental human questions and back again to practice, attempting to find our way through the ambiguities at the edge of our moral understanding.

But again, the ambiguities do not force anyone into moral relativism. It is unpleasant to imagine, but we can predict some uses of CRISPR that are unambiguously evil or highly questionable. Using gene drives to sterilize human populations is a new kind of eugenics to be condemned. Offering gene editing to parents to produce and update desirable qualities of intelligence or physique in their children would so undermine parental and peer relationships that it is difficult to imagine a morally good argument for any of it.

CRISPR Bioweapons

More pressing in our own day, CRISPR makes it easier to enhance lethal bacteria and viruses into a bioweapon that inflicts widespread suffering and death. The COVID-19 pandemic makes it easy to imagine and fear how a bioweapon would spread an unfamiliar disease quickly through a population, overwhelm health care professionals, and demoralize a people.

It is not surprising that media reports sometimes confuse bioethical thinking. For example, what do you think of when you hear the term “gain of function research?” If you have been following the story about the origins of the COVID pandemic, you probably associate “gain of function research” with irresponsible science or even bioweaponry. You have likely read stories about the National Institutes of Health in the United States funding experiments to enhance the transmissibility and lethality of the coronavirus at the Wuhan Institute of Virology in China.

If “gain of function research” means only enhancing pathogens for bioweapons or curiosity, then it is evil. But this is not the basic meaning of “gain of function research.” Gain and loss of function is simply a scientific term researchers use to describe the changes they see in the bacteria, insect or animal they experiment upon. They edit a gene and observe how the nonhuman organism changes. Thus "gain of function research" could mean enhancing pathogens to the degree needed to test how they evade the human immune system. Scientists could use that knowledge to produce better vaccines more rapidly.

The Way Forward

It is important to know, as classical education teaches, how to use language, numeracy, and logic, but is more important, as the classical tradition teaches, is to know thyself. Self-knowledge in bioethics means thinking deeply not only about the clear and present dangers, but also about the dangers hidden within our own desires.

CRISPR enters a global social environment already shaped by advanced technology and moral controversy. We regularly see boundary-pushing cases raising ethical issues that are difficult to disentangle. For example, the Chinese scientist He Jiankui ended up in prison when in 2018 he used germline editing, preimplantation genetic diagnosis and *in-vitro* fertilization to provide genetic HIV resistance in two babies. Worldwide, scientists objected that the scientific knowledge about germline editing is not developed enough to attempt in humans.

But no one objected to preimplantation genetic diagnosis or *in-vitro* fertilization, both of which raise serious ethical concerns. Preimplantation genetic diagnosis can help parents prepare to care for a child with genetic disabilities but is often used in a decision to abort them. *In-vitro* fertilization is also widely accepted but raises the most serious ethical objections because it brings embryonic human beings into existence in a laboratory environment, where they must be implanted in a mother to survive, can be manipulated before implantation, simply discarded or used merely for experimentation.

The moral repugnance that people felt when reading headlines like "Chinese Scientist gene-edits human babies" is provoked more by the idea of creating and manipulating human embryos than by providing HIV resistance. My guess is that He Jiankui knew he was pushing the boundaries and desired the "first in class" reputation but that he was following widely accepted social and research standards.

Conclusion

I know that I have raised many more questions than I have answered. But I hope that I have given you a purpose for thinking deeply with the Classical Liberal Arts tradition. If you are a student, I hope I have shown you that your education is not about completing assignments but about preparing to think and act well about the most important things in life.

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Technological innovations let us do amazing new things. Amazing new things plus moral uncertainty equals shocking new things, and shocking new things plus danger equals fearful new things. But it will not do to simply ban what we fear nor to resign ourselves to the evil that some will make of scientific and technological advancement. The human imagination needs to be both stimulated and tethered to reality. The classical liberal arts tradition teaches us how to think, to devise methods of scientific experimentation and moral evaluation, and most importantly to cultivate the wisdom and virtue most likely to bring human activities to a good end.

Further Reading

- Clyde F. Barker and James F. Markmann, "Historical Overview of Transplantation"
- Dana Carroll, "Genome Editing: Past, Present, and Future"
- Maureen Condic, "When Does Human Life Begin? The Scientific Evidence and Terminology Revisited"

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