



Creating Catholic Regenerative Medicine Organizations in a Secular Biotechnology Field: A Physician-Scientist Experience

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Abstract

One aspect of the progressive secularization of biotechnology is the use of the by-products from abortion and the use of human embryos. These morally illicit cells and tissue create a significant moral and economic challenge for Catholics at different stages of their career. A practicing Catholic physician or scientific professional will face the dilemma of how to reconcile their Catholic identity with their profession. While the Catechism is clear on what actions Catholics should not pursue, there has been less religious guidance on what activities Catholics should proactively pursue in their professional life to advance the Catholic culture. This essay will examine these themes through the lens of a true story of the author's experience in starting Catholic for-profit and nonprofit biotechnology organizations.

Summary: Abortion and the destruction of human embryos create a moral dilemma for Catholics at different stages of a physician or scientist's career. A practicing Catholic physician or scientist must reconcile their Catholic identity with their profession. While there is little professional guidance on how to advance the culture, Jesus says that one must take up the cross and direct their God-given gifts towards His name. The only way to succeed and thrive in a secular healthcare environment is to emulate Jesus by putting aside their own self-interest; pray for courage against ridicule; accept risk; and pursue scientific and medical excellence.

Keywords

Bioethics, Catholic identity in health care, Difficult moral questions, Faith and science, Personal and professional coaching, Stem cells, Vaccines

Over the past half century, there has been a progressive secularization of biotechnology with the experimentation of aborted fetal tissue, biomanufacturing that uses fetal cells, and embryonic stem cell research. The use of these morally illicit tissues and cells has resulted in the use of these cells in pharmaceutical drug development for a variety of products such as vaccines, biologics, gene therapy, and cell therapy (Graham et al. 1977; Naso et al. 2017; Pau et al. 2001; Wong 2006). The latter includes therapies that are directly or indirectly using embryonic stem cells or fetal stem cells from abortions (Mehat et al. 2018; Mazzini et al. 2019). Historically, these cells have not had a significant financial impact on

Catholic hospitals. However, use of these pharmaceutical products has penetrated our current healthcare system (Dumont et al. 2016; Ginn et al. 2018; Maude et al. 2014) and, unlike more common everyday medicines, these products need hospital

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supervision because they require more complex routes of administration and product preservation. Thus, there is an increased likelihood that the by-products of morally illicit cells will have a greater financial and moral impact on the future of Catholic healthcare and the pharmaceutical industry.

These secular biotechnologies create a significant moral and economic challenge for Catholics at different stages of a physician or scientist's career as illustrated in the following examples. Catholic students receiving education in a secular university and preparing for a career in biotechnology may risk their advanced degree or career opportunities if they refuse to work with morally illicit cells. Catholic physicians and scientists working in the pharmaceutical industry may well be coerced to use morally illicit cells in research and development to produce and advance pharmaceutical products. Catholic physicians working in a secular hospital may place their employment at risk if they exercise their moral conscience by refusing to administer or prescribe medicines that were derived from morally illicit cells. Catholics who serve on faculty in secular research centers may well risk tenure or promotion if they challenge secular research policies and situations that conflict with their Catholic beliefs.

A similar problem exists for Catholic physicians and scientists who work for secular hospitals, insurance companies, government agencies, or other businesses that support a secular antilife agenda like abortion, contraception, in vitro fertilization, gender identity transition, and physician-assisted suicide. Because twenty percent of Americans describe themselves as Catholics, there is a high probability that Catholic physicians and scientists will have to confront these moral issues at some point during their professional career. These moral issues will challenge the very foundation of what it means for a physician and scientist to be Catholic.

As Catholic physicians and scientists, we have a better sense of what activities we should not engage in based on our Catholic teaching. For example, a Catholic physician or scientist should not participate in the development of a medicine or advocate and support research that uses embryonic stem cells. A Catholic physician or scientist should not conduct or advocate and fund research that uses tissue from abortions. A Catholic physician or scientist should not work for an organization that promotes physician-assisted suicide and active euthanasia or commits abortion. A Catholic physician should not prescribe drugs or perform surgery to alter gender identity.

While the Catechism is clear on what actions Catholics should not pursue, there has been less religious guidance on what activities a Catholic should proactively pursue in their professional life to advance the Catholic culture. Yet, there are several biblical statements from Jesus on how Catholics should conduct their business life. Jesus made it very clear that engaging in a business that causes one to be overly preoccupied with accumulating wealth should not be encouraged. As Jesus said to his disciples (Matthew 19:23, New International Version), "Truly, I say to you, only with difficulty will a rich person enter the kingdom of heaven." For example, Catholic physicians and scientists should avoid directing their entire wealth and attention toward investing in casinos that offer no intrinsic value to the prosperity of society since gambling can lead to unhealthy addiction and negatively harm the poor. There is no intrinsic evil for a business to make a profit. Profit is an important tool for providing jobs for employees, helping a community, and supporting a mission that particularly offers a social good.

Jesus is also quite clear on his expectations from His followers. As stated in Matthew 16:24 (English Standard Version), "then Jesus told his disciples, 'If anyone would come after me, let him deny himself and take up his cross and follow me.'" Also, as stated in Matthew 10:38 (English Standard Version), Jesus states, "And whoever does not take up his cross and follow me is not worthy of me." Jesus is explicit when he states that to follow Him, one must take up his or her cross and make sacrifices in life.

Jesus is also quite clear how everyone should pursue their profession through the Parable of the Talent in which a master entrusts his possession in the hands of his servants. Each servant is given a different amount of money (talent) based on their individual capabilities. One servant receives five talents, one receives two talents, and one is left with one. Upon his return, the master discovers that the servants who received five and two talents had doubled the original amount that was entrusted to them. The master praises and rewards these two servants for their faithfulness. But the servant who was left with one talent the master admonishes because he buries the money out of fear that the master would be too harsh toward him. The Parable of the Talents represents Jesus's explanation that talents represent God-given gifts in the service for Him. Such gifts include an individual's abilities and wealth, which should be devoted toward God's sake and for His Kingdom. Interestingly, Jesus does not excuse the servant who is given the least talent. Failure to use one's gifts toward

God's sake, the parable suggests, will result in a negative judgment at the end of one's life.

For the Catholic physician and scientist, the Parable of the Talent is very instructive. Physicians and scientists have been blessed with intelligence, skills, and wealth unlike other members of society. They have completed more years of education and training than most members of society. They have talents in reasoning and trained to search for the truth. The career path for a physician and scientist prepares one to persevere and provides opportunities to test one's courage. Physicians and scientists are members of two noble professions whose service to mankind underscores the purpose of their profession.

Thus, as Catholics, we are called to channel these gifts in Jesus's name, not to waste these gifts out of fear and selfishness. Excuses like, "I was afraid of rocking the boat" or "I just felt that I did not have the stature to make changes in my company" lack spiritual courage. Jesus wants and expects us to take risk and make personal sacrifices. The greater the gifts one has received, the greater are His expectations. Jesus's expectations for a student would be less than for an established, successful, and wealthy Catholic physician or scientist. However, even the student would still be expected to take up his or her cross for Jesus' sake. Jesus calls upon his followers to make the hard choices, which include putting their career and livelihood at risk for His sake.

A critic could say that it's easy to preach self-sacrifice and risk-taking. While self-sacrifice and risk-taking are arguably very difficult, they are necessary conditions if Catholics want to change today's secular culture.

I speak from experience. When I was an assistant professor in academia and had not yet received tenure, I wrote a public editorial in our local newspaper arguing against the morality and ethics of embryonic stem cell research. I wrote this article in response to counter a previous editorial written by the dean of my college and the vice president of research of my university who argued in support for such research. However, no other Catholic in my department would sign this editorial out of fear or reprisals from the administration. Despite writing this editorial, I still received tenure.

By 2005, embryonic stem cell research had become popular and was viewed very promising. The National Institute of health (NIH) was supporting grants that used established embryonic stem cell lines. States were making public investments in stem cell research that promoted the creation of new embryonic stem cell lines (Hall 2007). Pharmaceutical companies were using embryonic stem cell lines

in drug development (McNeish 2004). Embryonic stem cells were being made commercially available to academic scientists to conduct basic research because of the plasticity of embryonic stem cells to differentiate into a variety of tissues (Thomson et al. 1998). It was clear that the federal and state governments were giving short shrift to adult stem cell research in favor of embryonic stem cell research.

By contrast, European countries were making greater advances in adult stem cell technology than in the United States. There was little effort in the United States to make commercial adult stem cells available to academic scientists. I decided that I would leave the safety of my academic tenure and an academic research career that was previously funded by NIH to start a biotechnology company that would manufacture adult stem cells in Iowa. Iowa was certainly not known or respected in the field of stem cell research. Iowa was also at the bottom of venture capital. I had to use my own personal wealth and resources to launch our company. My family made many financial sacrifices to support my work. To financially support our company and obtain access to tissue to produce adult stem cells, I simultaneously started a solo private practice at a local Catholic hospital to obtain tissue to develop adult stem cell lines and financially support our company.

It was extremely difficult to obtain grants in the stem cell field because I had no published track record in stem cell research and much less a track record in industrial manufacturing of stem cells. There were secular scientists and politicians who were hostile toward me because I was a Catholic working in an ethically controversial field. I recall a situation where a director of a government agency in Iowa was irate because I took a pro-life position in biotechnology. Another scientist rejected one of my grants on the basis that I should not pursue research in induced pluripotent stem cells (iPSC) because I had moral objections against embryonic stem cells. Another grant was rejected by a private foundation that advocated for Parkinson patients. Our company developed a rapid and efficient approach to convert fat-derived adult stem cells into dopamine-producing cells. At the time, the conversion of embryonic stem cells into dopamine-producing cells was inefficient and slow. The reviewers expressed that their foundation would be more interested if our company would apply our method toward differentiating embryonic stem cells into dopamine-producing cells. I refused to pursue this grant. Moreover, when I started my company, some

Catholics were misinformed that the Catholic church was against all forms of stem cell research. Such Catholics were critical of me, even though I was only working with adult stem cells.

These examples represent only a small fraction of the challenges our organization had to confront. There was a very high likelihood for failure. But as described in Matthew 19: 26 (New International Version), “But Jesus looked at the apostles and said to them, ‘With men this is impossible, but with God all things are possible.’” Yet, even if one does God’s perceived will, it does not guarantee worldly success.

Over a decade later, our organizations have achieved several cutting-edge and first-in-class milestones in the field of regenerative medicine. Our biotechnology company, Cellular Engineering Technologies (CET) created the world’s largest portfolio of adult stem cells, which are now used by scientists around the globe. One of the largest biotechnology companies chose CET as their exclusive manufacturer of adult stem cells for the research market. CET is the sole source manufacturer of some rare adult stem cells. We are the sole source manufacturer of human amniotic membrane mesenchymal stem cells for the United States Navy. There are over seventy scientific peer-review publications from scientists who used our cell products.

The John Paul II Medical Research Institute (JP2MRI), a nonprofit medical organization that I founded, is one of the few pro-life private stem cell research organizations in the world. JP2MRI advances adult stem cell research consistent with a pro-life mandate to advance the translation of adult stem cell research into clinical research. JP2MRI’s therapeutic priorities focus on neurodegenerative diseases, rare disease, oncology, and some more common chronic diseases. It has received donations from thirty-eight countries; over 90 percent of its donors reside outside the state of Iowa. Working together, CET and JP2MRI codeveloped and published a report in 2017 that described the first-in-class, virus-free, and oncogene-free iPSC from adherent human somatic cells (Kamath et al. 2017). Our publication achieved the top 97th percentile of the most read peer-reviewed scientific report among the 9 million published that year (personal communication from editor). This report demonstrated a method that significantly reduced the infectious and neoplastic risk of iPSC. In 2018, our group published a follow-up report that showed how our iPSC reprogramming method converted cord blood stem cells and peripheral blood in patients with genetic lung disease (Kamath et al. 2018). This

report was recently cited as a top publication in cord blood research in *Hematopoiesis News* (December 2018).

This iPSC technology now offers a less expensive, safer, and ethical alternative to embryonic and fetal stem cells. Our organizations have also developed innovations in protein production from mammalian cells and adult stem cells instead of using aborted fetal cell lines. JP2MRI is now focused on developing ethical and hopefully superior human cell lines to replace morally illicit cells that have been used in the biomanufacturing of vaccines, biologics, and gene therapy. Our stem cell capabilities are now well regarded within the regenerative medicine field even though our industry remains quite secular. However, biotechnology organizations are high-risked ventures, and much more work needs to be accomplished.

Thus, it truly is possible to succeed as a Catholic in the biopharmaceutical field and remain Catholic. Yet, reconciling one’s Catholic faith in medicine cannot be accomplished without sacrifice, risk, and courage. Further, it is not only possible to succeed, but it is Jesus’s expectation that physicians and scientists conduct their profession consistent within the teachings of the Catholic church.


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Biographical Note

Alan Moy, MD, received a bachelor of science in biochemistry at the University of California at Davis. He received an MD from Creighton University. He received specialty medical training in internal medicine at St. Louis University. He received his subspecialty training in pulmonary and critical care at the University of Iowa. He was faculty between 1994 and 2005 and tenured in the Department of Medicine and the Department of Biomedical Engineering at the University of Iowa. He currently maintains an adjunct appointment in the College of Engineering at the University of Iowa. His research at the University of Iowa was in the area of vascular biology, inflammation, gene delivery, and tissue engineering. His research was supported by the National Institute of Health, the American Heart Association, the American Diabetes Association, and the American Lung Association. In 2005, he left his faculty position to cofound Cellular Engineering Technologies, a pro-life biotech company in Coralville, Iowa, which manufactures and sells commercial adult stem cells around the globe. In 2006, he founded the John Paul II Medical Research Institute, a tax-exempt 501-c-3 nonprofit research institute devoted toward the use of adult stem cells for treating orphan diseases, degenerative neurological diseases, regenerative medicine, and cancer. He has been recognized in the *Who's Who in America* and in the *Leading Physicians of the World* by the *International Association of Healthcare Professionals*.