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Transhumanist Medicine: Can We Direct Its Power to the Service of Human Dignity?

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Abstract

The medicalization of transhumanist technologies demands our prompt and undivided attention. This article surveys the principal body/mind enhancement goals of transhumanist medicine and the means it would employ—genetic, robo, info-, and nanotechnologies—to accomplish those ends (Part One). Second, it engages Christian anthropological and natural law principles to evaluate the populist and essentialist concerns these therapeutic/enhancement interventions provoke (Part Two). And, third, it proposes formation of a Catholic medical think tank to appraise whether transhumanist biotechnologies can serve human dignity and, to the extent they can, to formulate wise clinical/administrative guidelines for their inclusion in US Catholic healthcare settings (Part Three).

Nontechnical summary: This article explores the body/mind enhancement goals of transhumanist medicine, evaluates the biotechnological means to accomplish those therapeutic/enhancement goals, and suggests the formation of a Catholic medical think tank to formulate wise clinical/administrative guidelines for the inclusion of genetic, robo, info-, and nanotechnologies in US Catholic healthcare settings.

Keywords

Body/mind enhancement, GRIN: genetics, robo, info-, nanotechnologies, Transhumanism, Transhumanist medicine

In his *Discourse on Method* (1637), philosopher and mathematician René Descartes envisioned a radically new kind of medicine, one that would make humans healthy and fulfilled *ad infinitum*—healthy bodies beyond aging and degeneration and vigorous minds beyond their natural powers and competencies. The potential of current and future biotechnological interventions to alter what it means to be human might very well convert Descartes's dream into reality. The medicalization of these transhumanist technologies demands our prompt and undivided attention.

This article surveys the principal body/mind enhancement goals of transhumanist medicine and the means it would employ—genetic, robo, info-, and nanotechnologies—to accomplish those ends (Part One). Second, it engages Christian anthropological and natural law principles to evaluate the populist and essentialist concerns these therapeutic/enhancement interventions provoke (Part Two). And, third, it proposes the formation of a Catholic medical think tank to appraise whether transhumanist biotechnologies can serve human dignity and, to the extent they can, to formulate wise

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clinical/administrative guidelines for their inclusion in US Catholic healthcare settings (Part Three).

Part One: Transhumanist Medicine: Goals and Means

Julian Huxley, first director general of UNESCO and president of the British Eugenics Society from 1959 to 1962, was the first to coin the term transhumanism. In his 1957 essay of the same name, he wrote: "the human species can, if it wishes, transcend itself—not just sporadically an individual here in one way, an individual there in another way, but in its entirety, as humanity." And, once human beings finally take hold of their biological destiny, they will be "on the threshold of a new kind of existence, as different from ours as ours is from the Peking Man" (Huxley, 1957).

Inferred in Huxley's statement is a definition of transhumanism that is, at root, a medical ideology, one promoting a technologically-mediated evolution that, according to the contemporary World Transhumanist Association (WTA), will enhance the mind, body, and psyche of the human being, taking the human body beyond its species-typical structure, function, and abilities (Wolbring 2008). The WTA also defines the basic premise of transhumanism and, therefore, of transhumanist medicine:

The belief that the present form of *Homo sapiens* does not represent the end of its development but a relatively nascent phase. GRIN—genetic, robotic, info, and nano—technologies will eventually artificially accelerate the natural evolutionary process, freeing the human being from the vagaries of random mutations and the incremental nature of variation and adaptation. As the Transhumanist Declaration states: "We favor morphological freedom—the right to modify and enhance one's body, cognition, and emotions" (Trippett 2018).

According to Oxford historian and cofounder of the World Transhumanist Association, Nick Bostrom, Transhumanism's goal is "to make good the half-baked project that is human nature" (McNamee and Edwards 2006, 514) Therefore, when transhumanist medicine sets its sights on overcoming evolution, it also presupposes surmounting disease, death, and human nature itself. This model of medicine replaces the traditional concept of medical therapy—using its biotechnical capacity to treat patients with disease or disabilities to restore them to a normal state of health—with the notion of enhancement—the technological alteration not of disease processes "but the normal workings of the human body and psyche, to augment or improve their native capacities and performances" (President's Council on Bioethics [PCB] 2003, 30). The insignia of the transhumanist movement—'h'or 'humanity plus'—speaks for itself. It defines enhancement beyond species-typical functioning as productive of least two scenarios. "Humanity plus" people, transhumans, or superhumans—people who are better than well; people who have superpowers; people who retain their human bodies but are much faster, smarter, stronger, healthier, and live longer/forever young lives than unenhanced people. Or they will generate posthumans: people who, after abandoning their bodies completely, upload their consciousness or even their entire brains to computers, so they can "live a virtual life forever" on the earth or in space. Ray Kurzweil, Google's director of engineering predicts we will be able to upload our entire brains to computers by 2045 ("How Soon Will We Be Able to Upload Our Minds to a Computer?" 2018).

The Transhumanist Declaration succinctly depicts the goals of transhumanist model of medicine: "We envision the possibility of broadening human potential by overcoming aging, cognitive shortcoming, involuntary suffering, and our confinement to earth" (Sutton 2015, 117).

The means of realizing these transhumanist goals are the various GRIN technological interventions, some of which are described below. Note the consistent pattern: initially, prescribing the biotechnology for therapeutic ends for sick people; subsequently, using it solely for enhancement ends for healthy persons.

Neuro-enhancements

- Early and primitive brain–machine interfaces (BCIs) have already been used for therapeutic purposes: to help restore some mobility to those with paralysis or to give partial sight to people with certain kinds of blindness (Masci 2016). Patients equipped with BCIs use their minds to control their wheelchairs, advanced neuroprosthetic limbs, and drones (Bohan 2017). Scientists predict, in the not so distant future, that BCIs will do everything from helping stroke victims regain speech and mobility to successfully bring people out of locked-in syndrome.

  Daniel Faggella, a futurist who founded TechEmergence, a market research firm focusing on cognitive enhancement and the crossroads of technology and psychology, anticipates that BCI technology intended to ameliorate medical conditions will inevitably be put to enhancement uses. "Once we have

boots on the ground and the ameliorative stuff becomes more normal," Fagella argues, "people will then start to say: we can do more with this." Doing more inevitably will involve *augmenting* brain function, which, in a relatively simple way, has also already begun. For instance, scientists have been using electrodes placed on the head to run a mild electrical current through the brain, a procedure known as transcranial direct-current stimulation (tDCS). Research shows that tDCS may increase brain plasticity, making it easier for neurons to fire. This, in turn, improves cognition, making it easier for people taking tests to learn and retain things, anywhere from new languages to mathematics (Masci 2016).

In 2016, Elon Musk inaugurated the idea of "neural lace," an advanced BCI in which a person's biological brain seamlessly meshes with nonbiological computing (Bohan 2017). Although neural lace may not yet be ready for clinical application, Musk is dedicating hefty amounts of money into its development in his new research firm, Neuralink. And he's collaborating with another Silicon Valley futurist, Bryan Johnson, whose Kernel start-up is working on similar projects.

For one, Kernel is focusing on "neuroprosthetics." His researchers have broken the code for the storage and retrieval of memories in the hippocampus paving the way for memory augmentation by an implant. Like mechanical prosthetics, neuroprosthetics will first be tested out in patients who are already suffering the progressive loss of their cognitive faculties and memory. However, as leaders of Stanford University's NeuroTechnology Initiative predict, neuroprosthetics will be perfected to the point where it will be accessed as a valuable enhancement. As these researchers argue, BCIs "will transform medicine, technology, and society" and "future devices will likely not only restore, but also augment, human capacities" (Tracinski 2017). Similarly, Musk argues that adding a layer of digital intelligence to one's normally functioning brain with a neural lace implant—using it exclusively for enhancement ends—will allow humans to compete with artificial intelligence.

- Synthetic blood has thus far been manufactured for therapeutic goals. Engineered to clot more quickly than natural human blood, artificial blood could prevent people from bleeding to death and could also monitor a person's arteries, keeping them free of plaque and preventing a heart attack.

  Whether produced through nano- or genetic engineering, one obvious task for "smart blood" would be to increase the amount of oxygen a person's hemoglobin can carry. Anders Sandberg, neuroscientist and fellow at Oxford University's Future of Humanity Institute, explains: "In principle, the way our blood stores oxygen is very limited. So we could dramatically enhance our physical selves if we could increase the carrying capacity of hemoglobin. Smart blood would give you a lot more energy, which would be a kind of cognitive enhancement" (Masci 2016).
- Nootropic drugs (from *nous*, the Greek word for mind) are drugs that affect and theoretically enhance cognition. Popular with residents of Silicon Valley as a way to attain sharp mental function, nootropics come from a combination of exotic dietary supplements and research chemicals that gives an individual an edge in his job—improved memory, increased clarity, and enhanced problem-solving—without side effects (Tracinski 2017). In search of enhanced performance, some people are experimenting with the drug modafinil, a treatment intended for narcolepsy. Others regularly take selective serotonin reuptake inhibitors like Paxil and Zoloft to regulate their moods. Transhumanist researchers predict these drugs are the forerunners of a new generation of neuro-enhancers that promises shortcuts to ever greater intellectual prowess (Honigsbaum 2013).

Body Enhancements

Dr. Gregor Wolbring, a bioethicist and science and technology studies researcher at the University of Calgary, points out that the ever-increasing appearance of internal and external enhancements of the human body to treat injuries promotes a growing cultural demand for, and approval of, modifications of the human body, its structure, function, and abilities, beyond species-typical boundaries (Berger 2008).

- The development of artificial or bionic muscles is progressing rapidly (Berger 2007). Researchers discovered the solution to the production of fast-contracting muscles is to use nanotechnology. The challenge for scientists is to simulate the intricacy of natural muscle in their artificial muscle systems.

These bionic muscles would initially have therapeutic uses for patients whose muscles have been wasted by disease or destroyed in catastrophic events. But when the technology advances beyond the capacity of natural muscles, people could opt, for enhancement ends, to swap normal, but less agile, natural muscles with their bionic counterparts.

- Biohackers—citizen cyborgs—are enthusiastically getting radio frequency identification (RFID) chips implanted in their hands or wrists in do-it-yourself surgery in tattoo parlors. Possible uses: making tap-and-go payments, registering boarding passes, and opening a home or office door electronically. The chip would eliminate the need to carry keys and could also replace public transport cards.

  In respect to more serious applications, RFIDs could soon be used on a national scale for identification and security, to replace paper passports and to record personal medical data. Accident victims wearing RFIDs who would be brought to the ER in need of a blood transfusion could immediately be scanned for their blood type and allergies, for their medical power of attorney, for their organ donor wishes, and for their end of life directives (Bohan 2017).
- Bionics and prosthetics are the form of bodily augmentation already being tested out for a small number of special users. Right now you can attend the Cyborg Olympics, a competition testing whose bionic limbs and robotics exoskeletons are the best. Exoskeletons that don't replace the normal human body but give it extra strength and, in some cases, extra dexterity are currently being used to help the paralyzed walk or, as a robotic glove, to help people with limited strength or range of motion in their hands. Exoskeletons are also beginning to be used in industrial applications to help factory workers execute heavy lifts more safely. The military sees significant value in exoskeletons that could help soldiers travel farther and faster and carry heavier loads all with less fatigue. The ultimate goal for military applications is an armored robotic supersuit—like "Iron Man" (Tracinski 2017).

Genetic Engineering

- The CRISPR revolution began when Jennifer Doudna, University of California, Berkeley; Emmanuelle Charpentier, Max Planck Institute, Berlin; and Feng Zhang, Broad Institute of Harvard and MIT, realized that the CRISPR system in bacteria is programmable, that is, it can be customized to locate and then edit—disable, repair, or augment—any gene in any species: microorganisms, plants, animals, and humans. In sum, the designable CRISPR-Cas9 is revolutionary in giving scientists and clinicians the ability to wield unparalleled control over the human genome with the singular result of a radical face-lift for genetic research and genomic medicine.

  Transhumanists have their eye on two current human applications of CRISPR technology. The first showcases Dr. Carl June who recently led researchers from three institutions in the first preclinical CRISPR trial. June enrolled approximately 18 terminal cancer patients in this phase-1 study, comprising the most extensive manipulation of the human genome to date. In this first-ever US CRISPR trial involving patients, June and his team are treating the patients' cancers—multiple myeloma, myeloma, and sarcoma—with CRISPR-edited cells. If these trials are even remotely successful, transhumanists predict (Bohan 2017) it won't be long before the public demands the use of these editing tools on early human IVF embryos to prevent genetic diseases. And, down the road, to design babies, that is, to edit early IVF embryos according to parents' wishes for traits such as eye and hair color and, even further down the road, characteristics, like intelligence or athleticism, involving the engineering of a whole complex of genes.

  And that's precisely why transhumanists are focused on the second of CRISPR applications. Shoukrat Mitalipov, Director of the Center for Embryonic Cell and Gene Therapy, Oregon Health & Science University, led a team of researchers in programming CRISPR-Cas9 to target the *MYBPC3* gene mutation that can cause hypertrophic cardiomyopathy (HCM), a disease causing sudden death in young athletes. Then they produced fifty-eight lab embryos by co-injecting CRISPR and sperm from a man who carried one copy of the mutant gene into the cytoplasm of each donor egg. Study results showed that CRISPR efficiently targeted the *MYBPC3* gene mutation in 72.2 percent of the embryos. Second, forty-two of the CRISPR'd

embryos corrected the majority of the targeted mutations by copying the normal gene from the egg donor. And, third, all of the CRISPR'd embryos showed no off target cuts and developed normally to their morula stage. These data suggested to Mitalipov et al. that human embryonic CRISPR therapy, if it should ever meet future safety, reliability, and ethical standards, could someday be used "to reduce the burden of [an] heritable disease [like HCM] on the family and eventually the human population" (Mirkes 2017).

As futurist Nick Bostrom, director of the Future of Humanity Institute, a think tank at Oxford University, explains: "This may be the area where serious [genetic] enhancement first becomes possible, because it's much easier to do many things at the embryonic stage than it is in adults using traditional drugs or machine implants" (Masci 2016).

Antiaging Technologies

- George M. Church is a geneticist holding positions with Harvard Medical School and MIT. Recently, he wrote an article in the *MIT Technology Review* recounting his plans to reverse aging in dogs by correcting genetic errors that shorten the lives of certain canine breeds. But the subtitle of the article—"Biologist George Church says the idea is to live to 130 in the body of a 22-year-old"—gets at the endgame of his genetic engineering endeavors. His company, Rejuvenate Bio, hopes to abolish biological mortality by curing aging, humanity's primary disease. Church and other proponents of antiaging medicine, hailing from respected universities and institutions throughout the country, have begun to convince lawmakers and healthcare providers to support their focus on treating conditions that accelerate aging. They insist that "technologies exist that will rejuvenate the aged and give them lives that resemble those of the super-agers" (Cox 2018).
- Age X, a subsidiary of BioTime, is another research entity working on radical rejuvenation. Founder Michael West hopes to accomplish his antiaging goals not by permanently altering the embryonic genome as Church's germline genetic engineering research would do but by temporarily reactivating embryonic gene pathways that would bring older adults to the state of a healthy twenty-year-old. In the not so distant future, West's adult patient, say age sixty, would undergo inverted Terminal Repeat (iTR) that would theoretically restore the patient to the twenty-year-old stage, from which point he would age normally. To stop the aging process altogether, the individual would have to repeat the iTR periodically when, for example, the patient once more ages to sixty, so the person would continually revert to the vitality of a twenty-year-old.
- The Salk Institute and the Weizmann Institute are also working on ways to regenerate people who are approaching old age. Another company, BioViva, is using gene-editing technology to lengthen the telomeres at the end of chromosomes and thus surpass the Hayflick Limit (forty to sixty normal human cell population divisions) defying cellular senescence and aging.

Part Two: Ethics Critique

The following ethics assessment relies on the populist and essentialist concerns President George W. Bush's bioethics council applied to the enhancement technologies that existed in the early years of the 21st century. I raise these concerns here because they help to adequately evaluate the more developed and sophisticated GRIN technologies of 2019.

Populist Concerns See Transhumanist Technologies as Threats to:

Safety and Efficacy

Using BCIs such as neural lace to produce smarter people, as Elon Musk hopes to do, runs the very real risk of overloading the brain's "carrying capacity." Neuroscience experts, including Martine Dresler, argue the natural evolutionary process has already "forced brains to develop toward optimal . . . functioning" (Masci 2016). When we try to ramp-up intelligence beyond that point, we do so at our own risk. Furthermore, given scientific ignorance regarding the interconnectivity between body and mind, changing the neural system may have unpredictable and deleterious impacts on other bodily systems.

The effort to genetically engineer smarter people runs up against the wall of the genetic complexity of human intelligence. Many scientists estimate that a dance of thousands of genes is responsible for

intellectual acumen. Even were we able to identify all the genes responsible for superior human intelligence, and then were able to turn all of them on, there would still be no guarantee that the human subject would be smarter than before the engineering project ("The Truth about Intelligence" 2018).

For someone who is cognitively intact, the possibility of improving one's memory through the use of nootropic drugs sounds good in theory. However, memory in humans is a selective, sensitive process (Wolpe 2004). The brain deliberately deletes some experiences and data. As Wolpe (2004, 274) notes, "Who needs to remember the hours waiting in the department of motor vehicles staring at the ceiling tiles, or to recall the transient amnesia following a personal trauma?" We simply do not know whether memory-enhancing drugs might impair that delicate selectivity process. Will memory-enhancer drug users end up so overloaded with either traumatic or inconsequential memories that they are forever plagued by their painful past or by paralyzing trivia? Here, too, evolutionary scientists argue that the natural evolutionary process has stabilized at the current memory capacity because this provides the necessary cognitive flexibility we need to flourish—a plastic brain rather than the one crammed with memory overdrive.

The fact that RFIDs are self-implanted or implanted by the owners of tattoo parlors; it is no surprise that those implanted often show up in ERs with infections. After twenty years of experience with infections around transdermal objects, Buddy Ratner, professor of bioengineering at the University of Washington, is skeptical about solving the problem of healing skin around transdermal RFIDs (Hines 2018). In addition, RFIDs could easily become targets of hacking and identity theft (Bohan 2017).

Futurist bionic limbs for therapeutic or enhancement ends will carry their own special brand of risk. These prosthetics will be wired directly into the recipient's central nervous system and, in the case of mechanical malfunction, could cause the recipient nerve problems running the gamut from "transmission of pain signals that are potentially excruciating to the deadening of nerve signals from electrical transmission" (Niman 2013). And to the degree that prosthetic technology is controlled more and more by software and other algorithms, so does the risk of malfunction increase, possibly leading to the need to replace the limb altogether. "With limbs wired directly into the central nervous system, and potentially the brain, it is possible that catastrophic limb failures could be fatal" (Niman 2013).

Jennifer Doudna, the original developer of the CRISPR editing technology, has repeatedly warned against its use on early stage embryos for therapeutic or designer purposes. She cautions that geneticists have insufficient knowledge of the interdependency and interactivity of human genes, making it very risky to make germline genetic changes that would be passed on to future generations. John Craig Venter, leader of the first effort to sequence the human genome, also urges extreme caution in respect to genetic editing of embryos: "Genes and proteins rarely have a single function in the genome and we know of many cases in experimental animals where changing a 'known function' of a gene results in developmental surprises" (Masci 2016).

The same safety risks surrounding neuro, genetic, or body enhancements apply to antiaging technologies. We do not fully comprehend the aging process, and until we do, efforts to suppress senescence run the risk of unforeseen side effects and unpredictable consequences.

Fairness

The use of enhancement technologies in the world of sports—whether the prosthetic blade runners used by double-amputee Oscar Pistorius or the futurist bionic limbs that competitive athletes might choose for their superiority to normal limbs—automatically evokes the accusation "unfair" (Honigsbaum 2013). Many top athletes undergo laser eye surgery to move their vision beyond 20/20. It's been reported that Tiger Woods underwent LASIK to improve his vision to 20/15, giving him the unfair advantage of seeing at twenty meters what a competing golfer with 20/20 vision can only see at fifteen meters (Berger 2008). Similarly, non-ADHD students who take drugs like Ritalin to increase their focus and concentration during important placement tests are given a prejudicial advantage over students who do not resort to these drugs. To the extent, then, these biotechnologies give athletes or students undeserved advantage over their competitors to that extent can we expect erosion of the very meaning of human community where technology ought to facilitate a level playing field for all rather than an unbridled quest for power and prestige for the few.

Michael Berger, author of two books on nanotechnology, gives a prescient response to the question: what will happen when enhancement technologies will result in vastly augmented physical or mental abilities?

> It would give physical laborers an advantage in strength and dexterity over their non-enhanced co-worker; it would give white-collar workers an edge over their nonenhanced neighbor in the next cubicle—improved cognitive abilities or the ability to stay concentrated for long hours on end (without the side effects of amphetamines). The list is long. Just try thinking through the issues of how employers would react; the response of unions; how this would affect people's income levels; the impact on "expected performance" standards, etc. (Berger 2008)

Equal Access and Equality

As these GRIN technologies come to market, to a doctor's office near you, all sorts of access questions will also arise (PCB 2003, chap. 6). Insuring equal admission to any medical treatment refers to preserving the common good. But what if people who need a certain technology to treat a serious disease can't get it because they can't afford it and people with money can get the same technology for purely enhancement purposes? And will a technology-enhanced "aristocracy" versus the unenhanced underclass only increase the widening gap between the rich and the poor, the brightest and the ordinary? Does expending large sums of money on goals beyond therapy exacerbate misallocation of limited medical resources in a world in which millions of people lack basic health care or clean drinking water? Who could afford to continually replace bionic limbs when, with the exponential increase of technology, "a cutting edge prosthetic limb in 2012 might be half as efficient as a limb created in 2022, a quarter as efficient as a limb in 2024" a 32 times less efficient limb by 2030? (Niman 2013).

Although he is wide of the mark, Arthur Caplan, bioethicist and current head of NYU's Division of Medical Ethics, judges unequal accessibility to transhumanist technologies as the principal indictment against their goals of curing aging and death, copying minds to computers, making humans into body/machine cyborgs, and living forever. "I wouldn't say it [transhumanist agenda] was wrong, but it certainly is not fair because only a few could do it" (Istvan 2015).

Freedom

In *The Abolition of Man* (1944), C. S. Lewis underscores the dilemma that could arise if GRIN technologies like those described above were used for cognitive, health, or athletic augmentation. "For the power of Man to make himself what he pleases means, as we have seen, the power of some men to make other men what they please." Surely, the problem of eugenics in the context of a tyrannical government like that of Fascism was fresh on Lewis's mind when he penned that line. In the early decades of the twenty-first century, despots working their will on targeted segments of society could very well include the exercise of biotechnological power by some (transhumanist) elites over others.

Of course, Americans do not live under an autocratic government. But we do live under the constraints of a cultural tyranny of conformism. Consider this: if many children are prescribed memory enhancement or stimulant drugs to increase their cognitive functioning, would it be hard to envision that parents whose children are unenhanced will soon be accused of poor parenting and, subtly or not so subtly, badgered into adherence to coercive programs of social engineering for their children? And consider this: Would you continue to be a "chemically pure" offensive lineman when you're up against a line of defensive linebackers who are all on steroids?

Would future parents who choose CRISPR for germline genetic engineering on their child at an early embryonic stage, whether for therapeutic or enhancement ends, place themselves in the position of power and control over their child? Do they reduce their IVF child to an object, a product whose traits they define without the child's permission or approval, all the while unjustly suppressing the child's freedom in the name of the absolute freedom they appropriate as the child's designers?

Does our culture need yet another societal stratification? The technologically enhanced against the new class of techno-impoverished "impaired" people? Superego enhanced human beings versus the unenhanced? Would it be a stretch to predict—as Lewis does from the perspective of history—that soon enough the enhanced would think themselves better than the unenhanced? Would they consider themselves the new aristocracy whose "superiority" lies not in acquisition of virtue and excellence of character but in some form of neuro, bodily, or genetic enhancement? Would it be beyond the pale to suggest that the enhanced elite would tend to treat the unenhanced as second-class, disabled citizens? As Francis Fukuyama sagely argues, "when the lottery is replaced by choice, we open a new avenue along which human beings can compete, one that threatens to increase the disparity between the top

and the bottom of the social hierarchy" (Sutton 2015, 125-26). Individuals—and society—would hazard their freedom, dignity, and equality in the shadow of such a posthuman future.

Essentialist Concerns Regarding Enhancement Technologies

Issues of safety, equality, fairness, and freedom are not the only concerns nor the most important ones when it comes to evaluating transhumanist endeavors. The use of biotechnologies for human enhancement could be safe, equally accessible, promote fairness and human freedom, and still be immoral by virtue of the essential nature of the interventions themselves. Do these various augmentations both provide the beneficence, especially respect for human dignity, that healthcare providers, in justice, owe to the patient and promote what the healthcare providers, in justice, owe to themselves, namely, allegiance to their oath to do no harm? The answer depends on whether these GRIN technologies respect the naturally given, the human pursuit of excellence, the psychosomatic unity of the patient, and full human flourishing.

Failure to Respect the Naturally Given

Respect for the naturally given—the human body, mind, genes, and life cycle—provides the best antidote to the Promethean spirit that administrates transhumanist experimental medicine. Benedict XVI advises us to see ourselves not as a self-generated being but as gift, someone shaped by being and its limits (no. 76).

As discussed above, human survival is, on one side, best served by the natural, incremental evolutionary process, which has, to date, realized *Homo sapiens*–typical structure, function, and abilities. On the other, human survival could be disastrously threatened by a radical expedition of the human evolutionary process of the kind proposed by transhumanists.

It's not that transhumanist enhancements would necessarily imply usurpation of God's powers as much as an attempt to augment the cognitive and bodily *without God-like wisdom*. Surveying transhumanist writings reveals a perspective with hubris writ large—the perennial temptation to be like God without the requisite prudence and wisdom. By contrast, Divine Wisdom dictates that to escape mere arbitrariness, transhumanist technological enhancement—of the body, mind, genes, and the life cycle—must acknowledge the good that underlies human nature. And for the moral ruler to guide these enhancement endeavors, medical providers, in fidelity to their Hippocratic oath, must look within themselves—and encourage their patients to do the same—for the law of reason, the fundamental natural moral law. Using new biotechnologies to extend or enhance our domination over human nature in a way that disrespects the Divine Plan for creation and man's appropriate dominion over creation—that is, in a way that is against reason—would be a tragic failure to respect the inherent dignity of the human person.

Perhaps the best illustration of that failure is the antiaging prospects of transhumanist medicine. The prospect of living until 130 where the second half of those years are as a healthy twenty-year-old might tempt many of us, driven as we are by the natural human desire to live forever. But the question is: Would this elongated temporal life satisfy that desire? Would flattening the natural bell curve of birth–adolescence–young adulthood–middle age–senior years leading to retirement and eventual death be a good thing? A natural law perspective, the perspective of reason, easily identifies prospective assaults against human dignity and social justice. What if healthy super seniors cling to their jobs, to their positions of power and influence in society? Instead of one predominant age group, would we end up with two, each jockeying with the other for jobs and power? Wouldn't the super-agers be less likely to encourage—or more likely to hinder—younger generations in their pursuit of familial and professional standing? Would the healthy centenarians still generate fresh ideas or would they be more apt to create a stagnant society? More importantly, would there be a need to generate new human life at all when a significant slice of the population is living superlong lives?

Taking the long view of things, advocates of transhumanist medicine seem to suffer from a fear of not being temporally present, from a fear of being replaced and, therefore, are seeking for more and more of the same thing, more and more of living in time and space, maintaining their status with no hope for something different (Sutton 2015). These fears ignore the Christian vision of life eternal, the very thing that would bring hope. St. John Paul II (1995) has penned the perfect solution for such anxieties: "Man is called to a fullness of life that far exceeds the dimensions of his earthly existence, because it consists in sharing the very life of God. . . . Life in time, in fact, is the fundamental condition, the initial stage and an integral part of the entire unified supernatural calling which highlights

the *relative* character of each individual's earthly life" (no. 2, italics mine).

Transhumanist medicine ignores another given: sin, both original and personal; and the fact that sin has consequences: a person's mind does not immediately or consistently see the truth of reality and, as a result, his will does not always choose the true good. Such cognitive and volitional limitations demand humility on the part of transhumanist providers in their efforts to enhance the human being. In that sense, transhumanist hubristic goals exhibit a "soft eugenics with Pelagian aspirations" (Sutton 2015).

Failure to Respect the Dignity of Human Activity in the Pursuit of Excellence

Transhumanist medicine, like other utopian dreams, is naive (Istvan 2015). It rests on the dogma that all we humans need is a more powerful intelligence or a longer life or a super-healthy body and we're good to go. Greater "smarts" and super-bodies will solve all our difficulties and, like cheap grace, the remedy requires no human effort—no personal will power or virtue—to reform other aspects of our life. Contraception is perhaps the most familiar effort-free biotechnology: its "benefit" of avoiding conception comes without the need to practice temperance/chastity. Woody Allen's famous line comes to mind here. He endorsed effortless antiaging biotechnology when he declared his desire to become immortal, not by doing great deeds, but simply by not dying!

Nicholas Agar, professor of ethics at Victoria University in Wellington, New Zealand, speaks to the issue of respect for the dignity of human activity in pursuing excellence: "There are things that I value and am proud of in my life, like my recent book, but how can I value the writing of my book if I've been cognitively enhanced, and doing such a thing becomes much easier?" (Masci 2016). On a similar note, would any audience be pleased if a struggling pianist elected to exchange his perfectly healthy hand for a bionic one so he could perform Rachmaninoff's notoriously difficult third concerto? (Honigsbaum 2013). We all sense that writing that book with enhanced cognition or performing that demanding composition with a bionic hand degrades the dignity of the human activity, and therefore the dignity of the acting author or performer. So, too, when GRIN technologies violate or diminish our natural capacity for the arduous acquisition of skills and virtues, we immediately recognize their threat to the human desire to achieve excellence by overcoming obstacles, that charism central to the dignity of our species.

The use of nootropics to amplify or augment the person's focus, fine muscle control, or mood is a different phenomenon altogether from attaining the same capabilities through one's practice and disciplined effort. Pharmacological enhancement not only separates the individual from his labors with their associated sense of pleasure and satisfaction, it also alienates the individual from other people, "short-cutting to a competitive advantage that is corrosive to the very meaning of human community" (Hurlbut 2014, 29).

Failure to Respect the Psychosomatic Unity of the Human Person

Transhumanist medicine views the human person in mechanistic terms, like a car whose parts can be replaced at will, and proposes a program for enhancement that tempts people to turn themselves in for a "better model." But when humans replace their natural limbs and organs with mechanical parts, when they outsource their embodied persons to the hands of device makers and software engineers, they risk self-alienation and confusion regarding their body–soul identity and their human agency (PCB 2003). They *may* become smarter, stronger, and ageless. But, even in such an eventuality, rather than being the ones in charge of their self-transformation, each person would become a passive patient of another's transforming powers. What's more, under this mechanistic view, where techno-medical practitioners see no need to engage the person, the spiritual component of their patients, they undermine their oath to do no harm. As a pastoral letter of the American Catholic Bishops warns: technology focused strictly on bodily improvement provides limited hope for healing the whole person (USCCB 1981, 12).

The anthropological truth that the body is an integral part of the human person inextricably linked to the spiritual component holds no place in the philosophical underpinnings of the transhumanist agenda. Embodiment is, in the dualistic transhumanist perspective, optional. Not only can the body be dramatically altered, it can, according to the ultimate transhumanist goal of uploading human consciousness to computers, be done away with completely in hopes of pursuing "virtual immortality." Since virtual life forms are neither alive nor capable of social interaction, the transhumanist blueprint of "living forever" not only demolishes the basic good of human life, it also helps to extinguish the good of human society. And the wanton destruction

of human embryonic life is the precise horror of Mitalipov's CRISPR research.

Furthermore, transhumanist medicine replaces the traditional concept that spiritual formation comes from virtuous living and good character with the notion that reduces moral growth to mere materialist enhancement. The transhumanist playbook dictates people will automatically become more upright—less violent, less greedy, less selfish—to the extent they become smarter, stronger, and longer lived. Of course, being students of history and human experience, we can quickly disabuse ourselves of that idea.

Dr. William Hurlbut, Department of Neurology of the Stanford Medical Center, underscoring the complexity of our body–soul unity, warns that pushing our cognitive capacities beyond normal bodily levels, especially through neural interfacing, may "underestimate the delicate equilibrium within the natural channels of sensory input, analysis and action. . . . The flow of these inputs is harmoniously governed through highly refined channels that might be easily overloaded, unbalanced or otherwise drastically disrupted" (Hurlbut 2014, 20).

Failure to Respect Full Human Flourishing

In 2003, The President's Council on Bioethics examined the populist and essentialist concerns over enhancement technologies that we consider here. What the Council said about the threat to full human flourishing from enhancement biotechnologies of 2003—most of which were still only in the minds of their developers—applies with remarkable prescience to the more developed GRIN technologies of 2018.

> What if everybody lived life to the hilt, even as they approached an ever-receding age of death in a body that looked and functioned . . . like that of a thirty-year old? Would it be good if each and all of us lived like light bulbs, burning as brightly from beginning to end, then popping off without warning, leaving those around us suddenly in the dark?
>
> . . . there seems to be something misguided about the pursuit of utter and unbroken psychic tranquility or the attempt to eliminate all shame, guilt, and painful memories. Traumatic memories, shame, and guilt, are, it is true, psychic pains. In extreme doses, they can be crippling. Yet, short of the extreme, they can also be helpful and fitting. They are appropriate responses to horror, disgraceful conduct, injustice, and sin, and, as such, help teach us to avoid them or fight against them in the future.
>
> Living with full awareness and acceptance of our finitude may be the condition of many of the best things in human life: engagement, seriousness, a taste for beauty, the possibility of virtue, the ties born of procreation, the quest for meaning. . . . The pursuit of perfect bodies and further life extension might deflect us from realizing more fully the aspirations to which our lives naturally point, from living well rather than merely staying alive.
>
> . . . It is a life not of better genes and enhancing chemicals but of love and friendship, song and dance, speech and deed, working and learning, revering and worshipping. If this is true, then the pursuit of an ageless body may prove finally to be a distraction and deformation. And the pursuit of an untroubled and self-satisfied soul may prove to be deadly to desire, if finitude recognized spurs aspiration and fine aspiration acted upon is itself the core of happiness. Not the agelessness of the body, nor the contentment of the soul, nor even the list of external achievements and accomplishments of life, but the engaged and energetic being-at-work of what nature uniquely gave to us is what we need to treasure and defend. All other perfections may turn out be at best but passing illusions, at worst a Faustian bargain that could cost us our full and flourishing humanity. (PCB 2003, chap. 6, 21)

Part Three: A Catholic Medical Think Tank to Analyze, Evaluate, and Regulate Transhumanist Medicine

Transhumanist endeavors threaten the foundations of human health and medicine. Countering that threat is going to require decisive, bold initiatives. Here is one possible remedy: Assembling a Catholic medical think tank—the wisest of our ethicists, lay and episcopal administrators, and healthcare providers from the Catholic Medical Association, the National Catholic Bioethics Center, and the Catholic Health Association—to analyze, evaluate, and regulate current and futurist GRIN transhumanist technologies—intervention by intervention—and their place within US Catholic healthcare centers.

We need to examine transhumanist means and goals carefully. Catholics are in an ideal position to spearhead an all-commission dialogue that draws both upon our best medical insights as well as the repository of wisdom and human experience within our Christian anthropological and theological traditions to understand what Catholic medicine is and will be up against with GRIN technological interventions. Thus, might it be possible to identify those treatments already out there, those that, in the near future, will be ready for clinical application and those that are still in the mind of the researcher or in the research and development pipeline and distinguish, to the extent possible, those transhumanist mediations that (1) could be used solely to treat patients for various pathologies, (2) could, at once, both treat and enhance patients, and (3) could be accessed only to enhance others who are of normal health.

The proper dominion of man over nature and technology, the dignity of the human person, and the common good as a just participation for all must illuminate, guide, and discipline both the research phase of these GRIN technologies and their application phase. Such a commission could investigate and evaluate the "products" of these various upstart biotechnical companies as well as design and execute in-service conferences to educate Catholic healthcare providers about the goals and means of transhumanist medicine and the extent to which each of their interventions conform to Catholic medical-moral principles.

There is a need to draw up guidelines, extensions of the ERDs, to regulate the use of these transhumanist endeavors as, intervention by intervention, they become clinically available within centers of Catholic health care. Is there any possibility of influencing futurist entrepreneurs like Elon Musk, Bryan Johnson, George Church, Nick Zuckerberg, or Nick Bostrom to limit their interventions to therapeutic ends and to suppress altogether those that can be reasonably shown to alter what it means to be human? Is there a way for Catholic medical representatives from this commission to lobby federal lawmakers to place legal limits on the use of any transhumanist interventions that represent a health/safety threat, unequal access, or that are designed to intrinsically alter what it means to be human?

The medicalization of transhumanist technologies demands our undivided attention STAT.

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