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Chapter 3

Religious Traditions and Genetic Enhancement

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Among important new biotechnologies are those that offer the promise of genetic intervention, both to correct genetic anomalies and to enhance human capacities. In this chapter, we ask: How do different religious traditions assess the possibilities for genetic enhancement? Understandings of "nature" become crucial here. Do religious traditions have a view of nature that impacts their approach to new genetic technologies? Do they see nature as a given that should not be changed? Do they see genetic enhancement as an alteration of nature, and if so, is that alteration acceptable? How does the approach to nature of a tradition impact its evaluation of the ethical acceptability of genetic enhancement? Is altering nature a shift to something 'non-natural' or 'unnatural,' or is nature itself understood as always in flux, so that alterations are simply in accord with nature? Inherent in the question of altering nature is an incipient moral charge, an ethical electricity, so to speak. If the form of altering nature to be considered is genetic enhancement, it is intuitively and immediately considered a moral matter.

Our approach to these questions takes the following form. We begin with some caveats, definitions and clarifications: what is "enhancement," how does it differ from "eugenics," what is "nature," how is the concept of nature relevant to moral norms or ideals? We then offer four case studies or scenarios involving possible genetic enhancement. Our third section reviews in turn a number of traditions: Judaism, Roman Catholicism, Protestantism, Hinduism, and Buddhism. In this section, we include a brief discussion of feminism as an important contemporary tradition that emerges in and draws from several religious traditions. As we look at each of these traditions, we will attempt to indicate how this tradition would reflect upon the four case scenarios.

The vastness and complexity of millennia of religious practice provide a formidable challenge. For sources, we have elected to analyze primarily texts ancient and modern, especially the writings of theologians or ethicists whose thinking brings us close to the issue at hand, namely, genetic enhancement. We report the classic or contemporary spokespersons at the heart of a religious tradition, or cite those who have commented on the focal ethical issue. We recognize that this dependence on the written word may not reflect actual practice in those traditions. We further recognize that no great religious tradition is monolithic; all include various perspectives and even subversive discourses. Yet, we believe that if we can report a theological

commitment or spiritual thrust that authentically articulates a tradition's fundamental vision, we will have provided a service to those sorting through today's ethical challenges.

3.1 The Shadow of Eugenics

No contemporary discussion of genetic enhancement can escape the legacy of suspicion and distrust left by the earlier eugenics movement. The publication of Sir Francis Galton's *Hereditary Genius* in 1869 sparked a long and controversial tradition of interest in the genetic 'improvement' of humans. The United States became one of the centers of eugenic thought. It is important to note that many eminent scholars in the first half of the twentieth century were associated with this movement (see Kevles, 1992, 5; Peterson-Iyer, 2004, 49–51; Lombardo, 2003, 209). That association has left a legacy of distrust of genetics in some communities.¹

The worst atrocities of the eugenics movement involved compulsory measures such as compulsory sterilization and racial 'cleansing.' In the United States, more than 60,000 people were sterilized in the twentieth century (Lombardo, 2003, 202). Legal support for sterilization laws drew from the famous declaration of Chief Justice Holmes in *Buck v. Bell* that Carrie Buck could be forcibly sterilized on grounds that she, her mother, and her child were all 'feeble-minded' and that "three generations of imbeciles are enough" (Robitscher, 1973, 10–11). In Nazi Germany, of course, eugenics took the form not only of elimination of those who were considered feeble-minded, but also, explicitly racially, of the elimination of hundreds of thousands of Jewish people. In the United States as well, the eugenics movement focused not only on mental 'defect' but on blindness and other physical attributes. Fear that any emphasis on genetic enhancement will fuel the seemingly dead embers of that compulsory movement can still be seen.

However, the eugenics movement was not all compulsory. From the beginning, the eugenics movement incorporated voluntary efforts to have children who were advantaged mentally or physically. More recently, the development of molecular genetics has allowed, in the view of an eminent scientist, a 'new eugenics' focused not on large population groups but on individual parents; and "the new eugenics would permit in principle the conversion of all the unfit to the highest genetic level" (Robert Sinsheimer, quoted in Keller, 1992, 289). Even where compulsory efforts are condemned, therefore, voluntary efforts at improving the health or characteristics of children are seen as contributing to a new emphasis on eugenics. Some see this new emphasis as dangerous precisely because of its subtlety and its distance from compulsory measures (see, e.g., Duster, 1990).

¹ It is significant that feminist and African American approaches to bioethics and genetics often begin with or include a discussion of eugenics. See Peterson-Iyer (2004), Long (1997), and King (1992).

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Thus, "the manner in which the eugenics movement developed cast a long shadow over the growth of sound knowledge of human genetics...."² In spite of the fact that the eugenics movement took many forms and that there is no single meaning to the term 'eugenics,' the term today carries a largely negative connotation (Lombardo, 2003, 202). Any association between genetic enhancement and eugenics will pick up this negative connotation.

As we approach our clarifications and descriptions, therefore, we are mindful of the need to remember and honor the painful legacy of the past. At the same time, we believe that contemporary genetic interventions need not carry a negative association with eugenics. To that end, some clarifications are in order.

3.2 Therapy vs. Enhancement

Many contemporary discussions of genetic intervention make a distinction between therapy and enhancement. For example, the President's Council on Bioethics defines *human gene therapy* as directed genetic change of human somatic cells to treat a pathological situation, a genetic disease or defect (President's Council on Bioethics, 2002). By *human genetic enhancement* they refer to the use of genetic knowledge and technology to bring about improvements in the capacities of living persons or future generations. "Genetic enhancement" generally refers to the transfer of DNA material intended to modify non-pathological human traits. The distinction between therapy and enhancement implies drawing a line between what is necessary to heal and what is desirable for reasons going beyond good health. Enhancement involves efforts to make someone not just well, but better than well, by optimizing attributes or capabilities. The goal might even be to raise an individual from standard to peak levels of performance. Eric Juengst defines enhancement this way: "The term *enhancement* is usually used in bioethics to characterize interventions designed to improve human form or functioning beyond what is necessary to sustain or restore good health" (Juengst, 1998, 29).

There are thus two ways to distinguish therapy from enhancement. One way is to identify therapy with a pathology and enhancement with the nonpathological. Another way is to identify therapy with genetic intervention that would bring an individual up to what is average and enhancement with interventions that would bring an individual beyond the average up to a level of excellence above others. We find the second way most helpful for our conversations, though we will raise questions about the distinction between therapy and enhancement.

The distinction between therapy and enhancement often carries a value connotation: 'therapy' is a good word and 'enhancement' is morally suspect if not outright objectionable. Note the assumption in a passing remark by Francis Fukuyama: "One obvious way to draw red lines is to distinguish between therapy and enhancement.

²From the 1961 Presidential address of L.C. Dunn, quoted in Lombardo (2003, 191).

directing research toward the former while putting restrictions on the latter" (Ukuyama, 2002, 208). Much ethical discussion to date has concentrated on the distinction between therapy and enhancement, asking whether a clear line can be drawn between them. The importance of this distinction will become clear when we turn to the discussion of Roman Catholic, Protestant, and Feminist ethics in particular.

In what we present in this paper, we will not concentrate on providing a precise distinction between therapy and enhancement. Indeed, we find such a distinction blurry and, hence, problematic. Nonetheless, we find that much of the literature uses such a distinction as though the line between therapy and enhancement is morally relevant.

Another distinction has been important in ethical discussions to date—the distinction between ‘somatic cell’ gene intervention and ‘germline’ intervention or Inherited Genetic Modification (IGM). When the objective is enhancement, the inserted gene may supplement the functioning of normal genes or may be superseded with genes that have been engineered to produce a desired enhancement. Such gene insertion may be intended to affect a single individual through somatic cell modification, or it may target the gametes, in which case the resulting effect could be passed on to succeeding generations. Thus, enhancement may apply to somatic cell modification or it may apply to what is sometimes called “germline” or inheritable genetic modification. Our focus will be on somatic cell interventions. There is presently considerable unanimity against germline intervention; hence, it is somatic cell interventions that raise the most pressing ethical issues.

At the level of the genome, we observe, enhancement might be accomplished in one of two ways, either through genetic selection during screening or through directed genetic change. Genetic selection may take place at the gamete stage, or more commonly take the form of embryo selection during pre-implantation genetic diagnosis (PGD) following in vitro fertilization (IVF).

Directed genetic change could be introduced into early embryos, thereby influencing a living individual, or by altering the germline, thereby influencing future generations. To attain genetic change, exogenous genes would be sent into existing cells aboard a vector, most likely a modified virus. One or two genes can be introduced in this manner.³ This makes genetic change an effective technique for dealing with a disease precipitated by a single mutant gene—that is, it is effective for some forms of genetic therapy. It is less likely to be effective for purposes of enhancement. The most desirable human traits—the traits most likely to be chosen for enhancement—are thought to be the result of interactions of many genes and their products.⁴ Successful enhancement may require the introduction or modification of

³The understanding of gene with which we work here is this: a gene is a segment of DNA that provides the source of a phenotypic trait. Some traits are due to multiple genes interacting with environmental factors.

⁴Steven Pinker, a brain and cognitive science researcher at M.I.T., sees the multiple gene factor as the “Achilles heel of genetic enhancement.... We know that tens of thousands of genes working together have a large effect on the mind.” Single gene changes, which may be technologically feasible, will not suffice for enhancement (President’s Council on Bioethics, 2001).

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numerous genes. Such a proposal would require technical capabilities beyond what is currently available in therapy vector techniques.

Modest forms of enhancement are becoming possible. For example, introduction of the gene for IGF-1 into muscle cells results in increased muscle strength as well as health. Such a procedure would be quite valuable as a therapy, to be sure; yet, it lends itself to availability for enhancement as well. For those who daydream of so-called "designer babies," the list of traits to be enhanced would likely include increased height or intelligence as well as preferred eye or hair color. As of this moment, the science of genetics and the technology of gene transfer are not sufficiently developed to inaugurate a new industry of genetic enhancement.

Instead of depending on a distinction between therapy and enhancement, therefore, we will place this discussion within the context of asking: Can an ethic of genetic intervention for either therapy or enhancement or both be grounded in nature? Do different traditions understand nature as entailing its own ethic? Would nature forbid our altering human DNA as evolution has bequeathed it to the present generation? Can nature provide us with the ethical guidance we need at this juncture of scientific research and medical advance?

3.3 What Is Meant by 'Nature'?

What do we mean by nature? Does the word 'nature' simply describe the world as natural science describes it? Does the word 'nature' refer to a moral norm? Do the multiple meanings slip and slide in such a way that ambiguities enter into our discourse about it? Among the many ways that we speak of nature, here are six assumed meanings that flow through everyday speech (see Coates, 1998, 3).

First, nature is a *place*. Nature is the place where civilization is absent. Wilderness is natural, and we can go to the wilderness to visit it. Some of the forces of life present in the wilderness are included in parks and gardens, so that visiting parks and gardens give us a feel for nature and an appreciation for nature. Prior to the rise of human cities we assume nature was wild, untamed, and everywhere. In this sense, nature is both place and time. It appears to us as a *given*, what we have inherited, what originally existed prior to our control.

Second, nature is our *comprehensive cosmos*. Nature is the composite totality of the cosmos, from the big bang in the past to the present fifty billion stars and anticipating its future demise due to entropy. The evolutionary history of life on planet Earth is one tiny chapter in the epic history of nature. Nature in this sense is not something opposed to human civilization, but something larger that encompasses civilization as well.

Third, nature provides us with *essence*. As essence, the nature of something can be minimalist or sublime. In its minimalist form, to speak of the nature of something is to point out its actual characteristics: its nature (*natura*) or quiddity (*quidditas*) defines a thing by its primary qualities. In its sublime form, nature (*natura*) identifies the fundamental—even transcendental—characteristics of an entity or

species in essence (*essentia*) and sets criteria for its existence (*esse*). In the latter case, the actual existence of something can undergo estrangement from its essential nature. This implies that what we see or perceive might not be true nature, but rather a distortion. The phenomena we daily see both hide and reveal an underlying nature, and this underlying nature constitutes the essential identity and even the value of an entity or a person. Nature is a quality or principle that informs or shapes or directs the empirical physical world, but it is not reduced to the physical reality. Nature is more real than what is merely physical. When nature is thought to be equivalent to essence, it takes on ethical valence. Nature becomes the source of value and the reference point for moral normativity.⁵

Fourth, building on what was just said above, nature can become the *guide* and even the inspiration for directing social affairs. Nature in this sense would be normative. It provides moral authority and orientation for governance. Green movements convey this sense of nature. The romantic tradition evokes a sense of mystical bond, wherein nature is at first alien but then intimate. The realization of this intimate unity with nature becomes the spiritual goal.

Fifth, nature is the *opposite of culture or artifice*. What human beings add to the history of nature is technological, and products of human technology are thought to be artificial. What is artificial is the opposite of what is natural. Whereas culture and its technology are anthropocentric—that is, oriented toward the human race—nature is that domain wherein humanity is not central but rather one expression among others of life on our planet. As the opposite of culture, this fifth definition is the flip side of the first definition of nature as place or what is given.

Sixth, nature is the result of a divine act of *creation*. Religions in the biblical tradition—Judaism, Christianity, Islam—view the origin of the natural world as the product of a divine action. Nature is not eternal; rather, its existence is contingent upon God's will and God's act of drawing the world into being from nonbeing. According to the doctrine of creation, human beings are fully natural, embedded in nature, creatures among other creatures. Nature is thought to give glory to God. It is dubbed "good" even if still in need of transformation.

Not all religious traditions proffer a doctrine of divine creation. Buddhism, for example, sees the physical world as the current state of co-dependent co-arising, *pratityasamutpada*. The ceaseless interaction of physical and mental processes provide the backdrop for spiritual striving, according to which human consciousness strives for enlightenment, for transcendence of the natural world. We human beings are born natural; our goal is to transcend our birth.

These alternative definitions of nature are not necessarily rivals. They can complement one another. When dealing with the ethical question of genetic enhancement,

⁵Treating nature as essence has played a significant role in theological deliberation. Roman Catholic theologian Richard P. McBrine (1995) provides a relevant definition. Nature is "that which is basic and unifying in anything existing independently of human action or chance, contrasted to what in it is superficial or transient." Note the transcendental and impossible status of nature as essence here.

our focus will be on nature as essence or guide, but it will be important to see whether concerns arise for what is 'artificial' or 'unnatural' as well.

A crucial question when we address the meaning of "nature" is how *human* nature is to be understood. Are we simply part of nature? Are we different from nature? When Descartes declared "I think, therefore I am," did he extricate human subjectivity from the objective natural world? Postmodern hermeneutical philosophers and holists hold that this extrication of the human subject from the natural world is an abstraction, maybe even a delusion. The human being is as much a part of nature as is the natural world the human being studies. Furthermore, the study and even the technological alteration of the world are as natural as the world being understood or altered. Nature is inclusive of both subject and object, of both human and non-human. Theologian Jürgen Moltmann makes this point: "Human beings no longer stand *over against* nature, as the determining subjects of knowledge and endeavour. As the determining subjects of knowledge and endeavour they are also part of a history *with* nature. They *have* nature—possess it—and yet they *are* themselves, at the same time, nature, which goes on developing in them and in their world" (Moltman, 2003, 15, italics in original). Still, there are some strands within religious traditions that place humans either outside of "nature" or as having a special place within "nature," such that "human nature" becomes a special category. Where alteration of nature might not be problematic for those strands of traditions, alteration of human nature can still be problematic.

The concept of therapy reminds us that nature can kill us, and in the end it finally will. While on the way toward our death, greater or lesser degrees of pain and suffering become options. Therapy employs science and technology as well as loving care to reduce suffering, to increase human wellbeing, to make life meaningful and even joyful. In the case of inheriting genetic predispositions to debilitating disease, we need to ask: does our genome belong to our nature, to the essence of who we are? Does our inherited genome say anything that counts as a moral guide? Does nature destine us to suffer, thereby making therapy an alteration of who we essentially are? Does therapy require altering the genome, or is it sufficient to offer loving care in order to reduce suffering?

Does what we say about therapy also apply to enhancement? The concept of enhancement in the abstract seems to entail an assumption that nature is what is given. Figuratively, nature is a place prior to alteration by human technology. What is being enhanced is a course of nature that would otherwise be merely natural, not yet modified by intentional intervention. To this extent, human enhancement could look like making a garden out of wilderness. Yet, in our experience, it is more. For many critics and skeptics, enhancement assumes that what is given in nature is what is essential and, therefore, normative. To enhance, then, becomes a deviation from the norm, an alienation from essence. Is our nature prior to intervention definitive of our essence? Does unaltered nature serve as a moral guide to proscribe altering it by technology?

Contributing to this moral valence is the high value contemporary society places on DNA. At the advent of the Human Genome Project in the late 1980s and early 1990s, scientists spoke of DNA as providing the blueprint for human beings. DNA

became associated with the essence of life, and our individual genome became associated with our individual identity. Our very personhood has come to be associated with the particular set of genes we have inherited. In addition, idealized images of biological evolution were lifted up in our culture so that the human genome became thought of as a gift of nature. Nature, the benevolent giver of our genetic code, evokes amorphous religious sensibilities for many, leading some to attempt a "resacralization" of nature.⁶

With these various definitions of nature in mind, we ask: can "nature" be our guide when it comes to moral norms? Does the attempt to move from "nature" to ethics constitute a form of the "naturalistic fallacy"? Philosopher G.E. Moore was not the first one to raise the issue or use the term, though it is usually associated with him. There are in fact *two* crucial issues. One is whether ethical terms such as "good" or "right" can be *equated* with natural terms, such as "conducive to growth" or "admired by everyone." If we say, "that is good," is that statement equivalent to saying "that conduces to growth"? The other issue is whether normative ethical judgments about what is "good" or "right" can be *derived* from "facts"—i.e., whether they can be derived using inductive or deductive methods (Hancock, 1974, 14).⁷ In Volume One of this project, the chapter on "Philosophical Approaches to Nature" described the naturalistic fallacy in detail. For our purposes here we need only to ask: Do religious traditions derive norms from facts? Does the anthropology of a religious tradition forbid alteration of what we have inherited from nature for purposes of enhancement? Does the concept of altering nature within a religious tradition imply that DNA or the human genetic code be granted special status, that it be treated as sacred and therefore unalterable by technological means? How can we forecast future public debate over the ethics of genetic enhancement, and what role might spokespersons for various religions likely play?

3.4 Altering Nature with IGF-1

3.4.1 *The Thin Line Between Therapy and Enhancement*

As we explore forecasts for the future regarding public debate over genetic therapy and enhancement, we note that genetic enhancement may in principle apply to *germline* intervention on behalf of future children or *somatic* alteration on now-living persons. Growth hormone intervention is an example of the latter. Because germline intervention is discouraged and in some cases banned, the more realistic

⁶"Nature needs to be resacralized," writes Muslim philosopher Seyyed Hossein Nasr (1996, 270). "The resacralization of nature stands before us as the great mission of the coming age," writes Jeremy Rifkin (1981, 252).

⁷Albert R. Jonsen (1998, 73) describes the barrier to jumping from 'is' to 'ought' as "Hume's Hurdle."

option for the near future is enhancement via somatic DNA alteration. As we try to anticipate future ethical deliberations over genetic enhancement, perhaps our present experience with growth hormone could be instructive. We will now look briefly at a genetic version of the growth hormone debate; then we will look at growth hormone case studies themselves. This will be followed by a review of the fundamental commitments of different religious traditions that might eventually be brought to bear on ethical debates in this arena.

By using growth enhancement as a template, we have the advantage of examining a medical intervention that can be either genetic or conventional, making it possible to discriminate between the *genetic* alteration factor and the *enhancement* factor. Growth hormone is available as a protein; it is being offered already. It can also be given as a genetic altering procedure. So by talking about it in two different forms, we make clear whether the fact that we use a *genetic element* makes a difference. Giving the protein is accepted widely. Is there, then, a real difference between that and giving a gene? We note that providing a protein is temporary, whereas providing a new or altered gene is permanent. Does this make a difference? This may make a difference if the persons involved cede to DNA or to our genetic code some special biological status. If DNA is thought to belong to a person's natural essence, then altering it for purposes of enhancement may seem to be a violation of the sacred. This may seem to be the case. Whether it actually is the case in light of the way various religious traditions view nature is what we will explore.

The genetic version of the growth factor debate centers on the insulin-like growth factor I (IGF-1), which plays a role in the regulation of cell growth, differentiation and apoptosis leading to multiple potential therapeutic uses. As a neurotrophic factor, IGF-1 is being evaluated for diseases such as amyotrophic lateral sclerosis (ALS), a fatal motor neuron disease in which motor neurons are progressively lost from the spinal cord and brain. IGF-1 also stimulates hypertrophy of skeletal muscle via activation of satellite cells (muscle stem cells) and increased protein synthesis, therefore it has great potential for diseases affecting muscle such as muscular dystrophies.

However, systemic delivery of IGF-1 protein has yielded disappointing results due to limited bioavailability and toxicity. Too much IGF-1 is also not desirable; it can cause detrimental cell growth contributing to cancer growth and cardiac hypertrophy. Thus, IGF-1, as a therapeutic reality, requires achieving regulated levels of the protein in the desired tissue. Recent data using tissue-specific promoters and viral vectors to deliver IGF-1 to the muscle have shown encouraging results in both ALS and muscular dystrophy models. Many hurdles still remain, such as how to effectively deliver to all the affected tissues and how to regulate expression in vivo. Toxicity has not been observed in the animal studies even after observation into old age, but mice are not men (or women). Ultimately, gene transfer may not be necessary if small molecule approaches can be used to selectively activate the IGF-1 pathway in affected tissues. Either way, any progress is welcomed by doctors, patients and families in the devastating diseases for which IGF-1 may be therapeutic and no therapy currently exists.

Rodent experimentation is showing promise. IGF-1 was shown to increase muscle mass and strength in muscles of rats injected with an AAV vector expressing IGF-1 under control of a muscle-specific promoter. The intervention enhanced the effectiveness of resistance training (ladder-climbing) and diminished the loss of muscle mass and strength after training was ceased. Many clinical applications can be envisioned for such an approach such as facilitating recovery from muscle atrophy caused by injury.

Now, with this in mind, let us try this possible scenario. Photographs of California governor Arnold Schwarzenegger, as the editor of *Muscle and Fitness*, appear in an advertisement for a new drug to enhance muscle build-up requiring less training time and only a single administration. Another ad appears in AARP magazine for a new drug for the elderly to improve strength and reduce the risk of falls, which does not add another pill to the medicine cup or another thing to remember, just a single injection. Now, how do we compare the young athlete to the grandparent?

Researchers and clinical physicians worry about the potential for abuse by athletes (Minuto et al., 2003; Kniess et al., 2003; Lissett and Shalet, 2003).⁸ They are concerned about safety and about the ethical issue, namely, unjust advantages in athletic competition. Yet, they wish to improve the quality of life for aging patients. Where does one draw the line? Aging is actually accompanied by a reduction in IGF-1 and growth hormone levels. Perhaps replenishing these factors by the insertion of genetic material up to the levels of younger people could be a way to retard age-related muscle wasting. Would this be considered therapeutic or enhancing? Would it be any different if it was delivered as a protein or any other non-genetic chemical?

Some in the medical fields use the safety issue as the focus to avoid dealing with the difficult ethical dilemma. However, this may not pass the scrutiny of the expert eye. Although these genetic therapies may appear less safe because they involve gene transfer, the safety concerns are not much more risky than those that have arisen from protein therapies. For example, erythropoietin may increase the risk of cancer growth, and may also significantly improve quality of life. Hormone replacement therapy is another example where long-term use may provide improved quality of life, but it may also lead to increased risk of cancer or cardiovascular disease. Thus, the long-term use of a protein therapy is not so unlike the semi-permanent introduction of a gene into a post-mitotic tissue to generate a local *in vivo* protein factory.

As with any new drug in development, safety must be a primary concern and needs to be evaluated carefully. "Safety" is the watchword for secular deliberations over public policy, and it covers over, and in some quarters replaces, direct

⁸These data illustrate that although activity of the GH/IGF-1 axis declines with age, peripheral responsiveness to GH is not attenuated. This suggests that a decrease in GH responsiveness does not contribute to the age-related fall in circulating GH dependent peptides. Thus, for those embarking on trials of GH therapy or GH secretagogues in the elderly, the capacity to generate IGF-1 will not limit potential efficacy. Furthermore, the dose of GH replacement required for patients with organic GH deficiency is likely to be lower in the elderly compared with young adults.

confrontation with the ethical issues. Yet, we need to look the ethical issues straight in the eye. One way to do this is to turn from athletes and seniors to children, and look at four imaginary scenarios based upon what is now available.

3.5 Four Case Scenarios: The Ethics of Growth Hormone

As we anticipate the medium- and long-range futures regarding possible advances in gene splicing and genetic intervention, we might benefit from a template to sort out expected religious reactions to these advances in medical science. Our society has already had a taste of enhancement in its experience with growth hormone, so perhaps this partially understood phenomenon might provide insights regarding what might happen ethically when religious traditions confront the new genetics.

Our society places great emphasis on height, particularly for men. Statistically, taller men are perceived as more "successful" and earn more than shorter people. This may be a consequence of wider social values or of family upbringing. Children who are short for their age often suffer from being treated as though they are younger rather than just smaller. This often leads to decreased expectations from and by the child. These children may consequently suffer psychological harm—and, in some cases, serious physical limitations. Thus, there are physiological and psychological reasons for parents to desire normal, and in some cases supra-normal, growth for their children.

There are many conditions and diseases that can cause poor growth. Administration of growth hormone (GH), also known as somatotropin, has many effects in addition to growth stimulation during childhood. Most commonly touted in the general press recently have been its "anti-aging" and "muscle-building" effects. However, here we will only deal with its growth-increasing effects in children.

Most children with short stature grow at a normal rate and reach an adult height that is about the same as that of their parents. These children do not have a growth hormone deficiency. However, a child who grows at a slower than normal rate may have a growth hormone deficiency, regardless of his or her final height. In other cases, children do not have a deficiency of growth hormone, but may nonetheless be unusually short in stature.

Historically, treatment for GH deficiency has been limited to therapy by injection with GH protein four to seven times per week. This therapy usually lasts for years until the end of the child's growth period. GH protein was originally isolated from pituitary glands obtained at autopsy. In April 1985, pituitary-derived GH was removed from distribution in the United States and many foreign countries following the deaths of several patients from a very rare viral disease that may have been transmitted through the pituitary growth hormone they had received. In October of that same year the U.S. Food and Drug Administration approved the use of GH produced using recombinant DNA technology (rGH) for children with growth hormone deficiency. Recently, the FDA approved a supplemental application for its

use to treat children who are healthy but unusually short (defined as an adult height of less than 5 feet 3 inches for men and 4 feet 11 inches for women) without a known cause. This approval makes GH available to short children who may suffer from, but cannot demonstrate, a medical condition that is responsible for short stature. The FDA based its decision on studies that found the biosynthesized hormone Humatrope added between 1 and 3 inches in height to children who took it for four to six years, and that there were no significant health risks for the children.

Human GH protein therapy is now quite safe but still requires many years of repeated injections and is very expensive with a cost of \$30,000 to \$40,000 a year. If a genetic transfer approach could attain similar or even more dramatic effects, without added risks, the morbidity and cost of the therapy may be significantly decreased. This could significantly increase the number of children who receive exogenous GH. The decrease in monetary and intervention costs may also make this therapy more available to those with less economic and educational resources, although critics may argue that the expanded use of GH is likely to be misused for non-health reasons.

Suppose a gene therapy approach to treat growth hormone deficiency with a viral vector that requires only a single application per year is approved by the FDA. It would be much less costly and intrusive than the daily injections of recombinant protein previously required. This would seem as a godsend to many families, especially for those without previous access. However, the increased access and the use of genetic transfer would also raise potential societal ethical concerns. Consider the following four scenarios:

1. Johnny is a child with a severely retarded growth rate, diagnosed with Somatotropin Deficiency Syndrome, low levels of human growth hormone, and an estimated final adult height of only 3 feet 6 inches. He was to receive an injection of the engineered virus to transfer a functional human growth hormone (hGH) gene into his muscle and allow him to attain a normal growth rate. He may still be short, but could gain an extra 12–24 inches in final height.
2. A second boy, Bobby, could receive rGH protein injections based on an unusually short predicted stature. However, Bobby is not diagnosed with hGH deficiency. Although he is below the 25th percentile for his age group and has a predicted adult height of only 5 feet, he seems to have a normal growth rate. Like his parents, he is of unusually short stature. Gene therapy for this boy may add 6–12 inches to his height.
3. A third boy, Tom, is displaying a slightly slower than normal growth rate, and has a possible growth hormone deficiency. However, because of his genetic composition, he is within the norm of height for his age group although predicted to be shorter than his unusually tall family members. He is predicted to achieve an adult height of 5 feet 7 inches, compared to his six-foot-six father. Gene therapy may bring Tom to a height similar to that of his family members.
4. A fourth case is that of Erwin, a boy with normal growth rate and above average height. Erwin was well above the 97th percentile in the growth chart with a predicted adult height of 6 feet 4 inches, similar to that of his father. However, his

parents feel strongly that if he were 6 inches taller he would be a happier and more successful person. Gene transfer could achieve his parents' wishes for Erwin.

These four cases present distinct therapeutic and enhancement scenarios for a genetic drug that makes the patient's cells the manufacturing site for the final effector, the GH protein. As noted above, many contemporary theorists would try to assess these cases by making the distinction between "therapy" and "enhancement." Where there is a clearly measurable medical deficiency, administration of growth hormone, or use of a genetic intervention, would be considered "therapy." Thus, for example, use of genetic intervention in Johnny's case would be considered acceptable, and use in Tom's case possibly acceptable, since there is the possibility of a physiological abnormality. But the scenarios involving Bobby—and certainly that involving Erwin—do not easily fit the model of therapy. Administration of the hormone, or genetic intervention, would be seen as "enhancement" rather than therapy.

In our view, it is difficult to justify such a distinction. Although Bobby may not have a measurable physiological abnormality, he will surely suffer psychologically as much as Jimmy will. If it is suffering that justifies intervention, it is hard to see why intervention should be acceptable in the one case but not in the other. Here is one place where understandings of "nature" might become crucial: must there be some deviation from a natural norm in order for genetic intervention to be acceptable, or is suffering alone sufficient justification? Different traditions will answer this question differently, as we shall see.

Among the complexities to be encountered here are the "genetic exemption", the potential changes of what is self; the perceived or real permanency of introduced changes; the potential for horizontal transmission of the drug (infection); the potential—however remote—of vertical transmission (to unborn offspring); the "slippery slope" of using genetic manipulations leading to psychological, moral or even species changes; the differential access to interventions that could provide unfair advantages to elite members of a society, and many others. In the following sections, we look to see whether the way that different traditions interpret nature has a direct impact on how they understand the ethical acceptability of genetic intervention, and whether such intervention is considered therapy or enhancement.

3.6 Contemporary "Naturalism" and Genetic Arguments

As we turn to alternative religious visions that serve as foundational for ethical visions, we will look first at *Naturalism*. This school of thought has developed primarily in Western Europe during the post-Enlightenment period. When fully articulated, it proffers the view that the only reality we can know is nature, and that nature is exhaustive of reality. Further, our cosmos and our bodies are organized according to natural laws, and these laws never go on a holiday. The laws are always in effect. No divine interruption (as in miracles) or even divine guidance (as in providence)

is permitted. Naturalists see the world as a closed system, closed to supernaturalism, sometimes closed to all forms of transcendence. Although naturalism does not have a church or other form of institutionalization, it is a strong force in Western culture and influences public policy.

Naturalism and science are frequently associated. Science is seen by many as justifying the philosophy of naturalism. David Ray Griffin has provided insightful studies of the intellectual roots of naturalism, its marriage to modern science, and its conflict with religion. He provides a most illuminating definition for two levels of *Scientific Naturalism*.

In the *minimal* sense, scientific naturalism is simply a rejection of the world's most fundamental pattern of causal relations. Understood *maximally*, by contrast, scientific naturalism is equated with sensationalism, atheism, materialism, determinism, and reductionism. Thus construed, scientific naturalism rules out not only supernatural interventions, as just defined, but also much more, such as human freedom, variable divine influence in the world, and any ultimate meaning to life (Griffin, 2000, 11).

What this definition in two levels tells us is that naturalism is a worldview, which sees the world as a closed causal nexus, exhaustively governed by laws discernable by the scientist.

Because naturalism does not have a church, it could take up alliances with those in churches; and in fact naturalism in the minimal sense is seen as compatible with biblical religion, especially Christianity. "Scientific naturalism and Christian faith, properly understood, are both true. Truth is one, so all truths are compatible with each other. As far as both scientific naturalism and Christian faith are true, therefore, they cannot be in conflict" (Griffin, 2004, 9). Judaism can make alliances with naturalism as well. This is important for the contemporary public controversies surrounding genetic research in general and enhancement in particular. Naturalism comes to expression not so much as a tightly argued ideology, but more as an intuition in partnership with established religious intuition. What distinguishes the naturalistic influence is the crudely articulated maxim that nature provides moral guidance.

This may not be obvious because of widespread acceptance of instrumentalism. Instrumentalism is the view that science and technology are value-neutral. If we make instrumentalist assumptions, and if we ask about the source or ground of values which we want to bring to bear on the question of altering nature, curiously, values appear to come from *humanity* or *to humanity*. If we begin with technology, it appears that values must come from human subjectivity. Technology in itself is value-neutral, so those whom we label *instrumentalists* assume; therefore, we need ethical direction to guide our use of technology. Moltmann looks at it this way. "Technological reason must be freed from ethical, practical reason, but must at the same time be integrated into it. It is only in their continual interplay that the two can grow from one another. Taken by itself, technological reason offers no criteria for the goodness of what can be done with it. Taken by itself, ethical reason has no means with which it can fulfill its purposes" (Griffin, 2004, 9). What is being said here is that the technology by which we alter nature is value-neutral, and therefore, we need to appeal to human commitment for our ethical norm.

The naturalist position, in contrast, holds that human subjectivity is prompted by an essence within nature, so that we value nature as nature. Opposition to the instrumentalist view can be found among scholars who honor the public outcry against genetic technology. They see the outcry as an intuitive insight into a natural link between fact and value. These scholars are dissatisfied with the disjunction between fact and value presupposed by analytic philosophers, and dissatisfied with the removal of teleology from nature. Celia E. Deane-Drummond, a British Roman Catholic bioethicist, and Leon Kass, former Chair of the U.S. President's Council on Bioethics, both appeal to what is natural for our essence and hence ethical norm. For these ethicists, values come to humanity from nature.

Celia E. Deane-Drummond tries to perceive purpose within nature while avoiding superimposing purpose from the outside. To accomplish this she retrieves the concept of latent dispositions toward essence.

Aristotle and Aquinas approached moral theory very differently, using an ontology of dispositional essence. Such a scheme breaks down the fact/value distinction, so that it is the disposition of the natural process towards some goal that forms part of its nature. In other words, the good is not added to the fact about the natural world, but is inherent in it as it progresses towards its goal. The value is the end of the natural process (Deane-Drummond, 2002, 212).

She retrieves Aristotelian categories such as final cause to buttress her position. Deane-Drummond is well aware that modern science rejects final causation; science has explicitly expunged purpose and design and especially progress from biology. Yet she presses on to apply her theory of inherent value to an ethic that draws limits to genetic engineering. She applies the notion of latent essence to genes. "While teleology is officially rejected by science, I suggest that the idea of latency is not, especially in the light of our current knowledge that different genes are switched on and off at different stages of development of complex organisms. This dynamic understanding of creaturely being is far closer to Aquinas' notion of essence compared with the fixed ontology of Moore" (Deane-Drummond, 2002, 213). This leads to sympathy for the public intuition that we should refrain from xenotransplantation and cloning.

A connection is here presumed to exist between nature's essence and our human intuition. This becomes grounds for an argument raised with considerable passion and drama by Leon Kass. "There is something deeply disquieting in looking on our prospective children as artful products perfectible by genetic engineering, increasingly held to our willfully imposed designs, specifications, and margins of tolerable error....a major violation of our given nature" (Kass, 1998, 23). Nature communicates its essence to our intuition, believes Kass, and we need to listen to the wisdom of our repugnance when that essence is violated.

What causes anxiety and concern for Kass is the danger inherent in Promethean hubris, the temptation for human beings to play God, what some call "Brave New World" or the "Post-human future." This danger derives from the human pursuit of perfection. We see it in enhancement, not therapy. Medical science will be capable of providing significant improvement in human health through genetic therapy, notes Kass, and for this we should be grateful. Medicine is not, despite what some people

think, a form of mastery over nature. Rather, medicine acts as a servant to aid nature's own powers of self-healing to overcome a deficiency in natural wholeness. Yet, this same medical science may tempt us to enhancement, and the problem here is that enhancement is based upon unrealizable fantasies about human perfection. The seductive lure of perfection appears in our projection of ends such as ageless bodies, happy souls, better children, a more peaceful and cooperative society, and such.

The fantasy of perfection provokes two philosophical problems, according to Kass. The first is the problem of ends and means. The present generation does not have a clear focus on the good, on the proper end or goal of pursuing perfection. We risk becoming homogenized at a level short of excellence. In a moment of eloquent flourish, Kass says,

We are right to worry that the self-selected non-therapeutic uses of the new powers, especially where they become widespread, will be put in the service of the most common human desires, moving us toward still greater homogenization of human society—perhaps raising the floor but greatly lowering the ceiling of human possibility, and reducing the likelihood of genuine freedom, individuality, and greatness (Kass, 2003).

The second problem on Kass' list is the loss of normativity determined by our nature. The natural normativity Kass is referring to here is our finitude. As finite creatures, we can expect to age, deteriorate, and die. Recognized finitude spurs aspiration; and aspiration acted upon becomes the core of happiness. Such happiness cannot be gained through technological intervention, but only through expression of the essential soul which nature has endowed to each of us. "I have tried to make a case for finitude and even graceful decline of bodily powers. And I have tried to make a case for genuine human happiness, with satisfaction as the bloom that graces unimpeded, soul-exercising activity" (Kass, 2003).

What we have here are ears straining to listen to what nature might be saying to us, asking what if any limits we might consider when contemplating intervention into the human genome. Deane-Drummond would like to avoid committing the naturalistic fallacy while still incorporating sensitivity to nature into her theologically informed vision. Kass listens to nature alone. On the bases of what nature whispers in their ears, both Deane-Drummond and Kass end up closing the door to enhancement even while leaving it open for some therapy.

What this type of naturalism opposes is human hubris in pursuit of perfection. We observe that perfection may not apply to what is at stake in the enhancement controversy. Rather than perfection, many families who entertain the possibility of genetic enhancement are simply looking for betterment. Short of ultimate perfection, medical enhancement alters our inherited nature by offering a better life.

3.7 Roman Catholic Views on Therapy and Enhancement

We now move from *Naturalism* to *Natural Law* squarely within Christianity. Any contemporary Roman Catholic approach to ethical considerations surrounding therapy and enhancement will almost inevitably draw on a long tradition of appeals

3 Religious Traditions and Genetic Enhancement

to natural law combined with commitment to human dignity in community. In this section, we will provide some background discussion of Roman Catholic theological precedents and methods, and we will attempt to forecast how Roman Catholic moral theologians are likely to assess genetic therapies and possibilities for enhancement.

In Roman Catholic tradition, "the words of scriptural revelation alone do not suffice to establish ethical norms, and therefore recourse must be had to the being or nature of man" (Grundel, 1975, 1017). According to Roman Catholic natural law theory, there exists a human essence, here called the "nature of man." This essence is discernible through human reason apart from special revelation. This essence sets limits on what people may do to themselves and to others.

The nature in natural law theory is not the laws of nature that would be described by a physicist or biologist. Rather, it is a natural *moral* law, built into the order of things as established by God the creator. Thus, nature is already graced. Nature points beyond the mere physical toward the end or *telos* of the creature. The natural law, then, incorporates an element of transcendence. It is a way of speaking about God's intentions for human beings, and about our proper ends, toward which human activity should be oriented. It is the participation of the eternal law in the rational creature that is the natural law (*Summa Theologica* II.1.Q.91, A2).

Because the natural law is discernible by reason, it is universal. It is not limited to believers or those with special revelation. In Catholic tradition, therefore, this natural law should be the basis for all positive law and for all human ethics. In this way, Christians and non-Christians have grounds for dialogue about ethics.

Contemporary Roman Catholic moral theologians affirm that nature changes, both through evolution and through human design (Grundel, 1975, 1020). The latter raises the question of deliberate change: should we alter nature? What alterations are ethical, and what alterations represent an unethical violation of the natural law? "Interventions in the course of nature are in fact to a great extent desirable for [human] existence. Hence, they are not *ipso facto* immoral. But they must not be detrimental to [human] dignity" (Grundel, 1975, 1019–1020).

Human dignity therefore emerges as a central norm that sets limits on human interventions into nature. Thus, the natural law norm does not stand alone; rather, the role played by human dignity in contemporary Roman Catholic ethical thought is decisive. The role of dignity emerges in several ways.

First, as with Enlightenment culture in general, dignity means that we treat each human individual as an end and not merely as a means to some further ends. When coupled with the understanding that life is human "from the moment of conception to death" (McKenny, 2000, 303), this norm prevents destruction of the embryo, even the very early conceptus or blastocyst. Thus, Roman Catholic moral reflection generally rejects any and all research that might involve the destruction of an embryo, such as stem cell research or attempts at cloning. Any genetic intervention that might destroy an embryo, even if done for purposes of developing genetic therapies, would be forbidden in this view.

Second, dignity involves an understanding that humans must be seen as "one in body and soul" (McKenny, 2000, 303). To respect in this way means to reject any

technologies that separate the act of procreation from the biological and spiritual union of husband and wife. For this reason, the Roman Catholic Church has consistently rejected interventions such as in vitro fertilization or artificial insemination. Any new technologies that involve manipulation of the embryo, or creation of the embryo, outside the womb will be seen to violate this understanding of human dignity.

Finally, human dignity includes an affirmation that human life must never be reduced to the status of an object (McKenny, 2000, 303). Hence, for example, the life and health of some may not be pursued at the expense of reducing others to objects to be manipulated. Since personhood begins at conception, this principle extends to research using human embryos (Catholic Bishops' Joint Committee on Bioethical Issues, 1995). Enhancement would be prohibited if it objectifies the person.

These affirmations about human dignity, respect for life, and human liberty mean that therapeutic interventions can be accepted when they are designed to restore health or improve one's condition. However, most germline gene therapy would be excluded because it involves direct manipulation of the human embryo, in a situation where the embryo cannot exercise its liberty to consent. While there might be circumstances in which enhancements could be countenanced, the general tendency is to stress the correction of maladies and this casts "a general suspicion on enhancements and eugenic efforts" (McKenny, 2000, 303).

While several contemporary Roman Catholic theologians, notably Richard McCormick, Thomas Shannon, and James Keenan, extend natural law theory in different directions, none rejects the basic Roman Catholic ascription of value of human life from the moment of conception. The official Vatican teaching, however, is extreme:

The Church has always taught and continues to teach that the result of human procreation, from the first moment of its existence, must be guaranteed that unconditional respect which is morally due to the human being in his or her totality and unity in body and spirit:

The human being is to be respected and treated as a person from the moment of conception; and therefore from that same moment his rights as a person must be recognized, among which in the first place is the inviolable right of every innocent human being to life (John Paul II, 1995; see also Congregation for the Doctrine of the Faith, 1987).

Any efforts at enhancement that would require manipulations of the embryo or possible loss of embryonic life are prohibited by this understanding of the guarantee of respect due to the human beings at all stages of life.

It is clear, then, that the natural law method, with its stress on human dignity, will set limits on what medicine and technology may do. Technologies that separate lovemaking from procreation will be rejected. Technologies that involve destruction of the early embryo will be rejected.

It is less clear, however, what the implications might be for gene therapy and enhancement. On the one hand, it seems consistent that most forms of gene therapy would be accepted. Since therapy is designed to fulfill human purposes and enable one's proper *telos*, therapeutic interventions are generally accepted in Roman Catholic tradition. Of our case scenarios, therefore, it seems very likely that

Roman Catholics would approve genetic intervention for Johnny, who is diagnosed with Somatotropin Deficiency Syndrome.

But what about the other case scenarios? What about Bobby, who will be very short but has no diagnosed deficiency? Or Tom, who may have a deficiency but again it is not diagnosed? Or Erwin, who has no diagnosed deficiency and who will already be fairly tall, though not as tall as his parents would like? There is nothing in principle in Roman Catholicism to prevent efforts at enhancement, if these efforts could also be seen as moving humans toward our proper ends. For example, if certain forms of excellence are among the ends of human beings, then it is possible that drugs that help people to focus mentally and to achieve such forms of excellence might be accepted.

At the same time, it is to be expected that most Roman Catholic theologians will not find themselves very comfortable with enhancement. The problem lies not in the technologies themselves (as it would for stem cell research or cloning, which involve the destruction of embryos), but in an understanding of what "excellence" means. The Catholic tradition has stressed the development of certain virtues, such as courage and fortitude, justice and temperance. Would temperance cease to be a virtue if it is enabled by administration of a drug, rather than by development of character over time?" As Donal O'Mathuna, a Protestant writing in a Roman Catholic organ, puts it, "Drugs can enhance people's sex lives, relieve baldness, increase height, improve concentration and hence take away conditions that many feel cause them to suffer needlessly. But is it appropriate to use the powerful tools of medicine to relieve these forms of suffering?" (O'Mathuna, 2002, 278).

Moreover, Catholic moral theology would always raise the question of whether true human ends, such as justice and mercy, are served by technological interventions. Mathuna notes that Catholics are leery of using medicine for enhancement because efforts at enhancement are so obviously bound up with value choices: "In making a person taller medicine promotes the belief that short people are of lesser value and that height is significant in achieving the good life" (O'Mathuna, 2002, 283). Some of these values are questionable from a Christian perspective: "Physical health is not the ultimate priority in Christian eyes" (O'Mathuna, 2002, 284). In short, if the *telos* or proper end of human life is the development of a relationship with God and the cultivation of those excellences or virtues necessary for living in community, then even some forms of suffering can be seen as serving those ends. Not all suffering should automatically be removed from human life. "Attempting to remove the trials and difficulties of life by genetic enhancement might derail the very ways in which God wants to shape our characters" (O'Mathuna, 2002, 295).

This position would not immediately posit a mandate to provide gene therapy for all forms of suffering, and it certainly would raise questions about the legitimacy of genetic enhancement. Thus, it seems very unlikely that any of these three scenarios would be considered acceptable in Roman Catholic tradition. Although increased height may be important for social standing or even for psychological health, Catholic tradition is much more likely to stress the virtues or excellences of

²³ "The President's Commission on Bioethics suggests as much. See Kass (2003).

character. Hence, if Bobby, Tom, and Erwin suffer to some extent because of their lack of height, this may simply be an opportunity to develop the strength of character to deal with adversity.

In summary, Roman Catholic tradition is long and complex. It is probably more accurate to speak of natural law *traditions* than of a single tradition. Thus, it is risky to generalize in a few paragraphs. Nonetheless, the central emphasis on human dignity, the affirmation that human life is to be seen as inviolable from the moment of conception until death, and the stress on development of virtues or excellences in human life all tend toward a conservative stance when it comes to genetic interventions for enhancement purposes. Nonetheless, we note that there is no automatic rejection of technology. What is rejected is any action or intervention that disrespects human dignity, understood as the unity of body and soul, the value of each human life, and the importance of human freedom and character.

3.8 Protestant Views on Therapy and Enhancement

Like Roman Catholic moral theologians, Protestant ethicists are conscientiously searching their respective traditions for precedents and core convictions to guide them through the perplexing array of new challenges posed by the frontier of scientific research. Coming from the sixteenth century Reformation in northern Europe, the core convictions of these protestors within the western Latin church became salient through appellations such as *solus Christus* (Christ alone), *sola scriptura* (Scripture alone), *sola fide* (faith alone), and *sola gratia* (grace alone). The overarching ethical commitment common to Reformation theology is a commitment to neighbor love springing spontaneously out of the freed or liberated human heart. Sometimes called *agape*, this love is a free expression of one's Christian faith rather than an appeal to a commandment or law. Ethics for the Protestant is closely connected to freedom, and freedom when exercised is creative.

Turning to the specific matter at hand, this freedom is tested by the question of enhancement. To date, few Protestant thinkers have weighed in on the question; yet, we do have some testimony by thoughtful Protestant ethicists.¹⁰ While individual differences among these ethicists are notable, the spectrum of views gives grounds for some broad generalizations. In this section, we have organized these around a number of tensions or paradoxes inherent in Christian anthropology that will influence the morality of genetic enhancement. Five such tensions can be identified, and set the stage for understanding the range of responses in the Protestant Christian community. Audrey Chapman observes that few ethicists carefully and explicitly tell

¹⁰ Although Catholics and Protestants freely utilize one another's resources, we can expect lower reliance among Protestants on precedents set by natural law theory and an increased reliance on appeals to scripture (*sola scriptura*). Interestingly, however, most contemporary Protestants reflecting on genetics make scant reference to Scripture.

us how they draw on their theological or anthropological assumptions when making ethical pronouncements (Chapman, 1999, 40).¹¹ Thus the link between underlying anthropology and specific judgments about enhancement may be present but weak.

The first tension is the dialectic between creation and "fall," which plays a significant role in Christian anthropology generally, and becomes especially significant for Protestants as we move from anthropology to ethics. Such anthropology affirms both that humans are part of God's good creation and that humans live in a state of sin in which that goodness is distorted. In classical theology, this tension is represented by doctrines of Creation and Fall. This tension leads to alternative frameworks. Some Protestants will stress the goodness of creation and see genetic enhancement as a way to affirm and celebrate this goodness. For example, the World Council of Churches in 1989 took an overall positive view toward genetic engineering and biotechnology.¹² So did the Church of Scotland's "Religion and Technology" project (Chapman, 1999, 54). An overall positive view toward genetic interventions might accept a rather wide range of such interventions, including all four of our case scenarios.

Other Protestants will be more cautious and inclined to stress the problematic nature of human existence and the limits of human knowledge. They will tend to see enhancement as either a usurpation of God's authority (often called "playing God") or as an exercise fraught with risks because of the limits of human wisdom. In 1982, for example, a Working Committee of the World Council of Churches cautioned that genetic manipulation "amplifies and accelerates the tendency toward total reductionism" (Cole-Turner, 1993, 70). In fact, Chapman finds that the World Council of Churches generally exercises more of a "hermeneutic of suspicion" than do American denominations (Chapman, 1999, 70). As Ronald Cole-Turner notes in his summary of a number of church documents, some writers believe "that our sinful human nature will prevent us from fully seeing the misuses of our technology" (Cole-Turner, 1993, 78). The phrase "playing God," in particular, is often invoked to connote arrogant interference with nature; thus, many theologians would caution against enhancement if it is understood as contradicting the goodness of God's creation (Chapman, 1999, 53). Such views would tend to reject most genetic enhancement, as it would be seen either as a violation of God's good creation or as unnecessary in light of the fact that God's creation is good.

Cole-Turner argues that if we see creation or nature *only* as good, then we tend to overestimate our own goodness (e.g., our powers of reason and ability to know what God wants) or we find it hard to name defects in nature that should be corrected. However, if we see creation *only* as flawed or fallen, we then assume that it is open to any and all manipulations and we fail to see that it has value independent

¹¹ Chapman reviews critically extant church documents and individual authors' arguments prior to 2000; in addition she offers her own critique and theological perspective, which is largely liberal.

¹² See Cole-Turner (1993, 71). Teaching in a Christian seminary, Cole-Turner writes with explicit attention to a theological framework in which Jesus as redeemer figures prominently. Cole-Turner represents a moderate liberal approach.

of us. He urges a stance that holds in tension both the goodness of creation and the fullness of our situation in the world; this stance reflects the classic tension of Christian traditions. Perhaps the general tendency is summed up by a Lutheran pronouncement that urges critical engagement, affirming in general the goodness of knowledge and new technologies, but being poised to offer criticism of particular applications (Chapman, 1999, 38).

A second tension is between the two concepts of stewardship and co-creation. Protestants, like Roman Catholics and Orthodox Christians, affirm that humans are not the world's Creator (God is creator), but we are charged with responsibility to carry on God's work in the world. The traditional language for this responsibility is stewardship (Chapman, 1999, 42). Stewardship generally implies that God sets limits on human activities. As stewards of God's creation, all decisions must be made with a view to fulfilling God's purposes rather than human desires. Christians have tended to see in nature some *logos* or divine purpose that stands as normative and sets limits on human intervention (National Council of Churches in the USA, 1980). For example, Princeton ethicist Paul Ramsey argued that we "ought not to play God" before we learn to be human, and that once we learn to be human we will not play God. Ramsey opposed genetic manipulations. Thus, Chapman finds that stewardship often evokes a static view: things were created a certain way and it is our responsibility as humans to ensure that they remain that way (Chapman, 1999, 43). In such a view, genetic intervention would be likely to be approved only in cases where there is a diagnosed deficiency, as in Johnny's case.

Some theologians have abandoned the language of stewardship in favor of co-creation. Renowned Catholic theologian Karl Rahner argued that humans are the creatures who "freely create" ourselves. A Lutheran leader in the dialogue between faith and science, Philip Hefner, coined the phrase "created co-creator" to emphasize that we human beings, created by our creator God in the divine image, are responsible for the ongoing creativity of the natural world. The concept of the created co-creator is both descriptive and prescriptive—that is, it provides us with a theological anthropology and with an ethical ideal (Hefner, 1993, 1998).

Those who see humans as co-creators generally see creation as continuously evolving and therefore do not see genetic intervention as an inappropriate use of human power. As early as 1980, a task force of the National Council of Churches argued that life is a gift from God but that humans are to show creativity in exploring life's possibilities (Cole-Turner, 1993, 71). More recently, Ted Peters has argued that the term "Playing God" can be understood in two ways: as a Promethean attempt to design an ideal or perfect future, or as an appropriate assumption of human responsibility. Playing God in the latter sense is appropriate because our ethical responsibility "includes building a better future through genetic science" and this exercise of responsibility is "a form of human creativity expressive of the image of God...." (Peters, 1997, xvii).¹³ The United Church of Canada has been

¹³ Lutheran theologian Ted Peters is largely favorable toward genetic science and suggests that there are interpretations of playing God that make genetic interventions acceptable.

most emphatic and clear on this point: "We are called to be co-creators with God..." (Chapman, 1999, 43).

Some who use the language of stewardship attempt to include within it notions that resonate with co-creation. Evangelical Protestants Bruce Reichenbach and Elving Anderson suggest that stewards are charged with filling, ruling, and tending the land. Hence, they believe that humans *must* "play God," and that genetic intervention can be a part of responsible stewardship (Reichenbach and Anderson, 1995).¹⁴ From this perspective, "the effort to improve on nature is not inherently wrong," as the National Council of Churches notes (Cole-Turner, 1993, 72). Several individual denominations have taken a similar stance. For example, the United Methodist Church in 1991 adopted a report that declared: "Humans are to ... employ, *develop and enhance* creation's resources in accordance with God's revealed purposes" (Cole-Turner, 1993, 76, emphasis added). Under such a view, improving on what nature gives us is not necessarily wrong. Hence, there would not necessarily have to be a specific diagnosed deficiency in order to approve genetic intervention to increase height.

Thus, the tension for Protestant churches is a tension between the sense that human beings may—indeed, sometimes must—manipulate and change nature but that in so doing we are held to standards established by God's purposes in creation. Depending on whether these purposes are seen to reside in physical creation or in some notion or vision of a future perfect or redeemed world, there may be more or less latitude for interventions that enhance the givenness of human genes. For most Christians, interventions are permissible so long as "the researcher follows God's design" (Pope John Paul II cited by Cole-Turner, 1993, 77). However, Chapman is correct to charge that neither the stewardship model nor the co-creation model by itself gives clear guidelines as to what interventions would be permitted and what would be prohibited (Chapman, 1999, 44).

A third tension occupies us in this essay, namely, the difference between therapy and enhancement. How does what we have said about theological anthropology apply to questions of genetic alteration for purposes of therapy and enhancement? Hidden within the tension between stewardship and co-creation are assumptions as to whether God's creation, including human nature, is continuously evolving and open-ended or whether creation has a fixed character in the sense of limits that should not be transgressed. The question of whether human nature, and creation in general, is fixed or infinitely variable becomes important in discussing genetic enhancement. Several ethicists note that it is difficult to draw the line between therapy and enhancement. But most ethicists do believe that it is possible to specify a base-line of human functioning that is part of the intended order of creation. When someone falls below this base-line, genetic interventions are called therapy or correction. When an intervention would move someone above the base-line, it is called enhancement. For example, Paul Ramsey argued strenuously for an "exact"

¹⁴ Writing from an explicitly evangelical Christian perspective and drawing carefully on biblical warrants, Reichenbach and Anderson argue for a stewardship framework.

and limited meaning of the term "genetic therapy," precisely so that it could not be used for enhancements that really treated parental desires (Ramsey, 1972).¹⁵

Similarly, LeRoy Walters and Julie Gage Palmer assert that "disease and disability" are "evils that should be overcome as quickly and efficiently as possible" (Walters and Palmer, 1997).¹⁶ While all short children may experience pain or discrimination, the question of whether there is a physiological basis for the short stature is taken to be morally relevant for policy purposes. "We are attempting to draw a sharp line between *bona fide* illness... and physical traits that can lead to discouragement or discrimination or both..." (Walters and Palmer, 1997, 113). They approve genetic enhancement for children of short stature who have hormone deficiencies, but not for children of short stature who do not have hormone deficiencies.

Both Ramsey and the team of Walters and Palmer would therefore appear to join the Roman Catholics in approving genetic intervention for Johnny, since Johnny has a diagnosed deficiency in human growth hormone. However, it does not appear likely that they would approve genetic intervention or 'enhancement' for Bobby, Tom, or Erwin, where there is no clearly diagnosed disorder.

However, the picture may be more complicated than that. In general, Walters and Palmer adopt Norman Daniels' concept of "species-typical functioning" as their base-line. Nonetheless, they approve some enhancements, such as improvements to the immune system, a reduction in the number of hours that people need to sleep, and memory enhancement for people with senile dementia, even while acknowledging that such enhancements go beyond species-typical functioning. It is possible, therefore, that they would approve 'enhancing' height for Bobby or Tom, if it is predicted that either boy will grow up to be of very short stature. Even though neither has a clearly diagnosed disorder, such enhancement might fit Walters and Palmer's understanding of improving general functioning (Walters and Palmer, 1997, 121).¹⁷

Retired Union Seminary ethicist Roger Shinn notes the problem with standards such as "species-typical functioning." "Terms like disease, ailment, defect, liability, and anomaly all imply some departure from a state of health regarded as normal," he asserts, but he cautions that the very idea of normality "needs critical investigation" (Shinn, 1996, 96, 101).¹⁸ Shinn further notes that culture has a great impact on what is considered biologically normal, for example, the availability of eyeglasses makes myopia trivial and it is culture that makes dark skin a liability.

¹⁵ Ramsey was an early critic of genetic interventions and argued strongly for limits that should not be transgressed. A Methodist by affiliation, he is generally understood to fall on the conservative end of the theological spectrum.

¹⁶ In this work, Walters and Palmer do not argue out of an explicitly Christian or theological perspective, but we include them because their book-length treatise has become a standard for assessing ethical issues in genetic interventions and Walters has a background in Christian ethics.

¹⁷ The discussion by Walters and Palmer is full of contradictions. They appear to establish physical norms, such as species-typical functioning, and then immediately violate those norms in what they propose. This suggests to me that their anthropology is more fluid than they acknowledge.

¹⁸ Shinn's career as a Christian ethicist spans several generations. His approach, though not heavily theological, is informed by liberal theology.

Nonetheless, when Shinn lists six insights that help us formulate norms, he begins with the understanding that health is a good and so is healing. Such statements presume a base-line for making judgments regarding wholeness or health. Chapman notes, however, that the base-line may be shifting already and will certainly do so in the future, with the result that interventions that are considered radical today will become acceptable in the future. It will in fact, she argues, become increasingly difficult to distinguish between prevention and enhancement. Interventions that today would be considered enhancement may some day be considered simple therapy, and there is likely to be "creeping enhancement" (Chapman, 1999, 75). If Chapman is correct, then even the scenario involving Erwin, who is not predicted to be short but whose parents would like him to be taller than predicted, would some day be considered therapy rather than enhancement or at least would fall within the acceptable range of genetic interventions.

At stake for many Protestants, as for Catholics, is the fundamental value of human life in all its conditions. To love our neighbor with *agape*—that is, to love a person as an end and not merely as a means—is to confer dignity on that person, to treat each person as having dignity. Children and adults who, due to genetic reasons, deviate from the norm or suffer from disease, have dignity. All Protestants, like their Catholic colleagues, will agree on this fundamental point. The United Methodist Church declared boldly: "we understand that our worth as children of God is irrespective of genetic qualities, personal attributes or achievements" (Cole-Turner, 1993, 76). The National Council of Churches had earlier also declared that human life is to be valued in relation to God, not in relation to human standards of genetic health (Cole-Turner, 1993, 73). Human dignity is God-given and not defined by human norms or standards. Several denominations have raised cautions about possible eugenic efforts associated with new genetic technologies. For example, the Christian Life Commission warns against eugenic applications or efforts to remove "undesirables" (Chapman, 1999, 47). The United Methodists in 1992 adopted a resolution that also raised concerns that efforts at genetic screening may have eugenic consequences. Ted Peters expresses very plainly a principle that many Christians would affirm: "God loves us regardless of our genetic make-up and we should do likewise" (Peters, 2003).

What Protestant spokespersons and theological ethicists try to hold together here is the paradox of saying that every human life, no matter what its genetic condition, is equally and ultimately valuable and at the same time affirming that it is acceptable to intervene in that life to correct defects. This leads Cole-Turner to ask pointedly whether illness is seen as natural or as a defect of nature (Cole-Turner, 1993, 78). If illness is natural, then what justifies intervention at all? If it is a defect, then intervention may be justified, but how does one then applaud the fundamental value of that defective life? This is the paradox for Christian theology, which seeks both to love and affirm all of God's creation and yet to accept a mandate to reduce suffering and improve the human condition.

A fourth tension arises when we try to put together freedom and justice. Protestants, especially liberal Protestants, are acutely concerned about the relationship of freedom to justice. Responsibility, whether as stewards or co-creators, implies freedom.

Protestant Christians usually believe that freedom is one of the greatest gifts given to humans by God. A major part of being created in the image of God is being free to choose and act. It is therefore a violation of the dignity of human beings to take away their freedom or to interfere in their right to make decisions about things that affect them. Most Protestant ethicists hold strongly that who we are is not determined by our genes and that genetics may shape our predispositions but does not remove arenas of freedom of choice. Peters, for example, holds that determinism at the level of *genes* would not remove freedom at the level of *persons*. Chapman argues that a genetic predisposition may place a greater rather than lesser burden of moral responsibility on a person. Hence, most authors do not see genes as reducing human freedom and responsibility. Freedom remains a core value.

At the same time, it is possible to use human freedom in such a way that it negates human dignity. Most Christians believe that the God who created humans is a God of justice and love. Humans are to use our freedom in loving service of others and in an effort to bring about right relationship or justice. In other renderings, such as the United Church of Christ, compassion is the overriding theme and freedom is oriented toward compassionate healing. As the working group of the Church of Scotland emphasized, the biblical mandate is to serve human welfare. The measure of justice or service is often understood to be the plight of the poor or dispossessed (the widow, the orphan, and the stranger in the land are the paradigmatic cases).¹⁹ Any use of freedom that undermines the position of the poor is therefore understood as wrong. For example, the National Council of Churches raised cautions about eugenic programs (Cole-Turner, 1993, 73). It also queried whether the poor would have equal access to any genetic technologies that are developed. Similarly, the United Church of Christ in 1989 welcomed the development of genetic engineering provided there was appropriate regulation and "justice in distribution" (Cole-Turner, 1993, 76). Philip Hefner cautions that use of our freedom to shape our own future may result in interventions being manipulated in accord with the interests of dominant classes. Karen Lebacqz has also cautioned that the genome project may be "no deal for the poor" (Lebacqz, 1997b).²⁰ The United Church of Canada expressed as a general principle that the "rights of the weaker and the needy" must be protected in any genetic interventions (Chapman, 1999, 60).

The combined stress on freedom and on justice sets a possible tension: to take seriously the plight of the poor could set limits on human freedom. We may be obligated to refrain from genetic interventions that might damage the situation of the poor. This tension is well illustrated by the one place where Walters and Palmer disagree with each other: in discussing the distribution of genetic technologies, Palmer accepts few limits on freedom, whereas Walters believes that the long-term goal of

¹⁹None of the ethicists considered here would qualify as a liberation theologian, but liberation theology out of Latin America has been particularly strong in arguing for a preferential option for the poor.

²⁰A liberation Protestant theologian, Lebacqz frames her discussion of genetics within the language of justice concerns.

reducing the gap between those who are best-off and those who are worst-off is preeminently important.²¹ Roger Shinn suggests that freedom must always be understood as "freedom in community," not simply freedom to do what one will. All of these concerns point to the possibility that human freedom would be limited in the interests of welfare, compassion, and justice. With regard to our case scenarios, for example, the acceptability of genetic intervention would not rest simply on what parents want (for Erwin, e.g.). Interventions would have to be measured by their overall social impact. If genetic interventions to make people taller in the West could be shown to damage the opportunities available for others, those interventions might fail the test of justice. However, Chapman notes that there is little development of an explicit "justice trajectory" among Protestants examining genetic interventions even though justice may be given lip service (Chapman, 1999, 48).

Finally, the fifth tension through which we discern the profile of Protestant ethics is the tension between reason and revelation. A perennial problem in Christian theology is the relative weight to be given to reason or to revelation. Do norms come from nature or rational discourse reflecting upon nature? Or do they come from Scripture or extra-rational authoritative sources? In the discussions of enhancement, this tension is reflected in differing stances on the precedence given to science or theology. Does science provide facts to which theological anthropology must respond? Or does theology provide a framework within which any scientific discoveries must be understood?

While many of the Protestants considered here agree broadly on policies regarding genetic enhancement, they nonetheless may approach this question from noticeably different perspectives. The most common approach in Protestant theology is to find some general theological affirmation (e.g., that humans are created in the image of God) and move to assess science and technology from that affirmation. Most begin with the language of *creation* and ask whether God's activities as Creator set any limits on human genetic intervention. However, Cole-Turner frames his response to technology in the language of *redemption*. For Cole-Turner, since Jesus came to redeem all of creation, Jesus' acts of healing are the norm by which judgments can be made regarding what needs to be corrected and what does not. A collection of Presbyterian essays entitled *In Whose Image?* (Burgess, 1998) draws explicitly on the notion of *imago dei* for its theological grounding. Thus, ethicists may depend on different theological affirmations—on God as creator, God as redeemer, or humans as made in the image of God—but they all share the strategy of drawing explicitly on theological affirmations as grounding for ethical evaluation.

Other theologians, however, do not use the story of creation, the life of Jesus, or notions of *imago dei* as guides for understanding what needs healing. Shinn, for example, simply turns to "widely accepted" views in order to argue that some interventions are acceptable and some are not. This seems a more anthropological appeal than a

²¹ It appears to us that this disagreement reflects Walters' training in Christian ethics, with its stress on a preferential option for the poor, whereas Palmer adopts the liberal values of American law and philosophy.

theological appeal. Similarly, Chapman charges that most church documents review theology only in general and rather traditional terms, and fail to engage theological resources in a deep manner when trying to discern ethical issues or argue for ethical positions: "theological affirmations once made do not become the grounding for subsequent ethical and policy discourse" (Chapman, 1999, 40). Serious theological work and its connection to the ethics of genetic interventions has yet to be undertaken.

Chapman's own constructive work on human nature takes yet a different tack. She permits science to trump theology: the discussion turns on what genetic science would require by way of *revisions* of Christian anthropology. In other words, science sets the stage and theology must adapt. Walters and Palmer also appear to do this, albeit somewhat indirectly, insofar as they begin every chapter with a careful review of the science and tend to accept scientific ways of dividing the world into categories. For these theologians, then, it is *not* revelation but reason that sets the stage, and revelation must follow and adapt appropriately to what science or reason tells us. Even though they might not differ much when it comes to concrete policy proposals, therefore, Cole-Turner, Shinn, and Chapman reflect differing views on the precedence of reason or revelation, science or theology.

At issue here is whether Christian theology can enter the public arena, and if so, how. Any strict dependence on theological norms such as views of creation or redemption limits the audience for the Christian theologian: only those who hold similar views will be persuaded. To enter into public dialogue, therefore, theologians often turn to generally accepted views or give priority to the scientific views that dominate in the contemporary dialogue.

In summary, it is impossible to capture the richness of Protestantism within the wider Christian tradition and reflection in a short section. However, the five tensions or paradoxes outlined here give at least some indication of why Protestants will disagree with each other on questions of genetic enhancement and also of the basic values that must be held together in any Christian view. Christians attempt to hold together both the goodness of creation and the distortions of human history, both the excitement of human creativity and the sense that this creativity must be in God's service. Protestant Christians will therefore struggle to affirm the goodness of every human life, no matter its genetic constitution, and at the same time to find a permissible range for interventions that "correct" or "improve" that life. Every correction will be seen as potentially dangerous, however, because of the sinfulness of human life. In short, there is a circle here: from affirmation of the goodness of life, to the call to intervene and make it better, to the recognition that such intervention is fraught with the dangers of self-deception and injustice.

3.9 Jewish Medical Ethics and Genetic Enhancement

"For Judaism, God owns everything, including our bodies," writes Elliot N. Dorff. "God lends our bodies to us for this duration of our lives, and we return them to God when we die." What this implies is that "God can and does assert the right to

restrict how we use our bodies" (Dorff, 1998, 15). This leads directly to the mandate to heal, to moral support for the practice of medicine. "Because God owns our bodies, we are required to help other people escape sickness, injury, and death" (Dorff, 1998, 26). Support for clinical medical practice implies, in addition, support for scientific research on behalf of human health and well being.

The most frequently appealed-to method for Jewish theology and ethics is one of interpretation, one of interpreting the Torah through the history of texts that make up the Hebrew and Jewish traditions. Moral laws are derived through application of interpretations, through *halakhah*. Are such moral laws strictly positive—that is, are they strictly grounded in the religious legal system?—or are they rooted in the natural condition of which the legal system is a cultural expression? Even if moral laws derive ultimately from God, do they also adhere to what can be discerned as natural law? Some Jewish thinkers affirm the latter. "Natural law theory is necessary for an adequate essential characterization of *halakhah*," writes David Novak (Novak, 1995, 40).

The appeal to tradition combined with appeal to natural law shows a kinship between Jewish ethics and Roman Catholic ethics. Aaron L. Mackler sees more convergence than contrast between the two approaches. On method, he says, "Jewish approaches generally are based on tradition, especially *halakhah*—a term meaning 'path' or 'way' and denoting Jewish law. Although Catholic moral approaches accord significant weight to tradition, more commonly they are centered on natural law, together with magisterial teaching" (Mackler, 2003, 1). On shared values, he says, Jews and Catholics share a commitment to "the intrinsic dignity of human persons, created in the image of God; the responsibility of a just society to offer needed support to its members; and a divine mandate to provide healing to people in need" (Mackler, 2003, 190). The second in this list of three, the commitment to justice, would likely place some Jewish ethicists along with some Roman Catholic colleagues in league with Protestants regarding problems of equal access associated with enhancement.

Let us turn here to the relationship of tradition to natural law. Within the context of *halakhah*, we can find some movement from *is* to *ought*. Dorff makes this move, but only when the concept of nature is theologically understood. Specifically, human nature includes our creation in the image of God. Our nature includes an essence and a *telos*, namely, to fulfill the divine image within us. "Locating the divine image within us may also be the Torah's way of acknowledging that we can love, just as God does, or that we are at least partially spiritual and thus share God's spiritual nature. Not only does this doctrine *describe* aspects of our nature; it also *prescribes* behavior founded on moral imperatives" (Dorff, 1998, 19). This is a theological, not a naturalistic, understanding of human nature. Because it includes a *telos* or purpose, such a view of human nature created in the divine image is compatible with a transformatory ethic.

Both Jews and Christians inherit from the Bible a future orientation, a divine promise of transformation. This seems incompatible with the naturalistic fallacy—that is, incompatible with an ethic projecting a vision of *what ought to be* in the future on *what is* the state of the human make-up in the present. Rather, biblical

theologians look forward to a future that differs from the past, that cures the ills of the past. Christians might emphasize an eschatological vision of a future new creation, a vision in which there will be no more suffering or pain and God will wipe away our tears (Rev. 21:1-5). This tends to support strongly efforts toward healing as anticipatory of God's redemption. What ought to be done is determined by a vision of what lies beyond the present state of nature. Jewish medical ethicists might emphasize rather the mission to heal, the God-appointed task for the human race to take care of our bodies. The Bible which Christians and Jews share is filled with God's promises that all things will be new (Isaiah 65:17), so human endeavors to transform the ills of present existence in light of a future healthier life is based on an ethic that relies upon divine promise.

Despite good theological reasons for supporting an ethic of transformation, listening to nature still provides a level of caution for some Jewish bioethicists. Elliot Dorff illustrates both the vision and the caution on the topic of genetic therapy and enhancement:

The potential of stem cell research for creating organs for transplantation and cures for diseases is, at least in theory, both awesome and hopeful. Indeed, in light of our divine mandate to seek to maintain life and health, one might even contend that from a Jewish perspective we have a *duty* to proceed with that research. As difficult as it may be, we must draw a clear line between uses of this or any other technology for cure, which are to be applauded, as against uses for enhancement, which must be approached with extreme caution. Jews have been the brunt of campaigns of positive eugenics...so we are especially sensitive to the dangers in creating a model human being that is to be replicated through the genetic engineering that stem cell applications will involve (Dorff, 2001, 92).

Within the divine mandate to heal and even transform, we find a caution against enhancement.

This caution goes so far as to appeal to the problem of playing God in medicine. Ordinarily, the risk of playing God is not a large factor in Jewish ethical deliberation. Laurie Zoloth writes, "whereas moderns are worried lest we 'play God', the rabbis were concerned that we act *more* like God might in many ethical and social-political arenas, as in helping the poor, creating justice, and healing the sick" (Zoloth, 2001, 96). Yet, appeal to the commandment to avoid playing God arises when the question of enhancement arises. Elliot Dorff asks, "How do we determine when we are using genetic engineering appropriately to aid God in ongoing, divine acts of cure and creation and when, on the other hand, we are usurping the proper prerogatives of God to determine the nature of creation? More bluntly, when do we cease to act as the servants of God and pretend instead to be God?" (Dorff, 1998, 162).

The risk of playing God arises when considering genetic enhancement. Elliot Dorff goes so far as to endorse germ line intervention on the grounds that it serves the divine mandate to heal and he applies it to future generations, but he shies away from enhancement because it goes beyond healing.

Since sickness is degrading, it would be our *duty* to cure the disease at its root if we could, so that future generations will not be affected. But the more powerful our abilities to intervene in preventing genetic diseases, the more urgent it becomes to accomplish the philosophical and moral tasks of defining the line between therapeutic and non-therapeutic uses of this technology and, in so doing, the boundary between us and God (Dorff, 1998, 164).

What we see here is reaffirmation of the Jewish commitment to heal combined with a cautious reluctance to go beyond healing to enhancement. The difficulty is in finding the right place to draw the line.

With this discussion in mind, we could easily imagine Jewish bioethicists strongly prescribing growth hormone for Johnny on the grounds of the divine mandate to heal. This would likely apply to Bobby and Tom as well, seeing promotion of social fitness as itself a form of therapy. When it comes to Erwin, however, the question of justice would be raised. If growth hormone would make Erwin superior to his peers at school or in the neighborhood or give him an edge in his profession, then we would want to ask: does it matter that Erwin has access to this enhancement while others do not?

In summary, Jewish ethicists appeal first and foremost to *halakhah*, to making application to present circumstances based upon interpretation of the Torah through historical commentary. The result is a system of moral laws. In addition, some Jewish ethicists are willing to incorporate a hint of natural law, especially if appeal to what nature teaches us aids in our *halakhic* deliberations. What all this yields is a solid reaffirmation of our moral obligation to heal—in this case supporting genetic intervention for the purposes of therapy—but a reluctance to engage in enhancement. Enhancement risks playing God.

3.10 Islam: What Might We Expect?

When we turn to Islam, we turn away from the shared commitment to natural law that we found in Roman Catholicism and the Enlightenment of western Europe. This is illustrated in the controversy over reproductive cloning which broke out in 1997. At that time, the U.S. National Bioethics Advisory Commission invited religious leaders to provide guidance for what might become government policy. Aziz Sachedina, a Muslim bioethicist at the University of Virginia, testified that the Qur'an and subsequent Islamic tradition do not provide background or principles that anticipate modern biological knowledge about the embryo or genetic inheritance (Sachedina, 1997). Decisive ethical guidance must await a process of interpretation which will involve application of past tradition to present circumstances. In Islam we appeal not to nature plus scripture, but to scripture alone, to the Qur'an.

In actual practice, the Qur'an does not stand alone. It is accompanied by its tradition of elaboration in the Sunna (meaning "trodden path"). To these two, the Qur'an and the Sunna, are added two other sources, consensus (*ijma*) of the early Muslim community plus the principle of analogy (*qiyas*) (Sachedina, 2003, 14). The latter, analogy, is a method of reasoning from data furnished by the Qur'an and the Sunna in which the unknown is approached via analogy of what is known. Relying upon ancient sources for moral reasoning in an era of fast-moving medical science is now giving birth to a nascent and as yet undeveloped field, Islamic Bioethics.

As Islamic ethicists and jurists confront new and unprecedented scientific challenges to human self-understanding, appeals to the Qur'an and ancient tradition

pervade their analysis. The conceptual apparatus inherited from the tradition provide the matrix for deliberation. One can expect that much of the vocabulary employed to sort through biomedical conundrums will be classical theological vocabulary, with only carefully filtered additions of contemporary scientific terminology. Because issues formulated by the contemporary scientific situation can be addressed only indirectly rather than directly, the method will necessarily be one of analogy (*qiyas*). Analogs to past juridical deliberations will be retrieved and contemporary applications sought.

Part of the tradition that makes up Islamic thought are philosophical debates regarding such subjects as the human soul, especially the relationship of the soul to the body. We can safely forecast that ancient debates on this topic will resurface as influences on contemporary jurists (*fuqaha*) as they ply their craft, the science of jurisprudence (*usul al-fiqh*). We can almost expect a twenty-first century extension of a fissure that opened up in the eleventh century, namely, the split between Ibn Sina (Avicenna, 980–1037) and Abu Hamid al-Ghazali (1058–1111).

Ibn Sina's anthropology comes close to that of Plato's. The soul is incorruptible and does not die with the body. Consciousness can perdure in a disembodied state. Attachments to the body which involve temperaments are accidental, not essential, to the soul. The body is not the form of the soul, nor does the soul imprint itself onto the composite parts of the body. The soul is not intrinsically dependent on the body; rather, the soul's fundamental relationships are with eternal principles that escape change or corruption. The result of this dualism is a form of everyday naturalism, according to which what happens to the body is exhaustively explained by its place in the physical causal nexus. The body's natural nexus of activity drops into near insignificance compared to the soul's destiny (Sina, 1952).

Ghazali, in contrast, is more Aristotelian. Because all humanly initiated action requires an act of the will in the soul, Ghazali argued against Ibn Sina, the soul cannot avoid an inextricable attachment to bodily movement. The natural causal nexus and the social nexus include the soul's activity. A continuity exists between the spiritual substance of the soul and the physical substance of the material world, though they are not identical. Ghazali describes the body as the camel the soul mounts to ride toward God. Without the body, the soul cannot reach its destination. Whereas dualists such as Ibn Sina could think of eschatology in terms of a disembodied soul, Ghazali holds out for a bodily or corporeal resurrection (Ghazali, 1988).

In an essay describing alternative views regarding the place of brain death and organ transplantation in Muslim bioethics, Ebrahim Moosa demonstrates that these two anthropologies influence two contrasting positions. He compares two *fatwas* or non-binding juridical opinions, one from Pakistan and one from Egypt. In the case of the Pakistani *fatwa*, organ transplantation violates human dignity (*karam wa hurma*). The person declared brain dead is the one whose dignity is being protected here; dignity is preserved by not dismembering the corpse. Repelling harm to the body—even the dead body—takes precedence over potential medical benefit to someone else. Moosa concludes that the anthropology of Ghazali is at work here. The Egyptian *fatwa*, in contrast, permits organ transplantation. Here, it is assumed that the soul's presence is the source of animation, and hence it is tied to

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brain function. Because a brain-dead person is no longer animated by the soul, and because the soul has been released to eternity, what remains is a body subject solely to the physical causal nexus. It is solely natural, with no supernatural component remaining. Organ transplantation is permissible. No precedent in Islamic law on this matter makes the question open to juristic discretion (*ijtihad*), and the discretion employed here relies on the dualist assumption.

Once it could be argued that the locus of the soul is the brain and that consciousness is an indicator of brain function, brain death can easily be justified. Those jurists who opposed brain death and organ transplantation used the same texts and sources as their fellow jurists but arrived at an opposing and differing position. Their emphasis was on the social imagery of the body as inviolable in its dignity (Moosa, 2002, 344).

With these precedents in mind, we can offer forecasts regarding likely ethical trajectories in Islamic thought regarding issues such as genetic therapy and genetic enhancement. Ethical postures deriving from the dualistic tradition may find it easier to engage in genetic engineering, both therapy and enhancement, on the grounds that the body belongs solely to the physical nexus. If the soul can be distinguished sharply from the DNA, then engineering changes in the DNA should leave the soul uncompromised. Ethical postures deriving from the Ghazali tradition, however, may be looking for physical elements to identify with a person's dignity. The genome would become a likely candidate, especially if it is imagined that the soul would have an essential connection to the person's genome. Then engineering of the genome could be construed as a violation of the soul, not just a healing for the body. The commandment, "thou shalt not play God," might be heard more frequently in Muslim circles.

No doubt therapy will count for more ethically than enhancement will. Preserving human life from suffering will play a role in Muslim deliberation, to be sure, trumping enhancement. Yet, even therapy may not provide sufficient ethical warrant to approve genetic engineering if by changing our physical nature it is believed we are violating the dignity of the soul.

Let us return for a moment to our four cases, which raise the difficult question as to whether there is justification for rejecting protocols solely on the basis that they extend an enhancement technique that is proven safe and effective, to an area other than the treatment of the disease for which it was originally devised. The cases of the boys offer some pointers. The use of gene therapy for Johnny, with hGH deficiency, appears straightforward in principle, because it can be viewed as treatment for a disease. Bobby, on the other hand, is short, not diseased; therefore his case is more controversial. However, differences in the cases of Johnny and Bobby are not so clear-cut if disease is defined as a condition that impairs human functionality below species-typical levels. Even if Bobby's short condition failed the classification of a disease, the gene therapy could be justified as an upgraded form of the hGH protein treatment he is already receiving, which is non-controversial, and which is cheaper and less cumbersome.

Tommy is normal, though slow in growth rate. This is not yet remarkable. Erwin is remarkable, because, although he is normal, his parents are considering enhancement. Are we crossing a line? On the right side of the line, it is argued that gene

therapy is developed for those who fall below the normal range of some characteristic or function. That line seems to be crossed when the treatment takes someone beyond the normal range to a higher level. There are two problems with this analysis. One: notions of normal and abnormal are technologically and culturally conditioned, and vary in time and place. Two: even if there were some universal standards, some functions can be greatly enhanced over the normal range by treatment with interventions designed for treating or preventing diseases.

Thus much of the debate boils down to what we mean by enhancement. In medico-ethical circles the major trend is to contrast it with the curing of a disease, and hence it is considered a procedure or intervention that is "nonessential at best and suspect at worst." Again, because the line between therapy and enhancement cannot be precisely drawn, we simply note that it has ethical significance even when it remains medically ambiguous. ♀

3.11 Hindu Perspectives on Genetic Enhancement

"Hindu bioethics believes there is a medical and moral divide between *somatic cell gene therapy* and *enhancement genetic engineering*, which must not be crossed, and which serves as a marker for how far genetic engineering should go at this stage of development," writes Cromwell Crawford (Crawford, 2003, 153). What is the religious background to this conclusion?

The Hindu concept of nature and the place of humans in it is vastly different to those of the Jewish, Christian, and Muslim traditions, and therefore we can expect some theoretical and practical differences, yet important commonalities also exist. Since Hinduism is a pluralistic tradition that allows for many expressions, we choose the view found in the classical Vedanta philosophy of Sankara (8–9 c.). Our purpose is to show that certain cognitive and moral insights that are necessary for a productive relationship between humans and physical nature, with implications for therapy and enhancement, find their locus in Vedanta philosophy.

The first insight is interconnectedness. You do not have to be a religious person to affirm this. Environmentalists have been telling us for decades that everything in nature is intrinsically connected with everything else—humans, plants, animals, and all sentient beings are part of the web of life. Nature is so structured that for every act there is a corresponding reaction, the full effects of which are not immediately visible.

The idea of nature as a connected whole has been cultivated by Hindus for millennia, and is encapsulated in the doctrine of karma. The word is derived from the root *kr-*, "to act." The Brhadaranyaka Upanishad (c. 1000 BCE) declares: "According as one acts, according as one conducts himself, so does he become" (IV.iv.5, in Hume, 1931, 1031). Actions that are born of ignorance and selfishness entangle the doer within the cycles of birth and rebirth. Thus the wheel of life is kept in motion, because every deed both impacts the world of nature, and also produces "tendencies" (*samskara* or *vasana*) in the doer in the form of habitual patterns of behavior. Deutsch states, "whatever one does will have effects not only in the immediate

present but in the long future as well: any act, in short, will have consequences that reach far beyond the act itself. And everything in nature is so interconnected through causal chains and relationships that we ourselves become part of the natural process and are conditioned by it" (Deutsch).

The second Hindu insight is linked to the first and states there is a natural kinship between humans and all of physical nature. By contrast, the West has held to a religious belief in an original creation of fixed species until recent times (and many still do). Darwin demolished this religious worldview with his theory of biological evolution. Details of Darwin's theory have since been revised, but his principle of evolution is universally accepted by the scientific community.

For Vedanta, the evolutionary orientation of science affirms its position that fundamentally all life is one; that in essence everything is reality; and that this oneness finds its spiritual expression in a reverence for all living things. These sentiments are embodied in the well-known concept of *ahimsa* (non-violence). *Ahimsa* is the primary virtue Hindus must observe in their relationships with all facets of nature of which they are a part. Gandhi interpreted *ahimsa* as 'non-violence' in a universal sense and ranked it as the foremost human quality.

A third Hindu insight is related to the doctrine of creation. Western attitudes toward nature have been shaped by the church's historic interpretation of the Genesis narratives of creation. Correctly or incorrectly, the church has historically believed the world was created by God for human ends, and that he has given them absolute dominion over nature. Only humans are made in God's "image." One derivative of this interpretation of the biblical doctrine of creation is that it introduces radical splits in life — splits between humans and the Creator, the Creator and physical nature, and between physical nature and humans.

Hindus understand "creation" through an emanationist theory. They see a natural unfolding of spirit in the world, and believe that the presence of spirit in matter invests the whole created order with spiritual worth. Nature is thus connected both horizontally and vertically, disallowing any sharp division between body and spirit in humans. Both body and spirit contribute to the whole, and express the full integrity of the whole. Thus the dualism that has dominated Western thinking finds no room in the philosophy of Vedanta.

In the next part of this paper we shall suggest the implications of these three core ideas—creation, continuity, and interconnectedness—for a proper evaluation of gene transfer for therapy and enhancement.

Hindu bioethics distinguishes between (1) somatic cell gene therapy and (2) enhancement genetic engineering. In terms of somatic cell gene therapy, many diseases such as ADA deficiency (an immune deficiency disease of children), sickle cell anemia, hemophilia, and Gaucher disease, are caused by a defect in a single gene and are treatable. Hinduism responds positively. It believes that all living beings have been created for health; that all living organisms are regulated by the principles of pleasure and pain; and that disease is an impediment to the fulfillment of all human goals, including spiritual fulfillment. Hence, the response to disease must be with *daya* (compassion). *Daya* is not pity but empathy—empathy that is based on the realization of our interdependence and interconnectedness.

Gene therapy must be given to persons with these sicknesses, for it is their only hope. The ethical principle in this context is *ahimsa*—do no harm (*himsam ma kuru*). It aims to balance risks and benefits in specific interventions. We know that gene therapy is a risky business in this early stage of development. Cutting-edge medical research is always risky, but relative to the severe privations and threat of death, the risks and uncertainties of gene therapy are at acceptable levels for many of these patients.

However, somatic cell gene therapy also has the potential for enhancement genetic engineering—for supplying a specific characteristic that individuals might want for themselves (somatic cell engineering) or for their children (germline engineering) which would not involve the treatment of a disease. The slide from correction to perfection is already underway. The human-growth hormone was devised for children with prospects of growing up the size of dwarfs, but it was soon used by children who only thought they were “dwarfs,” and who were blessed with wealthy parents who could pay \$30,000 for a year’s treatment of growth hormones.

What is the Hindu position on enhancement? Much depends on particular cases. First, in some cases enhancement could mean the use of biotechnology for the purpose of “self-improvement.” Self-improvement is as much of an American religion as being Baptist. Hindu bioethics has no problem with that, as long as one has a clear idea of the nature of the “self” that is to be improved. Arguing from one view of the self, a person can say, there is absolutely no difference between getting one’s child the best school and getting one’s child a perfect gene. What is the big fuss? Hinduism would answer that there is a difference and it has to do with *buying* “personal” traits versus *cultivating* those traits. The two approaches differ radically in their means, which then transform the end. For example, a parent could buy a Harvard education for a child, and the quality of the education could very well enhance the child’s natural gifts, but this type of enhancement is quite different to the purchase of those capacities. Ethicists like Erik Parens make the same point today that the Gita made a long time ago: “let a man lift himself; let him not degrade himself; for the Self alone is the friend of the self [person] and the Self is the enemy of the self” (VI.5). Both voices unite in a single message: personal transformation is a function of the inner life. Seeing with the “third eye” is not an acquisition of reconstructive laser surgery. To uplift himself an individual must engage creative forces that are within, and not simply rely on appendages that can be purchased at a price. In fine: *self-improvement is improvement of the self*.

Second, the use of biotechnology for enhancement raises questions of social fairness. Do we wish to usher in a society where only the rich become smarter? Who will have the right to access the technology once it becomes financially out of the reach of the common person? Every parent would want his or her child to be intellectually enhanced, but only a minority would be able to afford it. Would this not create a new ‘caste system’ in which the wealthy Brahmins of society constitute a new intellectual aristocracy that looks down upon children who are not enhanced, because they have lower IQs? Thus, Hindu bioethics appeals to its principle of justice, based on our common spiritual heritage and the connectivity of human life. The Gita says: “When

one sees Me everywhere and everything in Me, I am never lost to him and he is never lost to Me" (V1.30). Such thoughts invest each individual with equality, and evaluate all attempts at enhancement with the demands of social fairness.

Third, even if the questions of social fairness were resolved, is the enhancement of human capacities medically sound? The position of Hindu bioethics is that in situations of life-threatening disease, taking risks may be justified by the potential benefits of gene therapy; but in the absence of life-threatening disease, the risks may outweigh benefits, and enhancement is no longer an option. Five areas of medical concern stand out, all of which are addressed by Hindu principles derived from the core ideas presented above.

The primary medical principle of Hindu bioethics is *ahimsa*—do no harm. This is the first flag that goes up. Medicine is not an exact science, and when we stand on the medical frontiers of enhancement engineering, knowledge recedes while risks increase. For instance, we have preliminary ideas of how genes run a cell, yet what do we know about how the configuration of an organ takes shape? We know how the central nervous system works through electric circuits, memory storage, etc., but what do we know about "thought," about "consciousness," about "spirituality"?

The following are some of the areas of concern raised by pioneer geneticist French Anderson. He gives us a glimpse of the genie in the bottle. He says:

Even though we do not understand how a thinking, loving, interacting organism can be derived from its molecules, we are approaching the time when we can change some of those molecules. Might there be genes that influence the brain's organization or structure or metabolism or circuitry in some way so as to allow abstract thinking, contemplation of good and evil, fear of death, awe of a 'God'? What if in our innocent attempts to improve our genetic make-up we alter one or more of those genes? Could we test for the alteration? Certainly not at present. If we caused a problem that would affect the individual or his or her offspring, could we repair the damage? Certainly not at present. Every parent who has several children knows that some babies accept and give more affection than others, in the same environment. Do genes control this? What if these genes were accidentally altered? How would we even know if such a gene were altered? (Anderson, cited by Gibbs, 1999).

A second area of medical concern has to do with side-effects, which Hindu bioethics addresses through its principle of consequentialism. It is axiomatic to the Indian mind that everything has its own store of karma which eventually plays itself out. Anderson has made it perfectly clear that enhancement research is not at the point that all outcomes are known. It would not be a scare tactic to say that parents who are eager to give their children gene enhancement would be making decisions on behalf of their children over which they had no control and whose long-term effects would be uncertain or even dangerous. Who can predict all side effects? Can we be certain that a child engineered to become intellectually sharp could not actually turn out morally mean? What happens when the "super mice" get old? Scientists already fear that altered mice might be more prone to strokes, chronic pain, and premature death. There are many such possibilities of complications for which a karmic view of nature signals caution.

A third area of medical concern is expressed in Ayurveda's principle of health as balance. It alerts us to the fact that changes brought about by genetic engineering in one area could adversely affect balance in other areas.

A fourth medical concern has to do with homogenization. There is a troubling prospect that we could be heading toward a homogenized society that is shaped by certain dominant traits and values representing the fashion of the day. To the contrary, the premise of Hindu medicine is biological diversity, and psychologically each individual is conceived as unique by virtue of his or her karmic constitution. Hindu medicine affirms individuality in nature, which not only makes for survival but for the richness of heterogeneity.

A fifth concern is expressed in Hinduism's adoption of an inclusive approach toward humans and other forms of beings. This is completely missing in the Western approach, which limits the medical concerns of genetic engineering simply to human considerations and human wellbeing. Harold Coward points out: "Animals are genetically engineered to model some of the most devastating diseases that afflict humans. To accomplish this goal, however, requires that large numbers of animals live lives of intense pain and suffering" (Coward, 2000). Hindu inclusivism would mandate care for animals and avoid a cruel or callous use of animals for the sake of human enhancement.

In summary, the Hindu view of nature and of the place of humans in it counsels extreme caution when questions of altering nature are considered. Because of the line drawn between therapy and enhancement, we could expect a Hindu bioethicist to approve of the use of growth hormone for Johnny but withhold it from Bobby, Tommy, and Erwin.

Yet, at the same time, since Hinduism employs reason and is scientifically open, it may eventually withdraw from making a blanket condemnation of genetic enhancement as *intrinsically evil*. Instead, it could start with the person, holistically understood, which then calls for an evaluation of all means of genetic enhancement by the moral yardstick of whether they have karmic risks which are not worth taking at this time, or whether they do indeed enhance the person for good. "Enhancement" is here defined as the natural extension of health organically conceived as physical, mental, social, and spiritual wellbeing. Its emanationist view of creation, and its philosophic recognition of change as a fundamental feature of nature, both physical and human, make Hinduism cautiously optimistic about the future.

Though this technology is in its infancy, its potential is enormous to change not just how we play, but how we pray, and pay and do everything else. Genetic enhancement could be engineering a new creation. Such prospects behoove religious leaders to dialogue with members of the scientific community to ensure that our future is not just better but good; for "better" is not always good.

3.12 Buddhist Perspectives on Enhancement

Gautama the Buddha integrated religion and medicine in his understanding of nature, both physical and human. His basic outlook was naturalistic. He left out of his teachings concepts we normally identify with religion—ideas such as God,

soul, creation, judgment. He saw himself, not as a divine Saviour, but as a teacher and exemplar. He claimed that all of the salvific knowledge we need is found, not within some transcendent realm but "within this very body," and that each person has the capacity to become a Buddha.

His Asian naturalism made him a pragmatist. He said, when a building is burning, it is not the time to discuss the nature of fire, but to flee the flames. Likewise when you are shot by an arrow, you do not ask who shot the arrow, but extract the arrow and heal the wound. The point is: when people suffer, metaphysics must yield to practicality and self-reliance.

The Buddha was known as "the Great Physician," and made healing his mission. The ultimate healing is enlightenment or Nirvana, an internal realization of self-transcending achievement. His central religious teachings, embodied in "The Four Noble Truths," guide the Buddhist, especially the monk in the Samgha [the Buddhist monastic community], directly toward enlightenment. Because the ascetic monk avoids attachment to relationships such as marriage, family and children, ethical issues surrounding therapy vs. enhancement tend to involve the laity and are more subject to common secular values. Buddhist ethics thinking follows two tracks, one leading directly to Nirvana and the other indirectly via guidance for daily family and professional life. The spiritual path leading to the ultimate healing is guided by the Four Noble Truths.

The first of the four is that human life is replete with suffering. The Indian doctor first aims at an accurate diagnosis: are the complaints of the patient genuine, or is he or she only apparently ill? The Buddha's diagnosis of the human condition: suffering is universal and real. What modern philosophers have described as "anguish," "alienation," and "quiet desperation," the Buddha called "*dukkha*."

This view of life is neither pessimistic nor optimistic, but realistic. There is universal acceptance of the reality that life's passages of birth, old age, sickness, and death, are fraught with suffering—much due to our own ignorance and selfishness. Certainly, there is happiness, but happiness is subject to the laws of finite nature in perpetual change (*anitya*). Everything in nature is in a state of flux. The Greek philosopher Heraclitus, a contemporary of the Buddha, stated: "no man steps into the same river twice," because he and the river are ever changing. People are ignorant of this law of nature, because they superimpose on this ephemeral world notions of things which endure; which must be possessed in perpetuity; and which must be perfected. But the Noble Truth is: Humans belong to a single order of nature, and are creatures of change like all other sentient beings. Unlike the Hindus who taught the existence of the soul or *Atman*, the Buddha advanced the doctrine of *anatma* or non-substantiality. Just as the word 'chariot' is only a linguistic convenience to signify the combination of disparate parts, and not to signify something substantial, so too, the "I" is only a particular combination of physical and mental energies that are separable into five groups. These five aggregates (matter, sensations, perceptions, mental formations, and consciousness) are subject to the same universal law of change, and therefore they themselves are *dukkha*. Therapy and enhancement both belong to the realm of finite nature, replete with inescapable suffering, the human body in a world of *dukkha*.

Turning to the second Noble Truth that suffering is due to ignorance, especially due to our ignorance about the way unsatisfied craving affects us, we will follow the model of the doctor and the patient. Having ascertained that the patient has a real illness, the Indian physician gets to the nature of the illness, and probes into its origin. The Buddha links suffering with ingrained ignorance, which is a product of the universal desire to be, to grow, to enjoy, while naively clinging to the ego. Thirst (*tanha*) is the primary cause of *dukkha*, and is all-pervasive, including craving for pleasure, power, and also attachment to ideas, ideals, theories and beliefs. The power of thirst is also described in terms of mental volition and karma.

The Buddhist understanding of karma refers to volitional action, and should not be confused with its effect, which is known as the fruit of karma. Good karma issues in good effects, and bad karma issues in bad effects. Whether good or bad, karma keeps one bound to the cycle of rebirth, because it is driven by the will to exist, to re-exist, to continue, to become more and more. Trapped in *samsara*, one endlessly suffers. But one who is freed from the false notion of a permanent self, free from thirst, and free from defilements, does not accumulate karma even though he acts, and thus frees himself from the cycle of rebirths. When death comes, the physical body ceases, but the volitional energy persists, manifesting itself in another form through the process of rebirth. There is no soul that transmigrates, only a series which continues, like the flame of a candle that burns through the night—a flame which is the same, yet is not another.

Turning now to the third Noble Truth that knowledge leads to liberation, the Indian physician is in a position to make a prognosis: *dukkha* is eradicable. The acceptance of causality in nature does not preclude freedom; rather, it gives freedom a purchase on reality. Free of any doctrines of original sin, total depravity, or predestination, the third Noble Truth states: what has been done, by that same token, can be undone. Saviours are not needed, because bane and blessing belong to the order of cause and effect in the natural world, and are self-explanatory. When the driving force for permanency and possession are recognized as delusions, the suffering consequent upon such ignorance ceases.

Nirvana is not the annihilation of the self, because there is no self in the first place; instead, it is the annihilation of the illusion of the self. It is the Absolute Truth that nothing is absolute in the world—and that all things are relative, conditioned, and impermanent.

Finally, the fourth Noble Truth, which announces the Eightfold Path or the life of Buddhist discipline, has three components: Ethical Conduct; Mental Discipline; and Wisdom. The discipline aims at uniting head and heart, intellect and emotions. Buddhism does not try to perfect persons by making them follow rules, codes, or rituals, but tries to sensitize qualities of mind and heart to produce acts of compassion. Buddhism is par excellence a religion of compassion. The function of ethical conduct in the eightfold path is to help the devotee gain control over his senses, and thereby facilitate the uninterrupted arising of enlightenment.

What might be the implications of the Four Noble Truths for our issue here, namely, the distinction between genetic therapy and enhancement? A convenient starting point for a Buddhist evaluation of gene transfer for therapy or enhancement

is the scenario described in the Hindu section which supposes the availability of gene therapy for the treatment of patients with growth hormone deficiency. Since the scenario has already been described, we will only give the Buddhist responses to each of the four cases.

In the case of the boy who suffers from hGH deficiency, Buddhism would certainly approve the treatment to cure the disease. Pain and meditation do not go together, so one must not make a virtue of pain but rather work for its elimination. A fundamental value in Buddhism is compassion. The *Dhammapada* (X.1-2) asks us to put ourselves in the place of those who suffer, and to act for the purpose of relieving suffering. Compassion is the fruit of internalizing a sense of our interconnection with all beings and our interdependence on all fellow creatures. The image of the leaning Buddha one sees in temples, bending toward all who suffer, and the countless examples of *bodhisattvas* who have dedicated their lives for the relief of others' suffering, are examples for emulation, to free the person from the world of suffering.

In the case of the boy who does not suffer from hGH deficiency but is short, there is some question whether he is eligible for treatment that is specifically intended for disease. Though his problem is not physical but mental, Buddhism would support his case because its notion of health is not limited to the body. The Buddha's view of the person allows for no dichotomy between the mental and the physical, between mind and matter. Yoga combines the two with consequences for both physical and mental health. The Buddha spoke of four kinds of food or nutriment (*ahara*). He gave full recognition to the nourishment of the physical body, and rejected all forms of ascetic lifestyles because they were painful and unproductive. At the same time he was aware of the need for psychic and social forms of nutrition, their being essential for the psychophysical personality.

In the case of the tall boy, Erwin, many reject him as a candidate for the use of gene therapy on the grounds that the therapy is intended only for someone who falls below the normal range in some function or characteristic. Buddhism is not impressed by arguments based on definitions of what is deemed "normal." We live in a world where change is order of the day, therefore it is hardly credible to make some state or condition permanent when it is intrinsically impermanent. Besides, Buddhist medical practice is not guided by what is thought to be normal, but by individual differences, learned through diagnosis.

Positively stated, Buddhism is on the side of enhancement, and is categorically supportive of biomedical progress. It is a fundamental thesis of Buddhism that all forms of ignorance which produce suffering must be overcome, including genetic ignorance. The quest for enhancement is a recognition of profound human capacities of our physical and mental powers, which the Buddha fully understood and tapped into. Once he discovered that passion and hatred are the causes of *dukkha*, he eradicated these causes for himself and achieved new health and happiness under the *bodhi* tree. For the next forty-five years he perfected his health and happiness, which served as an antidote to the severe physical pain that dogged him down the years, due to an early regimen of extreme starvation. The Buddha excelled his contemporaries, and

notwithstanding his tireless labours for the welfare and happiness of all beings, and getting only three hours of sleep a day, he managed to live to the grand age of eighty.

All this is to say that from a Buddhist perspective nothing should stand in the way of a boy, even a tall boy who has big dreams of achieving the height of a basketball superstar, with the best of modern science. The problems some Jews, Christians, and Muslims face in connection with altering nature, expressed through fears of "Playing God," do not arise in the same way for Buddhists, because for them notions of sanctity belong to the natural realm and arise from our common connectivity and mutual interdependence. Nature is sacred because all life is part of a single web. The ethics of "do no harm" follows from a unitive vision of nature.

However, two strictures apply. On the side of science, the pursuit of enhancement through genetic intervention should not entail risks that would cause harm to the individual—physically, mentally, socially or spiritually. The watch-dog principle at work is ahimsa. Secondly, existential harm follows when a person becomes so emotionally and passionately attached to the allure of an enhanced state, that he becomes transformed into its very image. This is his new identity: *I am my height; I am my intelligence; I am my beauty; I am my strength*. Such aspirations arise from the illusion that it is what is engineered outside us that brings us happiness. The truth is that it is this very attachment which is the root of unhappiness.

3.13 Feminist Perspectives on Enhancement

As we saw in our earlier discussions of the naturalistic fallacy and naturalism, we cannot rely on easy assumptions regarding just what we are talking about when we use the word 'nature'. Feminist interpreters of religion in the last third of the twentieth century and now in the twenty-first century have found the nature of nature to be a problematic concept. Even though feminism, like naturalism, is not itself an institutional religion, we can benefit by reporting on feminist concerns and insights into the move from nature to ethics and apply this to questions surrounding genetic enhancement.

As with Roman Catholic and Protestant theologians, few feminist texts have addressed either gene therapy or gene enhancement specifically.²² By contrast,

²²For example, neither gene therapy nor enhancement appear as categories in the indexes of several leading texts on feminist bioethics: Susan Sherwin, *No Longer Patient: Feminist Ethics and Health Care*; Mary Briody Mahowald, *Women and Children in Health Care: An Unequal Majority*; Emilie M. Townes, *Breaking the Fine Rain of Death: African American Health Issues and a Womanist Ethic of Care*; Helen Bequaert Holmes and Laura M. Purdy, eds., *Feminist Perspectives in Medical Ethics*; Susan M. Wolf, ed., *Feminism and Bioethics: Beyond Reproduction*; Rosemarie Tong, ed., *Globalizing Feminist Bioethics: Crosscultural Perspectives*. One striking exception is Rosemarie Tong, *Feminist Approaches to Bioethics: Theoretical Reflections and Practical Applications*, which has an explicit discussion of gene therapy though no explicit discussion of genetic enhancement.

"eugenics" as a category for analysis and discussion shows up with some frequency in feminist works on bioethics.²³ A cursory background on feminist bioethics will help to explain why this is so and what its importance is when we turn to genetic enhancement and to our case studies.

As feminists can operate out of a number of fundamental approaches, there is no single feminist stance on most issues in bioethics. Just as Protestants may differ considerably from each other, so may feminists. Nonetheless, there is significant agreement on some basic affirmations and concerns. These undergird feminist thought in both philosophical and theological circles.

First, feminists generally begin by asking how new technologies or social arrangements will affect *women*. (Sometimes this is extended to include women and children.) While almost all feminists would argue that attention to women's well-being ultimately is also good for men, it is important that women's concerns and interests get priority.

Second, feminists begin with the conviction that "women have historically been oppressed and that such oppression is morally wrong" (Mahowald, 1993, 85). While feminists will disagree on the remedies for oppression—e.g., whether "equal treatment" under the law is sufficient or whether laws themselves need to be changed—they all agree that women around the world have been and continue to be oppressed.

Feminists therefore bring a 'hermeneutic of suspicion' to typical arguments in bioethics. For example, in assessing new reproductive technologies, Susan Sherwin notes that most arguments *for* technologies such as IVF are based on assumptions about the importance of autonomy. From a feminist perspective, however, such assumptions are questionable: the technologies are likely to be controlled by specialists and not by the women who are the 'patients' (Sherwin, 1992a, 126). Suspicion toward structures of health care and claims of what is 'good' for women is thus the third characteristic of contemporary feminist bioethics.

Fourth, feminist ethics looks beyond the desires or situation of the individual patient to ask about how *practices* in health care will affect women (Lebacqz, 1997a). Hence, feminist bioethics includes a *political* dimension that has been largely lacking in mainstream bioethics (Sherwin, 1992b, 22; see also Roberts, 1996, 116). Feminists ask how practices 'medicalize' normal experiences such as menopause or menstruation (Sherwin, 1992a). Feminists also ask how assumptions about the 'normal' have worked to constrain and disadvantage women.

Of particular relevance here is the fact that the category of 'nature' is itself suspect in feminist thought. 'Nature' has often been used as an argument to deprive women of rights and power, and thus claims about women's "nature" are viewed with particular suspicion by most feminists. As Wendell puts it, "We are used to countering claims that insofar as women are oppressed they are oppressed by nature.... We know that if being biologically female is a disadvantage, it is because a social context makes

²³Eugenics is mentioned specifically by Tung (1997), Wolf (1996), Holmes and Purdy (1992), Mahowald (1994), and Tung (2000).

it a disadvantage" (Wendell, 1992, 67). In a society in which women have historically been considered by nature to be 'weaker' than men and therefore unable to participate in the 'strong' world of the public arena, any discussion of women's 'nature' is automatically suspect (Wendell, 1992, 69). Asch and Geller caution specifically that the Human Genome Project and the attention to genetics raise again the danger that anatomy will be taken as destiny, especially for women (Asch and Geller, 1992, 323). The very framing of this project is therefore problematic from a feminist point of view. Minimally, feminists would argue strongly that attention to views of 'nature' and their impact on acceptance of technology must include significant critique of how 'nature' has traditionally been understood and utilized.

While most feminists eschew the category of 'nature,' one feminist does begin her work in bioethics with an account of 'human nature.' Mary Mahowald defines women and men in terms of their typical biological maturation into human beings capable of either conceiving, bearing, and nursing children or capable of fertilizing human ova (Mahowald, 1993, 5). Further, they are typically capable of forms of rationality and autonomy. Biological maturity and rational maturity may exist independently of each other, and life experiences will influence the specific expression of either. These affirmations about human nature give some guidance for bioethics. However, Mahowald sees equality as a social goal to be actively pursued and therefore rejects the historical 'natural law' view that men and women have different 'natures' and therefore social inequalities are acceptable (Mahowald, 1993, 79).²⁴ Seeing human life as a developmental continuum, Mahowald argues that ethical decisions must be appropriate to the specifics of the circumstances (Mahowald, 1993, 7). 'True egalitarianism must attend to individual differences. This attention to the concrete other is also typical of feminist thought.'

In spite of her apparent acceptance of 'nature' as a framing category, Mahowald reflects what Sherwin calls a typical feminist move: an acknowledgment of the social roots of individuals (Sherwin, 1992b, 23). Most feminists are skeptical of the extreme individualism that permeates liberal political philosophy (Asch and Geller, 1996, 327). Feminists look to the ways in which social contexts define people and structure interactions. Hence, feminists argue for an 'embedded' approach to persons, rather than for abstractions about human nature. They specifically and deliberately eschew the attention to 'private' encounters between doctor and patient, in favor of an approach that focuses on unjust social arrangements (see Roberts, 1996, 121).

Perhaps the most significant text in this regard is Emilie M. Townes, *Breaking the Fine Rain of Death*. In this "womanist" ethic of care,²⁵ Townes sets out precisely to analyze social location and cultural context and to provide a bioethics that takes

²⁴She rejects natural law reasoning in general. Primarily, she objects to its presumed opposition to 'artificial' interventions into conception. Arguing that the ability of human beings to transform the world, including themselves and their capacity for reproduction, is surely part—and perhaps the most important part—of any divine design, Mahowald rejects traditional natural law reasoning (77).

²⁵Many African American women eschew the term 'feminist' as reflecting primarily the concerns of white women, and use the term 'womanist' to denote concerns arising from the Black woman's context.

history and social setting seriously. Hence, she evaluates the legacy of the Tuskegee syphilis study on Black attitudes toward health care, she reviews in painstaking panorama the barriers to health care access for African Americans, and she draws deliberately on scriptural sources and images for a framework for her womanist ethic.

Given the feminist commitment to assessing the political context and meaning of health care and reviewing the history of women's oppression, it is no surprise that feminists have not addressed some of the typical categories of bioethics. Discussions of gene therapy are missing, but references to eugenics are rather common, as feminists search for an analysis of the wider social context within which all medical practices must be evaluated.

One of the few feminist texts that does discuss gene therapy and enhancement is Rosemarie Tong's *Feminist Approaches to Bioethics*. Tong reviews non-feminist approaches to a range of bioethical issues, and then shows what a feminist view looks like by contrast. The non-feminist perspective on gene therapy, for example, assumes that so long as the purposes of somatic cell gene therapy are 'negative' and 'medical'—that is, aimed at treating genetic conditions that society widely regards as diseases—there are no moral qualms about its use. Gene therapy can simply be likened to other somatic therapies (Tong, 1997, 227ff.). "Enhancement," however, raises problems for non-feminists, because its purposes are 'positive' and 'non-medical'—that is, raising people above 'normal' functioning. Germline gene therapy raises problems because of the unpredictable risks to subjects and their offspring, because it places numerous generations in the position of being consenting subjects, and because it might be used to create permanent alterations to suit the powerful rather than to suit those who are altered. Advocates of germline intervention counter all three of these arguments. A common concern, however, is whether the Human Genome Project has challenged our understanding of our 'nature' and significance. For example, we may increasingly think of ourselves as the product of our genes—or, conversely, attempt to become the active manipulators of everyone's genetic destiny.

Feminists make many of these same arguments, suggests Tong (1997, 238ff.). However, their focus would be on the impact on women of decisions made about gene therapy for children. Are the women truly ready to accept the possible risks and burdens? Are they already being blamed for the genetic problems of their children, and would they be blamed for any risks associated with gene therapy? Will they be pushed into accepting treatments that are still experimental and for which risks are not yet well established?

Feminists also raise serious questions of justice. Will the costs be so high that only the privileged can afford such treatments? Will women who cannot afford gene therapy be pressured to abort instead? And if we extend the arguments of Roberts and Townes, we might ask whether the intent of gene intervention is truly beneficent, as its proponents might claim, or whether it will be, wittingly or unwittingly, a tool for racist and sexist oppression.

This last question is particularly germane, as feminists are quick to point out that 'disease' is already a social category. Society can manipulate the criteria for disease. What genetic conditions should count as 'diseases' for which intervention is

sought? As Wendell puts it, "careful study of the lives of disabled people will reveal how artificial the line is that we draw between the biological and the social" (Wendell, 1992, 69). Sherwin, too, argues that feminists are and should be skeptical about any extensions of medical authority into "mental and social spheres" (Sherwin, 1992a, 193). This suggests that feminists might be particularly cautious about using genetic technologies for 'enhancement' purposes, since 'enhancement' is always a value judgment (Tong, 1997, 240). As for arguments that we already use techniques such as plastic surgery to 'enhance' ourselves, feminists have mounted compelling critiques of the practice of plastic surgery, and therefore would be likely to argue against gene intervention to secure desired characteristics for women.

What is crucial here is that 'enhancement' is so obviously a socially constructed category: what we find desirable today is not what would have been desirable a generation ago, nor necessarily what would be desirable in future generations. Further, such standards are often racist and sexist. For example, Mahowald notes that sex selection is extremely sex biased in favor of males (Mahowald, 1993, 83). Wertz and Fletcher argue against sex selection precisely because it might be the edge of a 'slippery slope' of 'positive eugenics' that would treat children as commodities to be manipulated and controlled (Wertz and Fletcher, 1992, 245). In sum, Tong argues that "feminists question whether science and medicine should devote energy and expertise to serving ephemeral social preferences, especially those that tend to reinforce an iniquitous status quo" (Tong, 1997, 241).

Given that feminists are also skeptical about the 'medicalization' of many aspects of life, it is possible that feminists would be hesitant about gene 'therapy,' and would join Roger Shinn and others in pointing out that 'therapy' is also a value judgment. As Mahowald notes, termination of fetuses because of their anomalies may be a kind of chauvinism or social prejudice (Mahowald, 1993, 87). Most abortions for genetic conditions are not really to avoid suffering to the affected individual, but to avoid suffering and costs to others. Perhaps the strongest argument here is from Susan Wendell, who states boldly, "the idea that there is some universal, perhaps biologically or medically describable paradigm of human physical ability is an illusion" (Wendell, 1992, 66).

In sum, it is not possible to construct or assume a single 'feminist' position on gene therapy and enhancement. No doubt some Western feminists, particularly those who adhere to liberal tradition and emphasize 'rights' and autonomy, will support gene intervention for therapy and even for enhancement. But we would expect that feminists in general will be skeptical about claims for 'enhancement' and will challenge us to look at the social and political context in which these technologies are developed. Feminists will examine the *practice* of gene intervention, and will not necessarily assume that it raises no new issues or can be dealt with in the same manner as other medical practices or interventions. Even if it can be, their general critiques of medical practice will apply to this new arena as well.

When it comes to our case scenarios, therefore, we might expect the following. First, although some feminists might hold, with Mahowald, to a standard of normal or natural development as a measurement for when genetic intervention is acceptable, most feminists would reject such a standard. Thus, the finding that there is a specific,

medically diagnosable disorder in Johnny's case, or in the case of Tom, is not relevant. More important is the issue of what each child may suffer from his projected height. More important than that is the question of whether the practice of emphasizing height tends to disadvantage some groups of people, especially women. Hence, we expect that feminists might agree with Wendell on the need for caution about setting any standards of "normalcy" that would alone determine the acceptability of intervention.

Given the long history of concern about eugenics and about the impact of practices, it is very likely that feminists would reject genetic intervention in the case of Erwin, where the parents simply want to make Erwin taller in order to ensure that he has an advantage in life. However, much depends on context. All of our case studies are framed around male children. Feminists would be most likely to point out the advantages that tall men already have in society, and to raise questions about practices that increase male advantages over females. If female children were involved, the judgments might be different.

Indeed, looking at context carefully suggests that we must make room for a variety of feminist responses, including possible acceptance of genetic enhancement. The "one child" policy in China has led some Chinese women to abort a fetus that they feared might be born damaged (Nie, 2000). The women generally expressed some sense of loss, grief, and regret over the aborted child. Therefore, it is certainly possible that they might have welcomed gene intervention in order to ensure *yousheng* or a "good birth." What is usually called gene therapy would be welcomed by many women in order to lighten the burden on mothers. Some of the Chinese women also stressed their support for the government one-child policy and spoke of their efforts to provide their one child with every possible advantage. Thus, it is also possible that they would desire genetic 'enhancement' were it available. This scenario makes clear how crucial is the central feminist claim that practices cannot be evaluated in isolation from social and political context and meaning.

3.14 Conclusion and Recommendations

What is the central question? Is it this: what is natural? Or, is it: what is right? Does the latter depend on the former?

We could be asking: is therapy more natural than enhancement? Both require technological intervention. The first is generally accepted regardless of religious background. The second is viewed as suspect. Yet, the grounds for suspicion are as yet inchoate and difficult to articulate. Even so, based upon the theological frameworks of living religious traditions, we can speculate. And we have.

We have noted a couple of distinctions. First, we assume that therapy and enhancement are two different things, but we hesitate to draw a sharp line between them. We work with the notion that therapy would move a person in ill health toward the average state of biological health, whereas enhancement would move a person from an existing healthy state toward a level of biological excellence above the average. Second, we distinguish between germline genetic alteration and

somatic genetic alteration. The first would influence heritable traits for generations to come, whereas the second would influence only the person whose cells receive inserted genetic material. For the foreseeable future, only somatic DNA alteration has been proposed for use in enhancement procedures. This draws the focus of ethical deliberation away from influencing inheritance and places it on living individuals whose genomes may be altered by insertion of an enhancing DNA material.

With these stipulations in mind, we have considered four scenarios. In the case of Johnny with Somatotropin Deficiency Syndrome, on the basis of our review of religious traditions it appears that none would have theological reasons for denying therapeutic genetic treatment. In the case of Bobby who is short but not suffering from a deficiency, genetic alteration could bring him up to normal height. No religious precedents would prevent such medical intervention. In the case of Tom who wants only to attain the height of others in his immediate family, again nothing we can find in our review of religious commitments would render genetic intervention morally illicit. In the case of Erwin, however, who is already of normal height and whose parents want him to exceed the normal height, such enhancement is generally thought to be morally illicit.

What we see here is that it is the distinction between therapy and enhancement that is decisive. Therapy is morally licit, even if it involves alteration of the human genome. Enhancement is a moral problem for some if it provides an unfair advantage of one person over another. Enhancement is a moral problem because it is a justice problem.

As we have interrogated the fundamental anthropologies and understandings of nature in the world's religious traditions, we find no prior commitments that would lead contemporary religious adherents to think of DNA as sacred. No existing religious precedents would require that a gene or a genetic code have a status higher than any other aspect of human biology. Even though recent cultural conversation includes voices of "genetic essentialism" or implicit beliefs in the sacredness of DNA, science does not confirm such a belief nor do religious traditions necessarily poise themselves to demand special status for the genome. This leads to a principle: *DNA is not sacred*.²⁶

QUESTIONS FOR FURTHER DISCUSSION AND RESEARCH:

1. Does the plurality of religious traditions necessarily indicate an irreconcilable diversity of moral commitments to genetic therapy and genetic enhancement?
2. Why has DNA become so central in people's thinking about human nature and identity?
3. What are the theological implications of genetics? Can ancient religious resources provide what is needed for contemporary theological and ethical judgments? Must theology be responsive to new genetic advances, or must genetic advances be understood in the context of theological affirmations?
4. Is genetic intervention different from or similar to genetic selection (by prenatal diagnosis or preimplantation genetic diagnosis)?
5. Is genetic selection closer to eugenics than somatic gene transfer? Is germline gene transfer more similar to genetic selection or eugenics? What are the morally relevant differences between eugenics, germline gene intervention and somatic gene transfer?
6. Should bioethicists consider it their job to draw lines, such as the line between therapy and enhancement?

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