

DNA: THE EMERGENCE OF WHO WE ARE AND THE
REEMERGENCE OF RELIGIOUS COMMENTARY AND
OPPOSITION TO GENETIC PATENTS

*Jeffrey Sjögren**

I. INTRODUCTION

In September of 2015, a group of thinkers—including religious leaders—gathered to discuss a continued concern: the morality of patenting life.¹ As genetic and biotechnological developments get closer to synthetically replicating nature, there are moral, ethical, and religious concerns with how ownership of these developments will affect human dignity and the population's rights to also own something that seems natural.²

A primary reason these issues were discussed was a recent 2013 decision by the Supreme Court of the United States:³ *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*⁴ There, the plaintiff sought patent protection for a gene that was isolated and then replicated.⁵ *Amicus Curiae*—the Southern Baptist Convention (“SBC”)—contended that extending patent protection in this circumstance would oppress its religious beliefs.⁶ While it

* J.D. Candidate, Rutgers Law School, 2017; B.A., Rutgers, The State University of New Jersey, 2013. I owe this note to: the Rutgers Journal of Law & Religion's hard-working members, for helping me to improve it; Professor Michael Carrier, for sparking my interest in intellectual property; my parents, for encouraging me during its writing; and my fiancée, for being my rock throughout law school.

¹ Thomas C. Berg, *Playing God? Moral Arguments on Patents on Life*, U. OF ST. THOMAS, (Jan. 25, 2016), <http://www.stthomas.edu/news/playing-god-moral-arguments-patents-life/>.

² *Id.*

³ *Id.*

⁴ 133 S. Ct. 2107 (2013).

⁵ *Id.* at 2110-11.

⁶ “[B]ecause the gene patents at issue cover everyone's BRCA1 and BRCA2 genes, the patents put the *Amici Curiae* in the untenable position of being personally subject to patents that violate their religious beliefs.” Brief for Amici Curiae of the Ethics & Religious Liberty Commission of the Southern Baptist Convention and Prof. D. Brian Scarnechia in Support of Petitioners, *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107 (2013) (No. 12-398), 2013 WL 432955, at *1. “Christian churches hold as a core principle that God created DNA. Granting ownership of DNA upsets the fundamental relationship between human beings and God, both because it commodifies the human body—degrading its dignity within creation—and consigns an essential part of the human genetic patrimony to private ownership.” *Id.* at *4.

ultimately ended patent ownership of genes themselves, the Supreme Court directly acknowledged that certain types of synthetic genes could be considered patentable subject matter.⁷ Since patent law's inception, the United States' Founders sought to benefit the public by granting Congress the authority to "[t]o promote the Progress of Science and useful Arts, by securing for limited Times to Authors and Inventors the exclusive Right to their respective Writings and Discoveries."⁸ This seemingly straightforward grant of authority attempts to foster a competing balance between maximizing innovations and minimizing monopolies.⁹ However, the scale may become out of kilter when, as SBC asserts, patent ownership interferes with the First Amendment's declaration that "Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof."¹⁰

This Note will attempt to explain what effect *Myriad Genetics* has had and will have on religious opposition to patents. It will first explore the basics of science—more specifically, deoxyribonucleic acid ("DNA")—and patent law that led to *Myriad Genetics*' decision. Next, religion's involvement in patenting genetic material has waxed and waned over time,¹¹ especially leading up to and including the Human Genome Project ("HGP");¹² the implications of its reemergence in *Myriad Genetics* will be assessed and if *Myriad Genetics*' result is compatible with these religious concerns.

Moving forward from *Myriad Genetics*, religious opposition to gene patents—and arguably patents overall—have multiple avenues to continue that opposition, including the freedom of speech. Tied to this, *Myriad Genetics*' amicus brief may be

⁷ *Myriad Genetics*, 133 S. Ct. at 2119-20.

⁸ U.S. CONST. art. 1, § 8, cl. 8; see also Brian Gargano, Note, *The Quagmire of DNA Patents: Are DNA Sequences More Than Chemical Compositions of Matter?*, 2005 SYRACUSE SCI. & TECH. L. REP. 3, 7 (2005) ("[T]he patent system, as envisioned by the founders, was created for the primary goal of promoting the advancement of technology for the public good by the lure of the opportunity for anyone to handsomely profit from creative innovation.").

⁹ Gargano, *supra* note 8, at 6.

¹⁰ U.S. CONST. amend. I.

¹¹ See Audrey R. Chapman, *Religious Contributions to the Debate on the Patenting of Human Genes*, 10 U. SAINT THOMAS L.J. 650, 664 (2013) ("It would be erroneous to portray the religious community or specific communions as having a consistent witness or involvement in the discussions related to the patenting of life forms.").

¹² See *id.* at 654 (discussing the initiation and development of gene patents from 1980 through 2005).

considered as a reemergence of using morality—and by extension, religion—to determine patentability. Last, religious commentary in the patent sphere may serve more than just religious concerns by serving as a helpful signal for determining if a particular invention meets patents' requirements—predominantly if it is patentable subject matter. By understanding how religion and patents may interact in the future, we may be better prepared for the moral and ethical concerns that could arise as scientific advances become exponentially more technical, sophisticated, and difficult to understand.

II. WHERE *MYRIAD GENETICS*' CONCERNS BEGAN

A. Genetic Background

To understand the respective roles of law and religion in genetics, it is helpful to first understand *Myriad Genetics*' science. DNA is cells' genetic information and is made up of only four letters—or nucleotide bases: adenine, thymine, guanine, and cytosine.¹³ These four bases are arranged in a strand and paired with a complementary strand, forming a double helix shape;¹⁴ the strands are paired together by matching adenine to thymine and guanine to cytosine.¹⁵ After the information is catalogued in the double-helix library, cells will use this information—as needed—to create proteins for internal and external functions.¹⁶ Unlike how humans are able to read words of varied lengths, cells can only read words three letters long; these groups of three nucleotide bases are called codons.¹⁷ There are sixty-four possible codon combinations and, while some codons do equate to a single amino acid—proteins' basic building blocks—multiple codons can code for one of the twenty amino acids.¹⁸

While this language's individual words are simplistic, its

¹³ D. Benjamin Borson, Article, *The Human Genome Projects: Patenting Human Genes and Biotechnology. Is the Human Genome Patentable?*, 35 IDEA: J.L. TECH. 461, 464 (1995). Uracil is another nucleotide base, but it only appears in RNA by taking thymine's place. *In re BRCA1-, BRCA2-Based Hereditary Cancer Test Patent Litig.*, 3 F. Supp. 3d 1213, 1223 (D. Utah 2014) [hereinafter *In re BRCA1-*], *aff'd and remanded sub nom. In re BRCA1- & BRCA2-Based Hereditary Cancer Test Patent Litig.*, 774 F.3d 755 (Fed. Cir. 2014).

¹⁴ Borson, *supra* note 13, at 464.

¹⁵ *In re BRCA1-*, 3 F. Supp. 3d at 1222.

¹⁶ *Id.*

¹⁷ *Id.*

¹⁸ *Id.*

complexity increases when writing a whole protein paragraph—or expression.¹⁹ To do so, cells' inner machinery essentially unzips the DNA's double-helix and makes a movable copy of the needed information—or transcription—of ribonucleic acid ("RNA").²⁰ The DNA holds onto the RNA being transcribed while a protein called RNA polymerase writes everything down.²¹ When the new RNA strand is finished, it still requires some editing—or splicing—because it contains unneeded phrases—or introns.²² The RNA's introns are spliced out and the remaining sentences and phrases around these edits—or exons—are pushed together—or ligated—to create a messenger RNA ("mRNA").²³ This mRNA is then sent out of the cell, translating into a corresponding protein.²⁴

In addition to proteins, mRNA can be used to synthesize another molecule—complementary DNA ("cDNA").²⁵ Similar to how DNA strands match up with one another and mRNA complements DNA's sequence, cDNA complements mRNA's sequence.²⁶ Basically, cDNA is the edited version of the original DNA because it contains neither DNA's unnecessary introns nor its sequences that regulate how the gene is expressed.²⁷

B. Patent Background

Patent law has been given a wide breadth of possibilities since its inception, which interestingly went against the Revolutionary War's fight against unhindered possession and power.²⁸ Thomas Jefferson vehemently shared this sentiment, yet he was simultaneously pulled in the opposite direction as an inventor,²⁹ viewing patent protection differently after the Bill of Rights' passage.³⁰ Instead of viewing a patent monopoly as almost

¹⁹ Borson, *supra* note 13, at 464.

²⁰ *Id.*

²¹ *In re BRCA1*, 3 F. Supp. 3d at 1223.

²² *Id.*

²³ *Id.*

²⁴ *Id.* at 1224.

²⁵ *Id.*

²⁶ *In re BRCA1*, 3 F. Supp. 3d at 1224.

²⁷ *Id.* at 1224.

²⁸ See *Graham v. John Deere Co.*, 383 U.S. 1, 7 (1966) (discussing Americans' general aversion to government-sponsored monopolies because of the British government's tea monopoly).

²⁹ *Id.* Jefferson's concern was that any potential benefit that could be derived from even minimal monopoly usage would yield much greater suppression of the public. *Id.* at 8.

³⁰ *Id.*

divine or omnipotent control for an individual or government, Jefferson viewed patent protection as more of a public protection than a private protection.³¹ Patent monopolies were being framed as an inducement to allow the public to experience innovation.³²

With this new vision, Thomas Jefferson authored the Patent Act of 1793.³³ In determining what was protectable subject matter, Jefferson wrote that “any new and useful art, machine, manufacture, or composition of matter, or any new or useful improvement [thereof]” could be protected.³⁴ While consisting of seemingly broad and overly expansive terms,³⁵ this was also incredibly limiting because of Jefferson and the Founders’ monopoly concerns.³⁶ This broad yet simultaneously narrow formulation endured through multiple statutory creations.³⁷ In 1952, Congress recodified patent law and laid out its elements, requiring that an invention must: (1) be patentable subject matter; (2) have utility/usefulness;³⁸ (3) have novelty;³⁹ (4) be nonobvious;⁴⁰ and (5) be disclosed to the public with a reasonable degree of specificity and certainty so that it can be replicated.⁴¹ This

³¹ *Id.* at 9.

³² *Id.*

³³ *Diamond v. Chakrabarty*, 447 U.S. 303, 308 (1980).

³⁴ *Id.*

³⁵ *See id.* (“[I]ngenuity should receive a liberal encouragement.”).

³⁶ *See Graham*, 383 U.S. at 9 (“Only inventions and discoveries which furthered human knowledge, and were new and useful, justified the special inducement of a limited private monopoly.”).

³⁷ *Chakrabarty*, 447 U.S. at 309.

³⁸ “Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.” 35 U.S.C. § 101 (1952).

³⁹ 35 U.S.C. § 102 (2012).

⁴⁰ “A patent . . . may not be obtained . . . if the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious . . . to a person having ordinary skill in the art” 35 U.S.C. § 103 (2012).

⁴¹ 35 U.S.C. § 112 (2012)

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same, and shall set forth the best mode contemplated by the inventor or joint inventor of carrying out the invention.

Id.

formulation is practically identical to Jefferson's original formulation besides switching the term "art" with "process",⁴² this demonstrates Congress' continued endorsement of patent law's terms over the years.⁴³ Moreover, the Committee reports leading up to 1952's recodification declared that this formulation was meant to "include anything under the sun that is made by man."⁴⁴ This leads to the question of when is something already under the sun, and when is something under the sun because of man.

C. Patents and Moral Utility

United States patent law has long been influenced by the concept of morality.⁴⁵ Morality and patent law first became a unified topic when considering the "moral utility doctrine."⁴⁶ Beginning in the early nineteenth century, the moral utility doctrine considered an invention's inherent morality in determining utility or usefulness—one of patent law's mandatory requirements.⁴⁷ Justice Story created this concept, saying that usefulness does not require an invention to be better but, instead, "[a]ll the law requires is, that the invention should not be frivolous or injurious to the well-being, good policy, or sound morals of society."⁴⁸ The usefulness assessment therefore partly took into consideration whether the invention was morally offensive or not.⁴⁹

In the nineteenth and twentieth centuries, moral utility was prominent in two areas: gambling devices and deceptive devices.⁵⁰ With regards to the gambling devices, courts assessed devices' morality by weighing the skill versus luck that was required to win and if the devices' primary place of use was in an inherently immoral place.⁵¹ However, by the mid-twentieth century, gambling devices were able to receive patents and the

⁴² Compare *supra* note 34, with *supra* note 38.

⁴³ See *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980).

⁴⁴ *Id.*

⁴⁵ Laura A. Keay, Article, *Morality's Move Within U.S. Patent Law: From Moral Utility to Subject Matter*, 40 *AIPLA Q.J.* 409, 411 (2012).

⁴⁶ *Id.* at 411.

⁴⁷ *Id.* at 412.

⁴⁸ *Id.* at 411-12 (quoting *Lowell v. Lewis*, 15 F. Cas. 1018, 1019 (C.C.D. Mass. 1817) (No. 8568)).

⁴⁹ *Id.* at 412.

⁵⁰ *Id.* at 412-15.

⁵¹ Keay, *supra* note 45, at 413.

doctrine faded away in this area.⁵²

With regards to deceptive devices, courts assessed if devices' inherent purpose was customer deception.⁵³ For example, a process patent that made unspotted tobacco appear spotted was invalidated because its primary purpose was to deceive the public—tobacco plants' leaves were considered higher quality if they were spotted.⁵⁴ Again, just like in gambling devices, the doctrine's application with deceptive devices has been abandoned.⁵⁵

This abandonment occurred in *Juicy Whip, Inc. v. Orange Bang, Inc.*⁵⁶ There, a post-mix beverage dispenser—one that keeps the water and syrup in separate locations until dispensed—used a display bowl that made it appear as if the mixing was occurring in front of the customer, prompting impulse purchases.⁵⁷ The lower court found the patent to be invalid because its primary utility was to create an illusion.⁵⁸ The Federal Circuit ultimately reversed this decision because “[t]he fact that one product can be altered to make it look like another is in itself a specific benefit sufficient to satisfy the statutory requirement of utility.”⁵⁹ In making this decision, the Federal Circuit emphasized that “[u]ntil such time as Congress does so, . . . we find no basis in section 101 to hold that inventions can be ruled unpatentable for lack of utility simply because they have the capacity to fool some members of the public.”⁶⁰

In the wake of the doctrine's loss, the United States Patent and Trademark Office (the “USPTO”) provided conflicting information as to the weight that moral concerns had on patentability.⁶¹ On the one hand, the USPTO's website states that inventions which were “offensive to the public morality” would not receive patent protection.⁶² On the other hand, the USPTO's Manual of Patent Examining Procedure does not expressly mention any moral or ethical influences on utility.⁶³ This

⁵² *Id.* at 414.

⁵³ *Id.*

⁵⁴ *Id.* at 414-15.

⁵⁵ *Id.* at 415.

⁵⁶ 185 F.3d 1364 (Fed. Cir. 1999).

⁵⁷ *Id.* at 1365.

⁵⁸ *Id.* at 1366.

⁵⁹ *Id.* at 1367.

⁶⁰ *Id.* at 1368.

⁶¹ Keay, *supra* note 45, at 418-19.

⁶² *Id.* at 410.

⁶³ *Id.* at 418.

difference suggests that morality and ethics may somehow still influence the patent process.⁶⁴

III. GENETICS AND LAW IN ACTION

A. *General Property Rights in One's Body*

In *Moore v. Regents of University of California*,⁶⁵ John Moore ("Moore") developed hairy-cell leukemia and required medical treatment.⁶⁶ During the course of treatment, Moore's attending physician extracted, modified, and patented a cell line from Moore's T-lymphocytes, yielding a financially and therapeutically valuable invention.⁶⁷ The court ultimately concluded that Moore had retained no property interest in his cells and their genetic information, leaving them for the physician's use.⁶⁸ In doing so, the majority furthered its policy interests in fostering biological research and development, pointing out that

[r]esearch on human cells plays a critical role in medical research. This is so because researchers are increasingly able to isolate naturally occurring, medically useful biological substances and to produce useful quantities of such substances through genetic engineering. These efforts are beginning to bear fruit . . . [and] [t]he extension of conversion law into this area will hinder research by restricting access to the necessary raw materials.⁶⁹

⁶⁴ *Id.* at 419.

⁶⁵ 793 P.2d 479 (Cal. 1990).

⁶⁶ *Id.* at 480.

⁶⁷ *Id.* at 480-82.

A T-lymphocyte is a type of white blood cell. T-lymphocytes produce lymphokines, or proteins that regulate the immune system. Some lymphokines have potential therapeutic value. If the genetic material responsible for producing a particular lymphokine can be identified, it can sometimes be used to manufacture large quantities of the lymphokine through the techniques of recombinant DNA.

Id. at 481 n.2.

⁶⁸ *Id.* at 488-89.

⁶⁹ *Id.* at 494.

Justice Mosk's dissenting opinion introduced the moral and ethical concerns that should be weighed against the majority's policy concerns.⁷⁰ Referencing how slavery was an abhorrent form of the human body's exploitation, Justice Mosk called for the human body to be held in a higher regard than something that can be individually separated and exploited.⁷¹ Most applicable to the religious concerns this note analyzes, Justice Mosk explained:

Research with human cells that results in significant economic gain for the researcher and no gain for the patient offends the traditional mores of our society in a manner impossible to quantify. Such research tends to treat the human body as a commodity—a means to a profitable end. The dignity and sanctity with which we regard the human whole, body as well as mind and soul, are absent when we allow researchers to further their own interests without the patient's participation by using a patient's cells as the basis for a marketable product.⁷²

Tied to these ethical and moral concerns are the ethical and moral concerns arising from religion. “In Biblical terms it means that man is made in the image of God, and . . . [t]his is what it means to be a person and not an object to be manipulated either by doctors or medicine or by the impassive operations of physical nature.”⁷³

B. The Defining—or Blurring—of the Line Between Unprotected Laws of Nature and Patentability

While *Moore* addressed general property rights in one's

⁷⁰ *Moore*, 793 P.2d at 515-16.

⁷¹ See *id.* at 515 (“[O]ur society acknowledges a profound ethical imperative to respect the human body as the physical and temporal expression of the unique human persona. One manifestation of that respect . . . is our prohibition against indirect abuse of the body by its economic exploitation for the sole benefit of another person. The most abhorrent form of such exploitation, of course, was the institution of slavery.”).

⁷² *Id.* at 516 (quoting Mary Taylor Danforth, *Cells, Sales, and Royalties: The Patient's Right to A Portion of the Profits*, 6 YALE L. & POL'Y REV. 179, 190 (1988)).

⁷³ Danforth, *supra* note 72, at 190.

cells and their genetic makeup, *Diamond v. Chakrabarty*⁷⁴ assessed patent law's property rights. Chakrabarty—a microbiologist—created *Pseudomonas* bacterium that used DNA instructions—called plasmids here—for a “hydrocarbon degradative pathway,” meaning the bacterium could break down particular components of crude oil.⁷⁵ While the *Pseudomonas* bacterium and its incorporated plasmids had naturally and separately existed under the sun, the two had not naturally functioned with one another.⁷⁶ Chakrabarty subsequently filed a patent for the bacterium, which was initially denied because the bacteria were “products of nature” and not patentable as living things.⁷⁷

In defense of this decision, Diamond—the Commissioner of Patents and Trademarks—argued on the Supreme Court's certiorari that the courts should avoid determining the limits of patentability unless the legislature explicitly defines it.⁷⁸ Diamond laid out a “parade of horrors” that claimed genetic and technological inventors would be capable of “depreciat[ing] the value of human life” if the Court held otherwise.⁷⁹ The Court

⁷⁴ 447 U.S. 303 (1980).

⁷⁵ *Id.* at 305.

These new DNA instructions were in plasmid form, which are hereditary units physically separate from the chromosomes of the cell. In prior research, Chakrabarty and an associate discovered that plasmids control the oil degradation abilities of certain bacteria. In particular, the two researchers discovered plasmids capable of degrading camphor and octane, two components of crude oil. In the work represented by the patent application at issue here, Chakrabarty discovered a process by which four different plasmids, capable of degrading four different oil components, could be transferred to and maintained stably in a single *Pseudomonas* bacterium, which itself has no capacity for degrading oil.

Id. at 305 n.1.

⁷⁶ *Id.* At the time, biological control of oil spills consisted of an incredibly limited mixture of bacteria that could each individually break down an individual oil component. *Id.* n.2. Chakrabarty's bacterium were a more efficient bacterial method because the old method's bacterium frequently would not survive long enough to effect the spill. *Id.*

⁷⁷ *Chakrabarty*, 447 U.S. at 306. Chakrabarty had also submitted two other patent claims that the patent examiner permitted: a process claim for creating the bacteria and a claim “for an inoculum comprised of a carrier material floating on water, such as straw, and the new bacteria.” *Id.* at 305-06.

⁷⁸ *Id.* at 314-15.

⁷⁹ *Id.* at 316.

brushed these fears to the side by strictly construing Congress' chosen terms in Section 101.⁸⁰

The Court grappled with if this *Pseudomonas* was a manufacture or a composition of matter.⁸¹ While broad, the legislative language prevents patentability to laws of nature and physical phenomena because "[s]uch discoveries are 'manifestations . . . of nature, free to all men and reserved exclusively to none.'"⁸² The Court determined that the *Pseudomonas*, while composed of naturally occurring components, was manufactured into an unnaturally occurring composition of matter, deserving protection.⁸³

It is useful to contrast this finding with that in *Funk Bros. Seed Co. v. Kalo Inoculant Co.*,⁸⁴ which similarly looked into the genetic makeup and application of bacteria.⁸⁵ At the time, a *Rhizobium* bacterium could be used to inoculate a particular legume root so that the root could fix airborne nitrogen and convert it to useful organic nitrogenous compounds.⁸⁶ The patentee had discovered that strains of these bacteria could be used in concert with one another to inoculate a broader range of leguminous roots with a single mixed culture.⁸⁷ Similar to *Diamond*, this was a combination of naturally occurring biological and genetic matter to create a more useful product.⁸⁸ However, the Court denied patentability because this more useful product was merely taking advantage of the *Rhizobia*'s natural processes.⁸⁹

⁸⁰ *Id.* at 318.

⁸¹ *Id.* at 308.

⁸² *Chakrabarty*, 447 U.S. at 309 (quoting *Funk Bros. Seed Co. v. Kalo Inoculant Co.*, 333 U.S. 127, 130 (1948)).

⁸³ *Id.* at 309-10.

⁸⁴ 333 U.S. 127.

⁸⁵ *Id.* at 128-29.

⁸⁶ *Id.*

⁸⁷ *Id.* at 130. Previous attempts had been made at combining other forms of *Rhizobia* into a mixture, but those *Rhizobia* had exhibited a mutually inhibitive effect on one another. *Id.* at 129-30. This inhibitive effect essentially means that, when the previously discovered *Rhizobia* were combined, the mixture's efficacy was reduced. *Id.*

⁸⁸ *Funk Bros.*, 333 U.S. at 131.

⁸⁹ *See id.* ("The combination of species produces no new bacteria, no change in the six species of bacteria, and no enlargement of the range of their utility. Each species has the same effect it always had. The bacteria perform in their natural way. Their use in combination does not improve in any way their natural functioning. They serve the ends nature originally provided and act quite independently of any effort of the patentee.").

C. *The Latest Development: Myriad Genetics*

1. Background and the Supreme Court's Decision

These prior cases helped to shape *Myriad Genetics'* analysis. Myriad Genetics—the patentee—discovered a couple of genes' locations in the human body;⁹⁰ these genes are referred to as BRCA1 and BRCA2.⁹¹ Up until this point, scientists were aware that hereditary genes somehow predisposed particular individuals to the risk of breast cancer, but they did not know where it happened.⁹² Myriad Genetics found BRCA1 and BRCA2 on chromosomes seventeen and thirteen,⁹³ and determined that these genes' mutations dramatically increased the risk of breast and ovarian cancers.⁹⁴ Because of the genes' potential for detecting cancer risks, Myriad Genetics sought patent protection for BRCA1 and BRCA2;⁹⁵ these patents included the genes themselves when isolated from the DNA and the associating complimentary DNA ("cDNA").⁹⁶ Myriad Genetics was previously granted these patents, setting it up to exclusively provide BRCA mutation testing for patients.⁹⁷

While discovering BRCA1 and BRCA2 was quite a feat, the Court determined that the discovery's potential future innovation was insufficient for patentability;⁹⁸ the discovery itself did not alter the genes' natural function but instead was an innovative use

⁹⁰ *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2112 (2013).

⁹¹ *Id.*

⁹² *Id.*

⁹³ *Id.* The human body has a total of forty-six chromosomes. *In re BRCA1-, BRCA2-Based Hereditary Cancer Test Patent Litig.*, 3 F. Supp. 3d 1213, 1222 (D. Utah 2014). Myriad found the two relevant chromosomes out of these forty-six. *Myriad Genetics*, 133 S. Ct. at 2112. The seventeenth and thirteenth chromosomes have approximately 80 million and 114 million nucleotides, respectively. *Id.* BRCA1 and BRCA2 are each a stretch of about 80 thousand nucleotides. *Id.* This represents that BRCA1 only takes up 0.1% of the seventeenth chromosome and BRCA2 only takes up about 0.07% of the thirteenth chromosome.

⁹⁴ *Id.*

⁹⁵ *Id.* at 2113.

⁹⁶ *Id.*

⁹⁷ *Myriad Genetics*, 133 S. Ct. at 2114. These two patents would "give [Myriad] the exclusive right to isolate an individual's BRCA1 and BRCA2 genes . . . by breaking the covalent bonds that connect the DNA to the rest of the individual's genome. The patents would also give Myriad the exclusive right to synthetically create BRCA cDNA." *Id.* at 2113.

⁹⁸ *Id.* at 2117.

of that natural function.⁹⁹ Myriad Genetics' argument got a little closer when it referred to how it created an unnatural stretch of DNA by severing its chemical bonds and cutting it from the chromosome.¹⁰⁰ The Court countered by following its logic in *Funk Brothers*, stating that it is insufficient to merely alter the chemical because the genes' usefulness lies in the informational sequence, not the individual chemicals.¹⁰¹ The Court further justified its declination of patent protection by referencing *Diamond*; Myriad Genetics agreed that *Diamond* would dictate the outcome.¹⁰² While Chakrabarty created an unnatural function by inserting plasmid DNA into a bacterium, Myriad Genetics' separated DNA served no new inventive purpose outside of the isolation itself.¹⁰³

Although Myriad Genetics' genes were found to be unprotected products of nature, the Court did not extend this analysis to Myriad Genetics' cDNA,¹⁰⁴ because

[i]t is important to note that the cDNA obtained in this way is not genomic DNA, but rather is truly "new" in a biological sense. The cDNA is "new" because genomic DNA is comprised of the protein-coding "exons" interspersed with the non-coding "introns," which are usually removed by the RNA processing steps that occur in the nucleus. Protein-coding regions comprise only approximately 2-3% of the DNA in the genome, whereas the non-coding regions comprise 97-98% of the DNA.¹⁰⁵

The petitioners were against patenting this cDNA because, although the cDNA's creation requires a lab technician's input, the cDNA's nucleotide sequence is still arranged by nature.¹⁰⁶ While the body naturally creates cDNA, this particular cDNA would never be naturally created.¹⁰⁷

⁹⁹ "[*Funk Brothers*'] patent claim thus fell squarely within the law of nature exception. So do Myriad's. Myriad found the location of the BRCA1 and BRCA2 genes, but that discovery, by itself, does not render the BRCA genes 'new . . . composition[s] of matter,' § 101, that are patent eligible." *Id.*

¹⁰⁰ *Id.* at 2118.

¹⁰¹ *Id.*

¹⁰² *Myriad Genetics*, 133 S. Ct. at 2116-17.

¹⁰³ *Id.*

¹⁰⁴ *Id.* at 2119.

¹⁰⁵ Borson, *supra* note 13, at 465.

¹⁰⁶ *Myriad Genetics*, 133 S. Ct. at 2119.

¹⁰⁷ *Id.* The Court did differentiate that it would seem possible to create

Similar to how the conference in September 2015 discussed the unknown interface of morality and synthetic products of nature in the future,¹⁰⁸ Justice Scalia's concurrence stated in full:

I join the judgment of the Court, and all of its opinion except Part I–A and some portions of the rest of the opinion going into fine details of molecular biology. I am unable to affirm those details on my own knowledge or even my own belief. It suffices for me to affirm, having studied the opinions below and the expert briefs presented here, that the portion of DNA isolated from its natural state sought to be patented is identical to that portion of the DNA in its natural state; and that complementary DNA (cDNA) is a synthetic creation not normally present in nature.¹⁰⁹

Biotechnology and genetics' continuous development can lead to gray areas between the synthetic and the natural.

2. Religions' Concerns with *Myriad Genetics*

Leading up to this decision, an amicus brief was submitted in support of the petitioners' anti-patent arguments, placing religious concerns squarely against genetic patentability.¹¹⁰ *Amicus Curiae*—the Southern Baptist Convention (“SBC”)—submitted the brief,¹¹¹ asserting that any grant of patent protection to Myriad Genetics would violate its religious principles because patentability “disregard[s] [DNA’s] intrinsic value and nature as a divine gift.”¹¹² SBC’s argument is laid out in two phases. First, SBC reviewed how its theological beliefs directly

cDNA that is barely indistinguishable from its DNA origin, raising an entirely different scenario. *Id.*

¹⁰⁸ Berg, *supra* note 1.

¹⁰⁹ *Myriad Genetics*, 133 S. Ct. at 2120.

¹¹⁰ Brief for Amici Curiae, *supra* note 6.

¹¹¹ “[T]he Southern Baptist Convention is America's largest non-Catholic denomination with more than 16.2 million members in over 44,000 churches nationwide.” *Id.* at *1. The amicus brief was presented to the Court by Prof. D. Brian Scarnecchia, M.Div., J.D., believing personally that DNA sequence patents (1) “treat[] as private property what is a part of the common and innate nature of the human person” and (2) “will open the door to further commodification of the gene pool reflecting a eugenic mentality” *Id.* at *2.

¹¹² *Id.* at *1, 4.

conflict with Myriad Genetics' patents and how these religious concerns are shared by several denominations.¹¹³ Second, SBC asserted that these moral and ethical beliefs are not limited to religion, comparing them to property and patent law both nationally and internationally.¹¹⁴ In doing so, SBC said that patentability here would adversely affect the nation, violating "the values that are interwoven into the laws and morals of American society" and asking the Court to "extinguish[] [these] serious threats to the values on which our nation was built."¹¹⁵

SBC lead off its argument by asserting that Christian theology connects into this arena because God himself created the DNA, which serves as the blueprint from which all individuals are built in God's image.¹¹⁶ SBC then acknowledged that, while all of these genetic blueprints differ from person to person, DNA's diversity carries a connection to God because it makes all people unique and creates individuality.¹¹⁷ Thus, according to SBC, gene patents would allow ownership and control of the soul,¹¹⁸ and would disrupt the natural order of Creator and creation.¹¹⁹ Instead of the Creator asserting divine ownership of the creation, the creation would be asserting ownership of the Creator's work.¹²⁰ In doing such, the creation would be able to withhold the Creator's gift that "should be held in common by all humanity so that it can be put to the service of all of its members."¹²¹

SBC then presented how these viewpoints are represented within particular denominations, including itself, the Catholic Church, the United Methodist Church, and the World Council of Churches.¹²² SBC believes that human beings hold an inherent value because they are created in God's image, and ownership of what dictates that image would diminish that value.¹²³ Similarly,

¹¹³ *Id.* at *2-3.

¹¹⁴ *Id.* at *3.

¹¹⁵ Brief for Amici Curiae, *supra* note 6, at *4.

¹¹⁶ *Id.* at *4, 5; *see also* *Genesis* 1:27 (New International Version) ("So God created mankind in his own image, in the image of God he created them; male and female he created them.").

¹¹⁷ Brief for Amici Curiae, *supra* note 6, at *7.

¹¹⁸ *Id.* at *5. "[G]ranting private exclusive rights over a part of the human body - especially one as central to human existence as DNA - degrades humanity, dropping it from its special role in creation to a mere species of property." *Id.* at *6.

¹¹⁹ *Id.* at *6.

¹²⁰ *Id.*

¹²¹ *Id.*

¹²² Brief for Amici Curiae, *supra* note 6, at *8.

¹²³ *Id.* at *8-9.

the Catholic Church asserts that there are dangers in the body's commodification because both the spirit and DNA are practically inseparable from one another.¹²⁴ The United Methodist Church believes that genes belong to the Creator, not the creation that figured out how it works.¹²⁵ The World Council of Churches¹²⁶ says human beings are equals under God's creation, and gene patents disturb that equilibrium.¹²⁷

With such seemingly broad acceptance of these ideals, SBC drew on their seemingly inherent compatibility with the law.¹²⁸ Patent law, as a whole, is in existence to provide a utilitarian benefit to society.¹²⁹ To achieve that societal benefit, patent law needed to incentivize the inventor to publicly release information in exchange for a limited monopoly.¹³⁰ However, patenting nature goes directly against both of these endeavors,¹³¹ which SBC claimed should deny patentability.¹³² SBC defended that granting patent protection over fundamentally natural components of DNA achieved no societal benefit because it would block any innovation that could stem from an unavoidably fundamental, genetic building block.¹³³ SBC then defended that there is no need to incentivize innovation here because Myriad Genetics just used an uninventive, unchanged version of God's own inventiveness.¹³⁴

SBC extended these messages beyond direct ethics and discussed how patentability would violate religions' belief in

¹²⁴ *Id.* at *9-10.

¹²⁵ *Id.* at *10-11.

¹²⁶ "The World Council of Churches is a fellowship of churches which confess [sic] the Lord Jesus Christ as God and Saviour according to the scriptures, and therefore seek to fulfil [sic] together their common calling to the glory of the one God, Father, Son and Holy Spirit." *What is the World Council of Churches?*, WORLD COUNCIL OF CHURCHES, <http://www.oikoumene.org/en/about-us> (last visited June 16, 2016).

¹²⁷ Brief for Amici Curiae, *supra* note 6, at *11-12.

¹²⁸ *Id.* at *12-13.

¹²⁹ *Id.* at *18-19.

¹³⁰ See *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1305 (2012) ("Patent protection is, after all, a two-edged sword. On the one hand, the promise of exclusive rights provides monetary incentives that lead to creation, invention, and discovery. On the other hand, that very exclusivity can impede the flow of information that might permit, indeed spur, invention . . .").

¹³¹ *Id.* at 1293 ("[M]onopolization of [natural] tools through the grant of a patent might tend to impede innovation more than it would tend to promote it.").

¹³² Brief for Amici Curiae, *supra* note 6, at *19.

¹³³ "Myriad Genetics' patents cannot be 'designed around' by other companies to avoid infringement." *Id.* at *21.

¹³⁴ *Id.* at *19-20.

helping the needy.¹³⁵ SBC contended that monopolization would serve no purpose in healing the sick because, otherwise, these genes would be publicly used for research and application.¹³⁶ With this monopoly, SBC stated breast cancer patients would be without valuable, essential second opinions when researching and assessing their condition, which would undermine Myriad Genetics' goal for patenting genes in the first place.¹³⁷ SBC referenced that "God blesses those who hunger and thirst for justice, for they will be satisfied,' and believe that providing access to health care is key to honoring God's will."¹³⁸

SBC concluded its brief by again aligning the motivations of religion and the law by saying that "[t]his Court has the opportunity to bring peace of mind to the women across the country facing a devastating disease . . . while preserving . . . vital religious values that form the foundation of the legal system in the United States."¹³⁹

IV. THE ORIGINS OF RELIGIOUS CONCERN WITH GENETIC PATENTABILITY

Three definite moments sparked religious involvement in genetic patentability. First, immediately following and directly responding to *Diamond v. Chakrabarty* in 1980, the religious community began to collectively recognize its concerns.¹⁴⁰ As opposed to rejecting genetics' technological advances, religious groups wrote to then President Carter that genetic and biological patentability rejects "the dignity and sanctity of life."¹⁴¹ Second—again in 1980—the Bayh-Dole Act was adopted.¹⁴² In an effort to continue patents' utilitarian motivation, the Bayh-Dole Act encouraged the recipients of federal research funding to publicly disclose their findings through intellectual property

¹³⁵ *Id.* at *23-26.

¹³⁶ *Id.* at *23-24; *see also* Acts 20:35 (New International Version) ("I showed you that by this kind of hard work we must help the weak, remembering the words the Lord Jesus himself said: 'It is more blessed to give than to receive.'"). Myriad Genetics lacked competition with its BRCA1 and BRCA2 genetic testing, which SBC alleged is why Myriad sets its price at the "prohibitive level" of \$2,680. Brief for Amici Curiae, *supra* note 6, at *25.

¹³⁷ Brief for Amici Curiae, *supra* note 6, at *24.

¹³⁸ *Id.* (quoting *Matthew* 5:6 (New Living Translation)).

¹³⁹ *Id.* at *27.

¹⁴⁰ Chapman, *supra* note 11, at 662.

¹⁴¹ *Id.*

¹⁴² *Id.* at 654.

applications.¹⁴³

Third—and motivated by the previous two developments—was the inception and development of the Human Genome Project (the “HGP”).¹⁴⁴ In 1988, the United States National Institute of Health internationally initiated the HGP to decode the human genome—the catalyst for a massive influx of genetic patent applications.¹⁴⁵ The HGP’s primary goal was to help provide a new set of tools for the medical and biological sciences by identifying genes, their mutative forms, and their connection to particular illnesses.¹⁴⁶ In turn, those researching the human genome became financially and innovatively interested in patenting the genetic sequences being found, including cDNA.¹⁴⁷

During the same year, the Methodist Church’s General Conference created a taskforce to explore genetic research’s moral ramifications—similar to the 2015 conference of thinkers—and to provide recommendations for the Methodist Church’s official policy stance.¹⁴⁸ The taskforce’s report drew a narrow line of acceptable and unacceptable practices for the Methodist Church’s belief system.¹⁴⁹ The report acknowledged the value and condoned the practicability of genetic research for maximizing benefits that would be available to everyone—such as in agriculture and medicine.¹⁵⁰

However, the report condemned the uses of genetics that would benefit only a select few, opposed to the whole population.¹⁵¹ In terms of the types of genetic research, the report condemned research “for eugenic purposes or genetic enhancements designed merely for cosmetic purposes or social advantage.”¹⁵² In terms of ownership, the report said that only owning a genetic sequence goes against the Methodist Church’s beliefs, but financial

¹⁴³ *Id.*

¹⁴⁴ *Id.*

¹⁴⁵ *Id.*

¹⁴⁶ Borson, *supra* note 13, at 475; *see also* G. Kenneth Smith & Denise M. Kettelberger, Article, *Patents and the Human Genome Project*, 22 AIPLA Q.J. 27, 42 (1994) (“One major purpose of the HGP is to identify genes and gene defects related to specific diseases . . . [and,] [a]lthough specific gene therapies will not be available for some time, the diagnosis of gene defects which may ultimately be corrected by gene therapy marks a significant milestone in the HGP.”).

¹⁴⁷ Borson, *supra* note 13, at 476.

¹⁴⁸ Steven Goldberg, *Gene Patents and the Death of Dualism*, 5 S. CAL. INTERDISC. L.J. 25, 33-34 (1996).

¹⁴⁹ *Id.* at 34.

¹⁵⁰ *Id.*

¹⁵¹ *Id.*

¹⁵² *Id.*

incentives for process patents that use those genetics to create a new organisms are acceptable.¹⁵³ With regards to the former:

Developments in genetic science compel our reevaluation of accepted theological/ethical issues including determinism versus free will, the nature of sin, just distribution of resources, the status of human beings in relation to other forms of life, and the meaning of personhood.¹⁵⁴

With regards to the latter, a process patent—which the report deemed appropriate—could potentially block the population from gaining a better understanding of how the genes can be used.¹⁵⁵ However, despite the differentiation between these two types of patents, the existence and expression of genetic material is often times wholly dependent on environmental and psychological variables—factors that are otherwise uncontrollable, unpredictable, and indefinable.¹⁵⁶

In 1995, the report's evaluations became the rationale for more religious communities—Protestant, Catholic, Orthodox, Jewish, Muslim, Buddhist, and Hindu—coming together and forming the Joint Appeal Against Human and Animal Patenting (the “Joint Appeal”).¹⁵⁷ While underneath a common banner, the Joint Appeal's motivations were pointed in this direction from the beginning, considering the parties that organized it: the General Board of Church and Society of the United Methodist Church—a religious group that had previously and explicitly taken a stance against genetic ownership—and Jeremy Rifkin—an anti-biotechnology activist.¹⁵⁸ Each signatory to this Joint Appeal subscribed to a single, short statement, saying:

¹⁵³ “[T]he Methodist report itself, immediately after opposing ‘patents on organisms themselves,’ supports process patents ‘wherein the method for engineering a new organism is patented, provid[ing] a means of economic return on investment while avoiding exclusive ownership of the organism’” *Id.*

¹⁵⁴ Goldberg, *supra* note 148, at 35.

¹⁵⁵ *Id.*

¹⁵⁶ “[T]he number of combinations that 100,000 genes can form interacting with one another and with the environment is essentially infinite, so we do not now foresee [the HGP], at any rate, leading to fundamental changes in what we regard as the nature of the self.” *Id.* (quoting Dennis S. Karjala, *A Legal Research Agenda for the Human Genome Initiative*, 32 JURIMETRICS J. 121, 147 (1992)).

¹⁵⁷ Chapman, *supra* note 11, at 662-63; Goldberg, *supra* note 148, at 34.

¹⁵⁸ Chapman, *supra* note 11, at 663.

We, the undersigned religious leaders, oppose the patenting of human and animal life forms. We are disturbed by the U.S. Patent's Office's recent decision to patent human body parts and several genetically engineered animals. We believe that humans and animals are creations of God, not humans, and as such should not be patented as human inventions.¹⁵⁹

Interestingly, a large portion of the religious leaders that affixed their names to this sentiment was unrepresentative of any formal religious support or condemnation of genetic patentability;¹⁶⁰ this made it difficult to differentiate whether the opposition was personal or indeed widespread.¹⁶¹ An example of this divide can be found in the United Methodist Church itself.¹⁶² While some of its leaders co-sponsored the Joint Appeal, the Methodist Church's origin is juxtaposed against the total ban on genetic patentability.¹⁶³ John Wesley—the Methodist Church's organizer and contemporary of Benjamin Franklin—was so interested in the medical sciences that he himself wrote pieces about them and “[t]o characterize Wesley or the church he organized as anti-science is simply unfounded.”¹⁶⁴

V. WHAT NEXT?

Myriad Genetics is not necessarily the debate's end.¹⁶⁵ In September of 2015, two years after *Myriad Genetics*, thinkers from the United States and Europe met at Cambridge University “to examine the legal, religious and social-injustice implications of ‘patents on life.’”¹⁶⁶ Despite *Myriad Genetics*’ providing some

¹⁵⁹ *Id.* at 663.

¹⁶⁰ *Id.* For example, the U.S. Catholic Conference declined to explicitly support the joint statement, yet ninety-one of its bishops had signed their names. *Id.*

¹⁶¹ *Id.* “[T]he position taken in that statement does not reflect a consensus within the religious community, not even within the majority of the faith communions represented.” *Id.* at 663.

¹⁶² Ronald Cole-Turner, *Religion and Gene Patenting*, 270 *SCIENCE* 52 (1995).

¹⁶³ *Id.*

¹⁶⁴ *Id.*

¹⁶⁵ See Berg, *supra* note 1.

¹⁶⁶ *Id.* This group of “thinkers” included “legal scholars, patent lawyers and judges, bioethicists, theologians and Vatican and American Catholic officials,” creating a conversational environment where “one might see Archbishop Silvio

clarity, the conference's topics showed that complexities still exist between life patents and religion.¹⁶⁷

While the religious objections on direct genetic ownership—originating from 1995's Joint Appeal—may now be settled, science continues to develop new forms of biotechnology that synthetically resemble their natural counterparts.¹⁶⁸ Moving forward, religion may serve as a helpful tool to assess when these biotechnologies come too close to nature, because patent law's bar against natural products and processes goes hand-in-hand with religions' moral and ethical objections.¹⁶⁹

A. *Why Religions' Concerns Could Be Done*

1. Scientifically and Legally

At first glance, religious concerns would seem to be finished with *Myriad Genetics*' holding “that genes and the information they encode are not patent eligible under § 101 simply because they have been isolated from the surrounding genetic material.”¹⁷⁰ The “cDNA does not present the same obstacles to patentability as naturally occurring, isolated DNA segments” because “the lab technician unquestionably creates something new . . . [and] distinct from the DNA from which it was derived.”¹⁷¹ Instead of being a direct copy of the DNA—which would likely also be found not patentable—the cDNA has none of the unnecessary DNA that is edited out of the strand;¹⁷² it is an edited chapter as opposed to the original rough draft.

The further that inventions get from the original DNA strand, religious objections carry less weight. The entire basis for

Tomasi, the Holy See's permanent observer to world organizations in Geneva, conversing with a patent judge, legal scholar or biotechnology lawyer.” *Id.*

¹⁶⁷ *Id.*

¹⁶⁸ “[T]he line between natural phenomena and human invention is not easy to draw; some substances are artificially created precisely to match genetic features in the human body.” *Id.*

¹⁶⁹ “Thus patents related to living things still must be subjected to limits based in morality and the equal dignity of all persons . . . [and] governments must continue to ban patents on natural products and processes, on human beings and on human organs.” *Id.*

¹⁷⁰ *Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*, 133 S. Ct. 2107, 2120 (2013).

¹⁷¹ *Id.* at 2119.

¹⁷² Kristin Wall, *Patently Obvious: Why the District Court's Ruling in Association for Molecular Pathology v. U.S.P.T.O. is Incomplete*, 93 J. PAT. & TRADEMARK OFF. SOC'Y 237, 249 (2011).

objecting to gene patents was that it was too close to the natural creation belonging to everyone.¹⁷³ On a basic level, as biotechnologies improve and require more human creation and ingenuity, genetic-based patents become less of a source of common heritage and more of a source of inventiveness;¹⁷⁴ it becomes exponentially more difficult to argue that these are patents on human existence.¹⁷⁵ The human body is comprised of millions of cells, and those cells are comprised of millions of DNA strands;¹⁷⁶ there are many variables in how all of those interact with one another. Considering all of this, even direct DNA ownership is difficultly characterized as ownership of what fundamentally makes us who we are.¹⁷⁷ Illustratively, “patenting a new human-engineered polymer is not necessarily the same as patenting a rubber chair that is composed of the new polymer. The question becomes whether the scope of the claims support the assertion that the chair is protected under the polymer patent.”¹⁷⁸ If classifying DNA this way is a stretch, then classifying something like cDNA—with its human involvement and unnatural characteristics—would be nearly impossible to do.

Even if there is continued religious involvement, and if it hypothetically became more influential, inventors have an alternative for protecting their work: trade secrecy.¹⁷⁹ However, this would likely be more unsavory for any opposing religious groups than patent ownership. Unlike patents that require a disclosure, trade secrecy requires that the invention be kept as a secret.¹⁸⁰ To do so, the primary expense for the holder of a trade secret is in maintaining the invention’s seclusion from the general public.¹⁸¹ If accomplished, trade secrecy can theoretically last forever until someone else independently invents it and publishes it.¹⁸² Instead of publicizing how the invention works and monopolizing it for a finite period of time, the creation will instead be indefinitely withheld from the general public.¹⁸³ The potential issues resulting from this would theoretically be much worse than

¹⁷³ Gargano, *supra* note 8, at 26.

¹⁷⁴ *Id.* at 26-27.

¹⁷⁵ *Id.* at 27.

¹⁷⁶ *Id.*

¹⁷⁷ *Id.* at 26-27.

¹⁷⁸ *Id.* at 27.

¹⁷⁹ Goldberg, *supra* note 148, at 29.

¹⁸⁰ Gargano, *supra* note 8, at 31.

¹⁸¹ *Id.*

¹⁸² *Id.*

¹⁸³ *Id.* at 31-32.

anything patents have done to withhold creation from the general population.

2. Religiously

Any further religious objection to genetic research and patents would seem to be limited anyway because of the rift at the core of this objection.¹⁸⁴ Although Rifkin's group of eighty different religious bodies objected, even in 1995, the "warfare between science and religion" may have only been "kept alive by those who want to push these two great human endeavors—the need to focus in communities on our deepest moral spiritual yearnings, and the longing to understand the natural world of which we are a part—into opposing camps."¹⁸⁵ These two opposing religious ideals can be classified as vitalist and theistic.¹⁸⁶ Vitalists see all life as sacred and above patent ownership.¹⁸⁷ Theists, on the other hand, "believe that only God is sacred," and that, "although creation should be treated with respect, there is no metaphysical difference between DNA and other complex chemicals . . . [and] no distinctly religious ground for objecting to patenting of DNA."¹⁸⁸

Of this limited number of potentially remaining objectors—the vitalists—would seemingly be cut off by another portion of the Constitution: the Establishment Clause.¹⁸⁹ "Congress shall make no law respecting an Establishment of Religion,"¹⁹⁰ and

[*Ass'n for Molecular Pathology v. Myriad Genetics, Inc.*] presents an interesting conflict between the Intellectual Property Clause and the Establishment Clause. Logically (the argument goes), the Establishment Clause must modify the Intellectual Property Clause, at least insofar as the Intellectual Property Clause can be read to capture "inventions"

¹⁸⁴ While religious objections were seen "as another page in a long history of conflict between science and religion," "[t]he fact is that many religious leaders have seen science as a means to achieve the goals of religion" Cole-Turner, *supra* note 162.

¹⁸⁵ *Id.*

¹⁸⁶ *Id.*

¹⁸⁷ *Id.*

¹⁸⁸ *Id.*

¹⁸⁹ W. Cole Durham & Robert Smith, *Religious Institutions and the Scope of Patentable Subject Matter*, 4 RELIGIOUS ORGS. & L. § 19:78 (2013).

¹⁹⁰ U.S. CONST. amend. I.

that implicate core religious beliefs.¹⁹¹

If the remaining religious opposition to genetic patents is truly a minority within a minority, denying patentability because of this group's concerns alone would essentially be—itsself—the establishment of a religion that truly does not reflect the majority.

As both patent and genetic understandings improve, so too does the discourse at the interface of science, religion, and the law.¹⁹² As genetic patents become more influenced by man's own creativity and disconnected from its natural source—as seen with *Myriad Genetics*—any remaining vitalist influences may dissolve away because the alternatives are far more controlling than patents ever would be.¹⁹³

The conviction that guides this movement is simple: When science and religion are opposed, both science and religion suffer, and so do all human beings and so eventually will life as we know it. When science and religion work together, there is at least the chance that we will be able to chart a responsible and sustainable future.¹⁹⁴

As the group of religious objectors becomes smaller and group of supporters becomes larger, both science and religion can mutually benefit one another in how they understand, view, and develop the world.

B. Why Religions' Concerns Could Continue

Religious groups may still take issue with cDNA, because it still may come too close to patenting nature.¹⁹⁵ While the cDNA at issue in *Myriad Genetics* itself occurred unnaturally, it is still inherently a copy of its source DNA.¹⁹⁶ If anything, cDNA reflects

¹⁹¹ Durham & Smith, *supra* note 189.

¹⁹² See generally Cole-Turner, *supra* note 162 (“Some religious leaders believe that . . . the patent process is an appropriate response to the need to protect intellectual property and . . . that today's religious communities are opening channels of dialogue with the institutions of science.”).

¹⁹³ *Id.*

¹⁹⁴ *Id.*

¹⁹⁵ “Isolated and purified DNA sequences . . . fall squarely within the definition of products of nature.” Wall, *supra* note 172, at 249.

¹⁹⁶ “Isolated and purified DNA sequences . . . are not substantially different from those naturally occurring in the body . . .” *Id.*

the source DNA's functionality more than the source DNA itself, because

it is pivotal to note that introns do not contain genetic material used in coding for proteins, and thus a strand of DNA consisting solely of exons, as in the case of cDNA, and a strand including both introns and exons, will code for the same proteins. These same proteins for which the DNA and cDNA strands code will then go on to perform identical tasks.¹⁹⁷

Although the DNA's natural strand is not patentable—as concluded in *Myriad Genetics*—cDNA practically represents DNA's natural function, process, and products—similar to what was found in the *Funk Brothers* decision.¹⁹⁸ Ultimately, “[r]egardless of the presence or absence of introns,” cDNA may still be too close to nature—and, by association, creation.¹⁹⁹

1. Religious Opposition Has its Justifications

At a minimum, religion seems to serve as a helpful tool in evaluating if an invention is patentable, especially with genetics. Morality—and, by extension, religion—had no real presence in patent law after the moral utility doctrine was removed from patent law.²⁰⁰ However, Jeremy Rifkin—who was actively involved with the Joint Appeal—brought it back to the table.²⁰¹ In doing so, it showed that morality—and similarly religion—shifted from usefulness to evaluating what patentable subject matter and, more specifically, products of nature truly are.²⁰²

The prime examples of this can be found in *Myriad Genetics*' development through the courts.²⁰³ At the district court level, the court actively considered the policy and morality in determining the contours of what is too close to our common

¹⁹⁷ *Id.*

¹⁹⁸ “[R]egardless of the absence of introns in the cDNA used to locate the BRCA1/2 genes, the information provided by the cDNA is identical to that of the native DNA from which the cDNA was generated.” *Id.*

¹⁹⁹ *Id.* at 250.

²⁰⁰ Keay, *supra* note 45, at 429.

²⁰¹ *Id.*

²⁰² *Id.* at 410-11.

²⁰³ *Id.* at 433-37.

heritage—or nature.²⁰⁴ At the Federal Circuit, Judge Moore’s concurrence discussed how moral and ethical concerns help shape the entire frame of property rights around what makes us human.²⁰⁵ However, these opinions were essentially academic, ultimately relying on the mandate that moral and ethical concerns were outside of the courts’ purview and belonged to Congress.²⁰⁶ Similar to how the USPTO sent mixed signals about morality’s place in patent analyses,²⁰⁷ the courts have left an open door for future religious and moral opposition.²⁰⁸

Continued religious opposition to particular patents that push the limits of patentable subject matter is also not an outlandish proposition, considering its use outside of the United States.²⁰⁹ Europe has involved moral opposition into its patentable subject matter assessments for over forty years.²¹⁰ In Canada, moral considerations are directly used in assessing patentable subject matter’s scope.²¹¹ *Myriad Genetics* could be a re-emergence of morality and religious concerns in the patent realm.²¹²

3. How Religious Opposition Could Continue

a. Freedom of Speech

Considering its absence in *Myriad Genetics*, the courts—even with an amicus brief suggesting it—seem to exclude patentability’s moral and ethical considerations for anything other than purely academic discussions.²¹³ However, a patent’s methods and purpose seem to reveal more of an inherent overlap with portions of the First Amendment—in particular, the freedom of speech.²¹⁴ Patents incentivize research and innovation,

²⁰⁴ *Id.* at 435.

²⁰⁵ *Id.* at 435-36.

²⁰⁶ Keay, *supra* note 45, at 435-36.

²⁰⁷ *Id.* at 418-19.

²⁰⁸ *See id.* at 410 (“[R]ecent decisions by the USPTO and the Supreme Court of the United States indicate that considerations of public moral issues may have a place in the patent eligibility doctrine.”).

²⁰⁹ *Id.* at 438.

²¹⁰ *Id.*

²¹¹ *Id.*

²¹² *See generally supra* note 208.

²¹³ *See* Keay, *supra* note 45, at 435-36.

²¹⁴ Krysta Kauble, Comment, *Patenting Everything Under the Sun: Invoking the First Amendment to Limit the Use of Gene Patents*, 58 UCLA L. REV. 1123, 1154-55 (2011).

opportunities that otherwise would be nonexistent without some form of protection on that investment.²¹⁵ In return for this monopoly, the public must then be able to benefit from their disclosure.²¹⁶ Similarly, the freedom of speech encourages commentary and critiques that would otherwise be suppressed without the First Amendment's protections.²¹⁷ As a result, society as a whole can then benefit from the speech, directing an ongoing commentary or a critique of the speech.²¹⁸

At face value, the First Amendment and patents seem to exist either separately from one another or so symbiotically that no one notices.²¹⁹ At their roots, the freedom of speech and patents cultivate information's free-flow to society.²²⁰ A patentee permits the free-flow of the invention's information, and the knowledge it can provide to society, by the requirement of a definite disclosure in the patent application.²²¹

However, patents can rub against the First Amendment when the free-flow is dammed; this occurs when genetic patents come too close to nature.²²² As stated, patentable subject matter excludes laws of nature, physical phenomena, and abstract ideas.²²³ When a patent permits monopolized protection of either a law of nature or physical phenomena, general information that properly belongs to the public is taken away and suppressed for the patent's duration.²²⁴

A strong base for these concerns emanated from the HGP.²²⁵ According to then President Clinton and then Prime

²¹⁵ *Id.* at 1127, 1172.

²¹⁶ *Id.* at 1127, 1155.

²¹⁷ *See id.* at 1154 (indicating how the First Amendment is meant to protect free thought, academic inquiries, and the overall exchange of information, opinions, and ideas).

²¹⁸ *See id.* (“[P]atenting a basic research tool is a violation of the First Amendment because it restricts the free flow of information . . . [and] [p]atent law and the First Amendment intersect because patents are essentially a limitation on the marketplace of ideas.”).

²¹⁹ *Id.* at 1155.

²²⁰ Kauble, *supra* note 214, at 1155.

²²¹ “[P]atents can be seen as furthering those rights because patents over new inventions force new information into the public domain through disclosure.” *Id.* at 1155.

²²² *Id.*

²²³ *Id.* at 1126-27.

²²⁴ “When a natural phenomenon is involved, patenting it takes information that previously existed in the public sphere and removes it. It is this removal of a natural phenomenon from the public domain that can constitute a violation of the First Amendment.” *Id.* at 1155.

²²⁵ *Id.* at 1155-56.

Minister Tony Blair, the information that the HGP uncovers and deciphers should freely flow to the public from which it emanates.²²⁶ From a financial standpoint, the HGP was publicly funded by taxes, so the public should logically gain primary possession and benefit of this genetic research's information.²²⁷ While it has been argued that any genetic patent automatically violates the First Amendment,²²⁸ the First Amendment should be used as a tool, as opposed to a bright-line rule.²²⁹ In doing so, the First Amendment may help to reveal when the invention is too rooted in the public's inherent possession for any valid protection.²³⁰

Just as there are varying opinions of the First Amendment's degree of use, there are opinions that the First Amendment's use should be avoided entirely.²³¹ To bring them under the freedom of speech's purview, patents would have to be considered a form of speech.²³² Scientific expression is a form of protected speech, however the research behind that expression may be an entirely separate issue.²³³ The freedom of speech has been interpreted very broadly, indicating that

[t]he right of freedom of speech and press includes not only the right to utter or to print, but the right to distribute, the right to receive, the right to read and freedom of inquiry, freedom of thought, and freedom to teach. . . . Without those peripheral rights the specific rights would be less secure.²³⁴

²²⁶ Kauble, *supra* note 214, at 1156.

²²⁷ *Id.* In fact, the public provided five million dollars for discovering the BRCA-1 gene alone. *Id.*

²²⁸ *Id.* at 1126. This strict form of the freedom of speech argument was raised by the American Civil Liberties Union ("ACLU") against Myriad Genetics for its patent application for the BRCA1 and BRCA2 genes. *Id.* at 1126, 1137.

²²⁹ *Id.* at 1128.

²³⁰ *Id.*

²³¹ Steve Keane, *The Case Against Blanket First Amendment Protection of Scientific Research: Articulating A More Limited Scope of Protection*, 59 STAN. L. REV. 505 (2006).

²³² *See id.* at 508-09 ("Scientific research is not mentioned anywhere in the Constitution and has no obvious textual link to the First Amendment . . . [y]et 'speech' under the First Amendment is an elusive term whose meaning has been debated for over 200 years . . . noting that the framers were men of the Enlightenment, who viewed scientific freedom as essential to democracy.").

²³³ *Id.* at 508.

²³⁴ *Id.* at 509 (quoting *Griswold v. Connecticut*, 381 U.S. 479, 482-83 (1965)).

Although intentionally broad, its reach into scientific research would—according to the critics—probably be an unreasonable stretch.²³⁵

b. Moral Utility as a Template for Future Religious Involvement with Patents

i. The Gambling Device Template

In addition to pursuing a constitutional pathway, religious opposition may take a similar approach into patentable subject matter as moral utility had into patents' usefulness.²³⁶ It seems unlikely that the same type of moral utility from gambling devices has a directly translatable purpose here because of its limited application to dated morality concerns.²³⁷ cDNA, as an example, is not used in an immoral place,²³⁸ but perhaps the evaluation of the games' luck may translate a little better. Religious opposition is based on preventing ownership of creation that is rightfully owned by everyone.²³⁹ Similarly, patent law prevents the patenting of building blocks.²⁴⁰ If inventions' proximity to nature outweighs inventors' influence—or if luck heavily outweighs the influence of players' skill—then religious opposition could rightfully argue that the invention is not patentable because it comes too close to

²³⁵ See generally *id.* at 549 ("Blanket First Amendment protection of scientific research is . . . not supported by free speech jurisprudence.").

²³⁶ See generally Keay, *supra* note 45, at 411 ("[B]ecause of recent examples of restrictions to the commonly recognized 35 U.S.C. § 101 patent eligible subject matter, U.S. patent law may not yet be amoral.").

²³⁷ See *id.* at 416 ("Moral opposition to gambling in the United States was highest around the same time courts were invalidating patents for gambling devices. America's early history reveals widespread acceptance of gambling activities, but two strong waves of anti-gambling sentiment led to near prohibition of gambling activities around the turn of the twentieth century. Prompted by the changing attitudes of the 1920's and the financial crisis of the 1930's, however, Americans gradually began to re-embrace games of chance.").

²³⁸ See Berg, *supra* note 1 ("Biotechnology can surely promote human dignity by producing new medicines and therapies . . .").

²³⁹ See *id.* ("From a religious perspective, the bar on patenting natural things is not simply a matter of preserving 'building blocks' so others can innovate at lower cost. The bar also reflects a proper humility toward creation, which – as the gene-patent critics emphasized in 1995 – is the work of God, not human beings.").

²⁴⁰ See *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 132 S. Ct. 1289, 1303 (2012) ("Courts and judges are not institutionally well suited to making the kinds of judgments needed to distinguish among different laws of nature. And so the cases have endorsed a bright-line prohibition against patenting laws of nature, mathematical formulas and the like, which serves as a somewhat more easily administered proxy for the underlying 'building-block' concern.").

creation or nature.

ii. The Deceptive Device Template

Moral utility's deceptive devices analysis seems to be more directly applicable—and ultimately unfavorable—for religious and moral opposition. As was seen in *Juicy Whip*, an invention's deceptiveness—or its immorality—is itself a useful characteristic.²⁴¹ Similarly, genetic and biotechnological inventions' proximity to nature and creation may itself be a usefulness that cannot be ignored. Pope Francis himself has said that using and developing God's creation to better society as a whole is why nature exists.²⁴² Being so close to creation, therefore, could be considered patentable in of itself.

4. How Religion Can Be Used in Other Patent Analyses

Another facet of patents can be implicated by being too close to creation: nonobviousness.²⁴³ A patent on cDNA could feasibly be seen as a patent on the naturally functional portion of gene in how it creates protein.²⁴⁴ Along the same vein, nonobviousness says that “[t]he basis for finding claims obvious is the argument that no patent should be granted on an invention that does not require an inventive leap from technology already available to the public, such as merely incremental variances

²⁴¹ *Juicy Whip, Inc. v. Orange Bang, Inc.*, 185 F.3d 1364, 1367 (Fed. Cir. 1999).

²⁴² See Berg, *supra* note 1 (“Christianity calls for us not to leave nature alone, but to exercise stewardship for the common good: as Pope Francis wrote in his recent environmental encyclical, ‘The modification of nature for useful purposes has characterized the human family from the beginning.’ Biotechnology can surely promote human dignity by producing new medicines and therapies; patents can provide important incentives for such innovations. And patent law, when properly interpreted, does not confer ownership over human life. It confers only a limited control over artificially created substances that correspond to a short, specific portion of the genome—arguably analogous to a patent on a form of artificial hip or heart.”).

²⁴³ See Wall, *supra* note 172, at 243 (“In order to make out a case of obviousness, one must: (1) determine the scope and contents of the prior art; (2) ascertain the differences between the prior art and the claims at issue; (3) determine the level of skill in the pertinent art; and (4) evaluate any evidence of secondary considerations, such as a long felt but unsolved need in the industry, failure of others to produce the claimed invention, commercial success of the invention, and undue experimentation.”).

²⁴⁴ See *id.* at 248 (“DNA is a product of nature, and whether it exists in its natural state or is isolated and purified, [which cDNA arguably is,] it contains the same information and codes for the same specific, predetermined proteins.”).

between the prior art and the claimed subject matter.”²⁴⁵ Thus, religious objectors could feasibly argue that, with regards to cDNA, the removal of DNA introns and patenting the edited genetic strand is an obvious improvement and requires no inventive leap.

VI. CONCLUSION

The *Myriad Genetics* decision may have indicated a shift in how religion, morality, and patents interact with one another. While it ultimately invalidated direct DNA patents, our understanding of genetics and biotechnologies will continue to push the limits of patentability as it intentionally attempts to replicate nature as closely as possible. Religious opposition originated in response to DNA patents, so the discussion could potentially be finished.

Yet, morality and patents did not exactly first meet one another during the Human Genome Project. Long before the issues raised today, patents’ morality was assessed in determining usefulness. While it has long been abandoned, the nuances of the moral utility doctrine may provide the template into how future religiously and morally motivated oppositions will shape themselves in assessing when an invention comes too close to nature. Even further, if the patentable subject matter angle is ultimately fruitless, the nonobviousness requirement may still provide an avenue for arguing that an invention is too close to the creation that properly belongs to everyone.

However, even after all of this, the continuation of religious opposition may be completely unrelated to patent law and instead may be dictated by the divide in religions’ varied opinions of the value in scientific research. Some consider the Joint Appeal to be an outlier, and that the general consensus leans toward using science to better understand creation. If the recent conference at Cambridge University is any indicator, some religious leaders still feel a sense of uneasiness with the future’s unknown scientific possibilities. Despite these gray areas of religion and morality’s role, the grayness does itself show one thing very clearly: *Myriad Genetics* did indeed leave the door open.

²⁴⁵ *Id.* at 243.