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Intellectual Property and Genetic Sequences: A Jewish Law Perspective

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1. OVERVIEW AND PROBLEMS

A. *Intellectual Property: A Balancing Act*

Since Johannes Gutenberg's printing of the Bible in the mid-fifteenth century, the question of authors' exclusive rights to their creative works has confronted publishers and writers, judges and moralists. Similarly, and also beginning in the Early Modern time period, with the emergence of increasingly sophisticated commercial manufacturing industries and ultimately the Industrial Revolution, societies have faced a demand to provide some degree of exclusive legal protection to inventors of new and useful machines and technologies.[1]

The rationale for awarding a measure of exclusive protection to creative works and useful inventions is fairly easy to articulate. Creating a truly innovative and successful invention or work of authorship typically requires a disproportionately large investment of costly resources (time, capital, etc.) at very high risk, as contrasted with the fairly modest, low-risk investment that enables *copying* a new work or technology once it has been demonstrated to be effective and brought to market. Thus, absent some form of exclusive protection for the original author or inventor – what we nowadays call a "barrier to entry" prohibiting would-be competitors from copying the same design – the high-risk investment necessary to develop breakthrough technologies and works would be economically irrational. Society as a whole would then be deprived of the great benefits delivered by artistic and technological progress. This rationale is very nicely captured in Article One (section 8, clause 8) of the United States Constitution (hereinafter the "IP Clause"), which succinctly explains the congressional power to grant exclusive patent and copyright protection as follows (emphasis added): "*To 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."

[1] The Venetian Patent Statute of 1474 is often regarded the earliest codified patent system in the world.

Note that the IP Clause expressly requires Congress to limit these exclusive rights ("for limited times"). Implicitly, the Constitution thus recognizes that patent and copyright protection should strike a balance between two values. The first is the societal benefit of providing sufficient economic incentive to motivate authors and inventors (and their stakeholders) to invest and to risk the resources necessary to create valuable new works and inventions. The second is the societal cost of monopolizing those new works and inventions – resulting in monopoly (higher) pricing and also restricting third-party competitors from adapting such works and inventions in their own, (possibly) improved offerings. Federal patent law thus strikes "a careful balance between the need to promote innovation and the recognition that imitation and refinement through imitation are both necessary to invention itself and the very lifeblood of a competitive economy."[2]

This careful balance means that, on one hand, an original author or inventor enjoys exclusive rights to his work or invention for a limited period of time – in essence, a lawful monopoly period intended to provide sufficient economic returns justifying the investment risked – while on the other hand, after that time period, the work or invention ultimately enters the public domain and becomes freely available to third-party competitors, so that society can more fully reap the benefits of that intellectual property at competitive prices and through further-improved products produced by third parties.[3]

In a sense, the fundamental nature of the balance between intellectual property exclusivity as an innovation incentive or impedance applies whether we are talking about the creation of a new written work of authorship – or imagery, music, or video, for that matter – or whether we are talking about technology for generating new materials or building new machines, or for creating new life or new forms of life. In each case, the underlying policy issue is whether legally conferred monopoly rights are a socially beneficial, appropriate financial inventive to motivate the investment necessary in order to yield new and valuable creative works, or whether such monopolization of creative work for a relatively few "lucky" inventors would on balance impede overall innovation and creative productivity.

Naturally, it can be argued by policy makers and stakeholders that the balance between incentivizing more creative research (by granting patents more liberally) versus encouraging the benefits of competitive freedom should be perceived as tipping differently in particular technological or artistic areas. In order to strike the best balance for society between innovation incentives and competitive freedom, US (and other modern) patent and copyright regimes have limited the extent of exclusive rights granted not only by duration of the grant, but also by defining certain areas

[2] Bonito Boats Inc. v. Thunder Craft Boats, Inc., 489 U.S. 141, 146 (1989).

[3] See, e.g., Fed. Trade Comm'n, To Promote Innovation: The Proper Balance of Competition and Patent Law and Policy (2003), https://www.ftc.gov/reports/promote-innovation-proper-balance-competition-patent-law-policy; Richard A. Posner, *Intellectual Property: The Law and Economics Approach*, 19 J. Econ. Persp. No. 2, 57–73 (2005).

in which such forms of intellectual property protection are not available. For example, the US patent statute broadly declares as patent eligible "any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof."[4] Nevertheless, under judicial doctrine established long ago by the US Supreme Court, "laws of nature, natural phenomena, and abstract ideas" cannot be patented.[5] As the Supreme Court has explained, these exceptions are essentially motivated by a public policy determination that granting even time-limited exclusive rights to such "basic tools of scientific and technological work" would create a cost to society – in terms of lost opportunities to freely exploit those basic natural laws or abstract concepts in third-party products – that decisively outweighs the societal benefits of any creativity that would be incentivized by granting such patents.[6] As explained at the end of Part III of this chapter, even as the Jewish tradition is comfortable averring that, theologically, all belongs to God, the Jewish legal tradition would not consider such ideals and ideas in a patent dispute of this type.

Interestingly, for virtually three decades following the establishment of the US Court of Appeals for the Federal Circuit in 1982 as the court with exclusive appellate jurisdiction for patent matters, the judicial exceptions to patentability were construed and applied in relatively narrow fashion by the Federal Circuit. For example, broad patent claims for software concepts and even for so-called business methods were widely upheld and enforced.[7] However, over roughly the last five years, the US Supreme Court has weighed in on patent matters far more actively and frequently, taking a relatively expansive view of the judicial exceptions to patent eligibility and reversing the Federal Circuit's position in important respects. For example, in its

[4] Subsequent provisions impose various substantive requirements such as novelty and non-obviousness. However, section 101 broadly defines the limits of what *categories* of invention are potentially patent eligible.

[5] Diamond v. Diehr, 450 U.S. 175, 185 (1981), and see earlier cases cited there.

[6] Mayo Collaborative Services v. Prometheus Laboratories Inc., 566 U.S. 66, 71 (2012) ("Monopolization of those tools through the grant of a patent might tend to impede innovation more than it would tend to promote it."). Interestingly, in denying the patentability of natural laws and phenomena, the US Supreme Court characterizes this doctrine as a policy-based, "judicially created" eligibility requirement linked to 35 U.S.C. § 101, instead of simply asserting that merely "discovering" a previously unrecognized natural phenomenon is not a novel invention as required under 35 U.S.C. § 102. Perhaps this is because § 101 itself opens by offering patent protection to "Whoever invents *or discovers* . . . any new and useful process." The Court may not have wished to categorically assert that discovery of existing *but unknown* phenomena per se lacks novelty and cannot be patented. Indeed, one can argue strongly that Einstein's "discovery" of Relativity and Newton's "discovery" of gravity were far more deeply innovative and novel than an improved mousetrap. Thus, instead of invoking lack of novelty, the Supreme Court has treated "laws of nature" as a category of discoveries deemed patent ineligible by courts for policy reasons.

[7] See, e.g., notably State Street Bank and Trust Company v. Signature Financial Group, Inc., 149 F.3d 1368 (Fed. Cir. 1998) (rejecting any "business method" exception to patentability, and finding patent eligibility for a partnership structure of mutual funds [implemented on a "data processing system"] because the claimed invention "produces a useful, concrete and tangible result" – in that case, a calculated share price).

well-known *Alice* decision, the Supreme Court applied the exclusion for "abstract ideas" to invalidate a patented business method on a computer-based escrow system – essentially a (purportedly) new application of routine computer technology.[8] Although the Court did not categorically declare "business method" inventions ineligible for patent protection, it nevertheless reformulated and applied the "abstractness" exception. Indeed, it did so in a manner that not only doomed the particular business method patent before it, but also led very quickly to a dramatic, widely observed decrease in the issuance and successful enforcement of such patents, as well as for patents on certain types of broadly claimed software inventions.[9]

An important, contemporary controversy – very much at the heart of our present discussion – is how the policy balance of incentives should be assessed in the context of intellectual property protection for genetic sequences. We examine the current state of that controversy under US patent law in the next section.

B. *IP Protection for Genetic Sequences: A Contemporary Controversy*

As noted previously, for the first thirty years of its existence, the Federal Circuit applied the judicial exceptions to patentability in a relatively narrow manner. One example that is especially pertinent for our present purposes was the Federal Circuit's holding that newly discovered – but naturally occurring – gene sequences could be patented specifically in their isolated form, based on the reasoning that such sequences do not occur naturally in isolated form.

However, in *Myriad Genetics*, the Supreme Court reversed the Federal Circuit's decision and established that *naturally occurring* gene sequences cannot be patented.[10] Merely isolating genes that are found in nature – even if doing so required great R&D efforts – does not make those genes patentable. Strikingly, the Supreme Court declared that "[g]roundbreaking, innovative, or even brilliant discovery does not by itself satisfy the Section 101 inquiry."[11]

Around the same time, the Supreme Court in *Mayo Collaborative Services v. Prometheus Laboratories*[12] used similar reasoning to invalidate a patent for the scientific discovery that the proper dosage of a certain drug for GI disorders could be determined for an individual patient by testing the patient's level of concentration of a particular metabolite (after an initial dose of the drug). The patent in question basically covered the method of initially administering the drug, testing the patient's levels of the metabolite, and then adjusting subsequent doses for that patient based

[8] Alice Corp. v. CLS Bank Int'l, 573 U.S. 208, 134 S. Ct. 2347 (2014).
[9] See, e.g., Jasper L. Tran, *Two Years After* Alice v. CLS Bank, 98 J. Pat. & Trademark Off. Soc'y (2016), http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2798992.
[10] Association for Molecular Pathology v. Myriad Genetics, Inc., 569 U.S. 576 (2013).
[11] *Id.* at 591.
[12] 566 U.S. 66.

on whether the metabolite level was above or below a concentration level that the inventors had discovered. Because technology to test for concentrations of that metabolite was well known and not novel in any way, the patented invention essentially amounted to the specified correlation between levels of the metabolite and an effective dose of the drug – in other words, a law of nature. The Court held that the patented process "add[ed] nothing specific to the laws of nature other than what is well understood, routine, conventional activity" and therefore was not patent eligible.[13]

While *Mayo* did not involve an invention based on genetic discovery per se, the underlying logic in *Mayo* subsequently led the Federal Circuit to deny patent eligibility in a widely watched biotech case, *Sequenom*, involving the scientific discovery that cell-free fetal DNA (cffDNA) can be found naturally in the blood of pregnant mothers.[14] Well-known techniques (e.g., PCR amplification) can be employed to amplify the cffDNA present in a sample of maternal blood and to detect the presence of particular DNA sequences of interest. The discovery of cffDNA in maternal blood was thus a breakthrough, allowing doctors to perform prenatal genetic diagnostics by means of a relatively safe and simple blood draw, instead of a more dangerous, invasive procedure like amniocentesis. Despite the acknowledged scientific merit and practical medical value of the invention, and although the natural phenomenon of cffDNA in maternal blood had been previously unknown and undiscovered, the Federal Circuit concluded that the rules and reasoning of *Mayo* compelled finding the patent invalid, because the patent's claims were essentially directed to exploiting a natural law with purely conventional techniques. The Supreme Court denied certiorari, despite numerous passionate amicus briefs from both industry and academia on behalf of the petitioner.[15]

It is noteworthy that Supreme Court patent eligibility jurisprudence focuses so categorically on whether a claimed invention involves "natural" (even if previously undiscovered) phenomena.[16] Thus the Court in *Myriad* held that naturally occurring gene sequences are not patent eligible; at the same time, it also held that complementary DNA (cDNA) derived from a corresponding natural gene sequence (simply by removing the "introns" or non-coding regions) *is* patent eligible. The Court rejected the argument that simply because "the nucleotide sequence of cDNA is dictated by nature, not by the lab technician" claims to cDNA should

[13] *Id.* at 82.

[14] Ariosa Diagnostics, Inc. v. Sequenom, Inc., 788 F.3d 1371 (Fed. Cir. 2015), *cert. denied*, 136 S. Ct. 2511 (2016).

[15] See *Amici Support Certiorari in* Sequenom v. Ariosa, Patent Docs, May 2, 2016, http://www.patentdocs.org/2016/05/amici-support-certiorari-in-sequenom-v-ariosa.html.

[16] It has been suggested that original, non-naturally occurring DNA sequences might also be protectable under *copyright* law. Christopher M. Holman, *Copyright for Engineered DNA: An Idea Whose Time Has Come*, 113 W. Va. L. Rev. 699 (2011). Copyright necessarily could apply only (if at all) to non-natural sequences, because it only protects "*original* works of authorship." 17 U.S.C. § 102 (emphasis added).

not be patentable. It reasoned that "the lab technician unquestionably creates something new when cDNA is made. cDNA retains the naturally occurring exons of DNA, but it is distinct from the DNA from which it was derived. As a result, cDNA is not a product of nature and is patent eligible under section 101."[17] This distinction may seem superficial, at first blush. However, as further explained in *Mayo*, the Court's view is that while the "law of nature" exception to patentability is motivated by public policy considerations – in particular, by an assessment that exclusive rights should not be granted to "basic tools" and "building blocks" of science and research – the exception functions as a bright-line, absolute rule. In the Court's words:

> 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 . . . and the like, which serves as a somewhat more easily administered proxy for the underlying "building block" concern.[18]

Consider this hypothetical. Suppose there are several alternative treatments for a particular cancer. Each treatment has severe side effects, and each fails to succeed on average for a significant percentage of patients. Now, imagine that a team of medical researchers determines through careful experimentation and insightful data analysis that there is a strong correlation between certain genetic sequences and the probability of success for each alternative treatment. In other words, patients who have sequence 1 will do much better with treatment A, whereas patients who have sequence 2 will do much better with treatment B. Unfortunately for our researchers, because this correlation is a "natural phenomenon," and because treatments A and B are conventional (as is genetic testing technology), under *Mayo* and *Sequenom*, this valuable scientific discovery apparently cannot be patented. Trying to patent a "personalized medicine" method in which treatment A or B is administered, depending on the results of a patient's genetic test fails for exactly the same reasons as the patent claims in *Mayo* and *Sequenom*.

Our hypothetical is quickly becoming reality. Recently, intellectual property researchers presented an analysis showing a "spike in patent rejections" for personalized medicine inventions in the United States in the wake of *Mayo*.[19] Is this good public policy? Does it strike an optimal balance between incentives to innovate and freedom to compete? Many voices in the biotech industry consider *Mayo* and *Sequenom* terribly ill-advised from a public policy perspective. While that point is certainly debatable, for our present purposes, we wish to highlight the fact that the Supreme Court itself largely avoids the policy question by characterizing the "law of

[17] 569 U.S. at 595.
[18] *Mayo*, 566 U.S. at 89.
[19] Heidi Ledford, *US Personalized-Medicine Industry Takes Hit from Supreme Court*, NATURE, 17 August 2016, http://www.nature.com/news/us-personalized-medicine-industry-takes-hit-from-supreme-court-1.20436.

nature" exception as a "bright line prohibition" – a convenient "proxy" for the original underlying policy concerns, and justifiable on grounds that courts "are not institutionally well-suited" to make more fine-grained assessments of the social tradeoff in granting exclusive rights for some natural discoveries versus others.

We have emphasized herein the reluctance of courts to make fine-grained, case-specific policy assessments under US patent law, because we shall claim in the following sections that a *halakhic* theory of intellectual property can lead us in a very different direction with respect to these challenging issues.

11. DEVELOPING A *HALAKHIC* (JEWISH LAW) THEORY OF INTELLECTUAL PROPERTY

In attempting to establish a *halakhic* theory of intellectual property, one must first confront the fact that there is little or no discussion of intellectual property per se in the early legal sources, such as the Talmud, that traditionally form the basis of a typical *halakhic* analysis. This fact is not difficult to explain. As we noted at the outset, what we now think of as copyright and patent systems only began to emerge in the late fifteenth century – roughly a millennium after compilation of the Talmud, and centuries after composition of the definitive, medieval Jewish legal codes and commentaries, including Alfasi, Maimonides, Tosafot, and Tur. As such, there is quite naturally no real discussion of intellectual property as such within those early, classic texts of Jewish law.

Is it possible to somehow identify a distinctively *halakhic* theory of patent law? We believe so. Despite understandable lacunae regarding intellectual property in the early classic sources, Jewish lawmakers in the early modern period nonetheless confronted and addressed many new developments in commercial law, including intellectual property and related matters. While we are not aware of any rulings under Jewish law (at least until the establishment of the modern State of Israel) specifically on patent matters,[20] many *halakhic* responsa were written regarding copyright-style protection for published works of authorship following the advent of the printing press.[21] The same is true for disputes regarding local monopoly rights, such as exclusive licenses to distribute whiskey or to slaughter beef in a particular

[20] A likely explanation is that the rabbinate could adjudicate disputes among Jewish businessmen, but generally had no jurisdiction or authority over members of the larger non-Jewish community. Because there were significant markets *within* the Jewish community for books (e.g., for printed works of Jewish scholarship), it was not uncommon for copyright disputes among competing Jewish publishers to come before rabbinical courts. In contrast, an exclusive right to manufacture or use a new type of industrial machine would, by its nature, impact businessmen and markets far beyond the Jewish community, and so rarely if ever did disputes over patent infringement come before parochial rabbinic authorities for resolution. Interestingly, a well-known nineteenth-century Jewish responsum on a question of *copyright* law involving Jewish publishers of rabbinic works does mention (secular) patent law – but only by way of analogy, to support a strong *copyright* regime under Jewish law. *Shoel uMeishiv*, first ed., vol. 1, responsum 44.

[21] We discuss several examples of these as follows.

community.[22] Our claim is that analyzing the underlying legal reasoning of these responsa allows us to develop a legal theory with meaningful application to protection of genetic inventions.

The very notion of protecting technological innovation as personal property is radical from the perspective of classical Jewish property law. The major codes uniformly rule that intangibles (*davar she'ein bo mamash)* such as "the aroma of an apple" cannot be purchased like tangible articles of property. Instead, one who wishes to sell, for example, the right to occupy a particular building *must* characterize the transaction as selling a limited interest in the (tangible) building itself, and not as a stand-alone property right separate and apart from ownership of the building.[23]

An intellectual property monopoly, like a patent, is even more profoundly intangible.[24] A patent on the design for a new type of machine bestows on the patent owner the power to exclude anyone else from building, using, or selling a machine of similar design. Such a sweeping power to restrict what others can do with their *own* tangible resources cannot be conceptualized as an "interest in" an item of tangible property. Rather, the point of a patent or copyright is a monopoly that restricts the freedom of what others can do with their own private resources, even absent any involvement with tangible property of the patentee.[25]

Nevertheless, as mentioned previously, *halakhic* decisors[26] from the early modern period onward enforced certain legal monopolies, such as copyright-style protection for publishers and exclusive licenses to distribute whiskey. On what grounds did they do so, given the utterly intangible nature of such rights?

Two very different rationales were offered. Some authorities argued that prevailing *secular* rules of commerce are *halakhically* controlling in such circumstances, under the pragmatic principle that "the law of the sovereign is the law" and/or that mercantile practices widely and generally adopted by businessmen become authoritative.[27] While the same principles can likewise be invoked to recognize patents *halakhically*, fundamentally this approach would not move us any closer to

[22] We also analyze examples of these as follows.

[23] Rambam, *Laws of Sale* 22:13–14; Tur and Shulchan Aruch, *Choshen Mishpat* 212:1–2.

[24] This point was recognized and well-articulated in an important responsum of Maharshal involving a monopoly right to sell whiskey. We discuss this responsum in more detail as follows.

[25] In this way, the concept of patent rights also differs from – and is much more abstract than – classic nuisance doctrine, which restricts a property owner's activities on his own land to the extent those activities would tend to physically harm neighboring landowners and their property.

[26] "Decisors" is the common term used in English for *poskim*, who are those individual Jewish law authorities – frequently not even authorized formally by any ecclesiastical body – who issue decisions of Jewish law that are widely accepted by the community.

[27] *Pitchei Tshuva* CM 212:1; *Aruch HaShulchan* CM 212:3. It is worth briefly reflecting on why Jewish commercial law includes an extensive, built-in, unapologetic deference to the "law of the land." One possibility is that Jewish law may view the essential function of commercial law as setting common "rules of the game" that participants can rely on. The rules thus need not be "religiously correct" – rather, they become "correct" precisely because they are conventionally followed. Alternatively, Jewish tradition may have wished to relieve its followers of a choice-of-law problem in which they

a *distinctively halakhic* theory of patent law – because it simply borrows and imports a reigning secular patent regime wholesale.

However, many other prominent authorities argued that legal monopolies could be *halakhically* rationalized as instances or extensions of Talmudic protection against unfair competition. The Talmud records,[28] for example, that the owner of a local business is entitled to block outsiders (but not local residents) from opening a competing business in his vicinity; similarly, a fisherman may not cast his net in the vicinity of another fisherman's net already present. *Maharshal*, an Early Modern contemporary of *Shulchan Aruch*, argues in a lengthy responsum[29] that a municipally-granted monopoly right to sell whiskey could be thought of in similar *halakhic* terms. Crucially, the Talmudic cases cited are well outside the bounds of normal Talmudic property law. A businessman does not "own" his prospective customers, nor does a fisherman own the free-swimming fish that he might prospectively catch if not for the intrusion of a competing net. Rather, these Talmudic rulings can best be understood as equitable doctrines enacted to protect society against unfair competition.[30]

faced one set of rules (*halakha*) for transactions solely among Jews while facing an inconsistent set of rules (secular) for transactions involving Gentiles: the solution was to adopt the more universal (i.e., secular) rules. Either way, for those areas of commercial law in which moral and religious values of the Jewish tradition were at stake (such as labor law, usury law, and a few other areas), *halakha* could nevertheless declare that secular law should not supersede traditional doctrine in such realms. For more on this, see Michael J. Broyde, Public and Private International Law from the Perspective of Jewish Law, in THE OXFORD HANDBOOK OF JUDAISM AND ECONOMICS 363–87 (Aaron Levine ed., Oxford University Press 2010).

28 Bab. Talmud Bava Batra 21b.

29 *Responsa of Maharshal* nos. 35 & 36; *Responsa of Chatam Sofer* (vol. 5) *Choshen Mishpat* 79.

30 A responsum from R. Ezekiel b. Judah Landau (*Noda' Bi-Yehuda*, *Hoshen Mishpat* 2:24) is sometimes mentioned in this context as furnishing another basis for *halakhic* copyright-like monopoly. However, upon closer inspection, that responsum does not deal so much with intellectual property rights, but more with ownership and usage rights with respect to *tangible blocks of movable type*. The question involved a dispute between an author and a printer about whether the author was entitled to recover some portion of the printing costs he paid to the printer from the revenues subsequently earned by the printer who re-used (some) of the same tangible type blocks to print and sell *other* books, but only used blocks of type corresponding to text that was *not* original to this author. This was fundamentally a question of tangible property rights, and so R. Landau fit it logically within classic *halakhic* doctrine regarding one who benefits from *tangible* property at another's cost. It is unclear to us if this responsum has true import for intellectual property theory.

Another source sometimes suggested for *halakhic* copyright protection is a contemporary ruling that forbids copying of purchased recordings, on the basis that when a producer sells her work, she withholds the right to copy it. When a purchaser of, for example, a tape copies the recording, he thus commits theft: a purchaser may not simply do whatever he wishes with his article of purchase, because the right to make further copies is (implicitly or explicitly) contractually excluded from the sale. See R. Zalman Nechemia Goldberg, *Copying a Cassette without the Owner's Permission*, Tehumin 6, pp. 185–207. But even assuming the *halakhic* efficacy of a post-sale restriction of this nature, this approach is simply inapplicable to most practical cases involving infringement of biotechnology, because a would-be competitor/infringer can typically learn about the invention by reading freely available publications (e.g., scientific papers, published patent applications, or regulatory filings) and without relying on purchasing tangible articles subject to post-sale restrictions.

The significance of a theory of patent law that conceptualizes patent rights as a variety of equitable protection against unfair competition, as opposed to a form of personal property, is that the particulars of the doctrine are more tightly coupled to considerations of public policy, fairness, and social welfare. For example, under the Talmudic doctrine of unfair competition, whether a competing business may lawfully be opened depends on the extent of harm to competitors and social value of the products or services being sold. Competition is thus more liberally permitted for teaching Torah, for important scholars, for visiting merchants selling perfume and the like to women, for wholesalers versus retailers, and for out-of-towners versus locals.[31] Such distinctions would seem curious in the context of basic personal property rights, but make perfect sense in the context of an equitable, social doctrine of unfair competition.

A thousand years after the Talmud's completion, the prominent *halakhic* authority R. Moses Sofer (Hungary, 1762–1839, widely known as *Chatam Sofer* after the title of his works) applied the policy principles underlying Talmudic unfair competition doctrine to the new, modern context of copyright infringement.[32] Invoking Maharshal's earlier analysis, and staying true to the underlying Talmudic principles of unfair competition, R. Sofer boldly drew new lines and endorsed strong copyright-style protection for many types of written religious works. Revisiting the Talmudic rule that seemingly accorded little competitive protection to teachers of Torah – a rule which some generalized to other religious services – R. Sofer argued that the Talmud plainly spoke of contexts in which increased competition would in fact "increase wisdom" by fostering even greater scholarly devotion. However, where unfettered competition would realistically destroy the incentive to provide (for example, religiously) necessary products or services, R. Sofer argued that Talmudic law called for limits on competition.

Therefore, instead of broadly encouraging free competition among suppliers of merchandise and services for religious purposes, Chatam Sofer endorsed strict (time-limited) copyright-style protection for authors and publishers of religious works that would likely never see the light of day without the economic incentive of at least limited-duration monopoly protection. He was even willing and able to draw a relatively fine distinction for works directed at broader, general audiences (such as standard prayer books), which he observed did not need monopoly protection in order to be economically viable (because much greater sales volumes allowed recovery of fixed costs even with modest, competitive profit margins). R. Sofer likewise updated the classical rule limiting anticompetitive protection to local neighborhoods, reasoning that for contemporary purposes, the market for published books was essentially global (i.e. embracing Jewish communities around the globe), and that, indeed, without legal protection extending beyond a publisher's own local

[31] Bab. Talmud Bava Batra 21b *et seq*.
[32] *Shut Chatam Sofer* (vol. 5) *Choshen Mishpat* 79.

neighborhood, there was no economically viable model for publishing works of scholarship.[33]

Contrast this flexible, policy-guided, contextually sensitive *halakhic* approach to intellectual property – and from no less an authority than the famously conservative R. Sofer[34] – with the US Supreme Court declining to draw policy-based lines based on the social impact of protecting particular scientific discoveries and instead endorsing "a bright line prohibition against patenting laws of nature" because "[courts] and judges are not institutionally well-suited to making the kinds of judgments needed" to draw such lines.[35]

Notably, patents did not emerge organically from classical property law under secular, non-Jewish legal systems either. The very term "patent" – short for "letters patent" – traditionally denotes a type of published legal instrument issued by a sovereign and granting an exclusive right or title.[36] Nevertheless, while modern patent law remains a creature of statute, not common law, modern secular jurists comfortably conceptualize patent rights as a species of property ("intellectual property"). The *halakhic* formalism that regards intangibles as explicitly outside the bounds of conventional property law would position patent protection more squarely within an equitable framework. Application of patent law to specific inventions would then arguably be more consistently and thoroughly subject to considerations of public policy.[37]

Interestingly, the US Supreme Court faced an opportunity just last year to squarely address whether patents should be treated as private property or should instead be characterized as public rights. In *Oil States v. Greene's Energy Group*, this question arose in the high-stakes context of a constitutional challenge to the IPR (inter-partes reexamination) procedure employed by the United States Patent and Trademark Office (USPTO) to review and invalidate issued US patents challenged by third parties. Particularly in the last few years, since passage and implementation of the America Invents Act (AIA), IPR proceedings have been used to invalidate numerous US patents – and with attractively high speed and low cost from the perspective of patent challengers.[38] Because the USPTO is an administrative agency and not an Article III judicial body, the petitioner in *Oil States* contended that

[33] *Id.*

[34] R. Sofer famously punned, in a very different, polemical context, that "everything new is Biblically forbidden." https://en.wikipedia.org/wiki/Moses_Sofer#Influence_against_changes_in_Judaism.

[35] See *supra* text at note 18.

[36] *Letters patent*, https://en.wikipedia.org/wiki/Letters_patent; *Patent*, https://en.wikipedia.org/wiki/Patent.

[37] A more flexible, context-sensitive approach by courts to intellectual property adjudication would also better accommodate industry-specific tuning of intellectual property rights, as has been advocated by a number of leading legal scholars. See, e.g., Dan L. Burk and Mark A. Lemley, *Policy Levers in Patent Law*, 89 VA. L. REV. 1575 (2003). To date, such proposals have gotten very little traction, as US courts consider industry-specific adaptations to be the exclusive province of Congress – where political considerations often present obstacles to legal change.

[38] See, e.g., *IPR Statistics Revisited: Yep, It's A Patent Killing Field*, www.patentattorney.com02/08/2017.

USPTO IPR proceedings violate the constitutional rights of US patent owners by extinguishing their lawful private property without adequate due process. Respondents countered (among other arguments) that patents are more properly viewed as public rights created by federal statute for the instrumental purpose of promoting the progress of useful arts.[39] In a 7–2 decision,[40] the Supreme Court upheld the constitutionality of IPR proceedings, declaring patents to be a "public franchise" and hence a type of public right.

Nevertheless, it remains to be seen whether *Oil States* will empower US courts to take a more flexible, public policy–oriented approach toward patent eligibility. According to a very recent, bipartisan letter signed by (among others) Senator Chris Coons (D-DE), chair and ranking member of the Senate Judiciary Subcommittee on Intellectual Property, and Representative Doug Collins (R-GA-9), ranking member of the House Judiciary Committee:[41] "Today, U.S. patent law discourages innovation in some of the most critical areas of technology, including artificial intelligence, medical diagnostics, and personalized medicine." The letter announces a bipartisan, bicameral framework for significant reform of US law for patent eligibility, in response to decisions like *Mayo* and *Sequenom*. As one signatory to the letter stated, "[L]eaders in the fields of biologics research and diagnostics will deliver the cures of tomorrow . . . [only] if we can protect those innovations with the patent protection that rewards the risks and investment necessary to discover the next great idea." However, this legislative framework aims to define "a closed list" of exclusive categories of statutory subject matter which alone should not be eligible for patent protection. While such a list might capture a good, current snapshot of policy priorities, it is not the same as dynamically bringing public policy interests to bear on a case-by-case basis as our society continues to evolve.

III. TOWARD A JEWISH/*HALAKHIC* PERSPECTIVE ON IP PROTECTION FOR GENETIC SEQUENCES

As we saw in section I, secular US law for genetic patenting focuses on the unpatentability of "laws of nature." Discovering natural genetic sequences or phenomena is not a patentable invention – even if such sequences or phenomena were previously unknown, and even if the discovery required great ingenuity and enables much smarter diagnosis and/or targeted use of existing technologies. This judicial exception to patentability has been rationalized by the US Supreme Court as a way of preserving free availability of the basic "building blocks" of scientific research.

[39] See, e.g., Professor Dmitry Karshtedt's concise and informative summary of the oral argument in *Oil States*, available at https://patentlyo.com/patent/2017/11/engaging-history-property.html.

[40] Oil States Energy Services, LLC v. Greene's Energy Group, LLC, 584 U.S. ___, 138 S. Ct. 1365 (Apr. 24, 2018).

[41] "Thom Tillis, U.S. Senator for North Carolina," https://www.tillis.senate.gov/public/index.cfm/press-releases.

The Court has resolved not to draw distinctions among different types of natural laws by assessing how critical the free availability of particular discoveries is, or how socially beneficial it might be to incentivize such discoveries through patent protection. Courts are "institutionally" bad at making such assessments, and a "bright line" test is best.

In contrast, as we saw in section II, a *halakha*-inspired approach to intellectual property as an equitable, policy-oriented social doctrine facilitates context-sensitive line drawing by courts. If courts were to adopt such an approach to intellectual property, in place of a personal-property theory, they might feel freer, or even mandated, to replace the bright line between natural and non-natural discoveries with a more context-sensitive assessment of the social benefits of intellectual property incentives for particular scientific discoveries (or types of discoveries) of genetic properties – whether purely "natural" properties or not.

Beyond offering a theory of intellectual property that is more open to case-sensitive policy analysis, can a *halakhic* perspective offer specific value judgments that might inform policy in the secular, contemporary context of genetic intellectual property? We will next review several *halakhic* considerations that may provide helpful insights.

A. *Balancing Competitive Freedom against Incentives to Innovate*

On one hand, the Talmud's liberal permission of competition in the realm of Torah teaching (based on the principle that "competition among scholars increases wisdom") may logically weigh against strong patent protection for scientific advances in a modern secular society that values and honors scientific progress in a manner not unlike the way in which Talmudists valued and honored Torah scholarship. Indeed, the Supreme Court's pronouncement that the judicial doctrine against patenting laws of nature is concerned with maintaining free competitive access to the "basic building blocks" of scientific research is very much in the spirit of fostering "increased wisdom" through free "competition among scholars." Nevertheless, we have also seen R. Sofer's sensitivity to the policy counterargument that protection against unchecked competition provides otherwise inadequate incentives for production and distribution of content that is important for scholars and society. Ultimately, R. Sofer saw fit to update the *halakhic* rules for unfair competition and to draw more nuanced legal lines for certain types of content meriting greater protection in light of the economic realities and social needs of his time.

B. *Balancing Social Welfare against Private Property*

Saving a person's life/health is permitted at the expense of someone else's property. By Rabbinic enactment, one who acts to save a third party (not himself) in mortal

danger need not even reimburse the property owner.[42] This might suggest that from a *halakhic* perspective, intellectual property should not be strongly protected for potentially life-saving technology (genetically based or otherwise). Here again, however, this policy consideration only goes so far, and faces the counterargument that eviscerating intellectual property protection would leave inadequate incentives for development of new life-saving technologies in the first place.[43]

C. *Ethical Danger in Treating Life as Instrumental?*

Halakha, like most religious systems in today's world, values human life as sacred. By itself, however, this value need not necessarily weigh against strong intellectual property protection for many common types of new genetic technology. Personalized medicines based on discoveries about the natural sequence and function of human DNA; bioengineered therapeutic compounds like monoclonal antibodies that bind to particular disease-causing targets; new organisms such as genetically modified bacteria or algae that efficiently output useful compounds; and even gene enhancement therapy, which introduces new genetic material into a human individual to compensate for anomalies in that individual's personal genome – these are all examples of genetic technologies that can be (and are being) created and used to greatly enhance the quality of human life without mistreating human individuals as if they were merely tools.

Likewise, Jewish tradition would not look askance on the use of genetic engineering to produce individuals in order to be of specific assistance to others in need of help. Consider the case of an individual dying of leukemia, in need of a bone marrow transplant, who agrees to participate in a cloning experiment with the hopes of producing another like him or her who, in suitable time, can be used to donate bone marrow and save the life of a person (and even more so, the donor). The simple fact is that Jewish law and tradition view the donation of bone marrow as a morally commendable activity, and perhaps even morally obligatory such that one could compel it even from one's child.[44] Jewish law and ethics see nothing wrong with having children for a multiplicity of motives other than one's desire to "be fruitful and multiply." Jewish tradition recognizes that people may have children to help take care of them in their old age and accepts that as a valid

[42] Bab. Talmud *Bava Kama* 117b; Rambam *Laws of Battery and Damage* 8:14. No such enactment was necessary to motivate saving oneself, but the Rabbis did not want fear of potential financial liability to deter or delay anyone in a position to save a third party's life.

[43] This counterargument of course did not typically apply in the classic context of a rescuer who damages tangible property in the course of trying to save a particular victim in jeopardy.

[44] See J. David Bleich, *Compelling Tissue Donations*, 27 TRADITION 4, 59–89 (1993). The rationale for this is that such donations (which are not really donations according to Jewish law, as they can be compelled) are neither statistically harmful nor particularly painful, and thus one who engages in this activity fulfills the biblical obligation not to stand by while their neighbor's blood is shed. This activity is compulsory activity in the same way one must jump into the water to save one who is drowning, if one knows how to swim and such activity poses no danger.

motive.[45] The same is true for a couple that conceives a child with the hope that the new child will be a bone marrow match for their daughter who is dying of leukemia and is in need of bone marrow from a relative. There is no basis to assert that one who bears a child in order to save the life of another is doing anything other than two good deeds – having a child and saving the life of another.[46] While the popular press may condemn this conduct as improper and instrumental use of human life, Jewish tradition would be quite resolute in labeling this activity as completely morally appropriate. Having a child is a wonderful, blessed activity; having a child to save the life of another child is an even more blessed activity. Such conduct should be encouraged rather than discouraged. The fact that genetic engineering can help us derive important functional value from living organisms – even from people – should not in itself be seen as ethically improper, if there is no likelihood of harm to the participant. This is consistent with deep respect for the sacred nature of life and the moral obligation to help others.

D. Ethical Risks to Social Equality and Human Rights

Some have argued that enabling individuals to enhance their personal genome through genetic engineering may give rise to serious moral problems of social inequality. Such enhanced individuals will achieve success more easily than those who remain un-enhanced. For example, studies show that people who are tall and physically attractive are more likely to be hired and promoted than people who are short or unattractive. Although Western democratic societies can accommodate a certain degree of inequality, the difference in prospects between the enhanced and the unenhanced could become so pronounced and decisive that serious social instability would ensue.[47] Taken to the extreme, enhancements could be installed by manipulating gene lines, resulting in social advantages that are inherited by succeeding generations. This could eventually create a political system dominated by a genetic aristocracy or "genobility" who possess an unfair – and arguably immoral – lock on wealth, privilege, and power. The threat of inequality is amplified if technology to confer such genetic advantages is eligible for patent protection, such that it is only accessible by those who can afford to purchase access under license of the patent owner.

As intriguing as this position is for many ethicists, a strong counterargument is that many medical discoveries – not only in genetics – initially accrue to the benefit of the wealthy, and for a time allow certain advantages only to those with better access

[45] See *Yevamot* 64a; *Shulhan Arukh, Even ha-'Ezer* 154:6–7; and Yehiel Michel Epstein, *Arukh ha-Shulhan, Even ha-'Ezer* 154:52–53.

[46] The birth of the child itself is a fulfillment of the *mitzvah* to be fruitful and multiply, and the donation by the child of bone marrow or blood or other replenishable body serums that can save the life of another – particularly of a parent – is a second good deed.

[47] Maxwell J. Mailman, *The Law of Above Averages: Leveling the New Genetic Enhancement Playing Field*, 85 Iowa L. Rev. 517 (2000).

to health care. Insisting that developing manufactured insulin to treat diabetics was unethical because the initial beneficiaries were wealthy patients who could pay for insulin[48] cannot be correct, either as a matter of *halakha* or sound public policy. Instead, we hope and expect that life-saving treatments – like manufactured insulin – that may be initially expensive will ultimately become widely available through typical industry progress. That is a much wiser policy than halting medical progress and depriving society altogether of new cures. "Solving" the need for more equitable allocation of access to medical care by blocking the development of genetic technologies (as some advocate[49]) seems to contravene the *halakhic* mandate to cure and prevent illness wherever possible.[50] Maximizing long-term benefits to society at large is always a factor in the intellectual property policy balance and motivates – for example, a (twenty-year) limit on the enforceable lifetime of all patents. Social equality seemingly furnishes little reason to treat genetic patents any differently than other patents in the medical realm.

However, some ethicists go further, and express the fear that society will mislabel genetically engineered individuals (e.g., clones) as non-human and engage in activities tantamount to murder or enslavement, by treating these individuals as organ sources, or as individuals to be experimented upon, or as forced labor. This is really a fear of what might occur through abuse of genetic technology, and not a necessary consequence of its appropriate use. It is quite plausible from a *halakhic* perspective to support temporary restrictions against human cloning, for example, as an ethical precaution until would-be practitioners of this technology – and society at large – can be adequately educated, sensitized, and regulated so as to unfailingly accord full and complete human dignity to the products of human cloning.[51] Similar considerations might militate against granting patents for such technology. However, this type of prophylactic rule, which argues that inherently permitted activity should for the time being be prohibited or discouraged in light of current ethical challenges, is not the same as asserting as a categorical rule of Jewish law that

[48] See Seale Harris, Bunting's Miracle: The Story of the Discovery of Insulin (Lippincott 1946).

[49] See George J. Annas, *The Man on the Moon, Immortality and Other Millennial Myths: The Prospects and Perils of Human Genetic Engineering*, 49 Emory L.J. 753 (2000).

[50] For a fine volume on this topic, see The Orthodox Forum Proceedings VI: Jewish Responsibilities to Society (D. Shatz and C. Waxman eds. 1997).

[51] See, e.g., *Cloning*, Pittsburgh Post Gazette, March 1, 1997, at A1:

> Rabbi Moshe Tendler, professor of medical ethics, Talmudic law and biology at Yeshiva University in New York, sees other potential good use for human cloning. In theory, the Orthodox scholar might permit cloned children when a husband cannot produce sperm. But he believes that the danger of abusing the science is too great to allow its use [at present]. As a Jew, he lives in the historical shadow of the Nazi eugenics program, in which people with "undesirable" traits were weeded out of society, forbidden to have children and ultimately killed . . .. "The Talmud says that man has to learn to sometimes say to the bee, 'Neither your honey nor your sting.' Are we good enough to handle this good technology? Of course we are, if we can set limits on it. And when we can train a generation of children not to murder or steal, we can prepare them not to use this technology to the detriment of mankind."

such conduct is prohibited. Rather, it is at most only a temporary safeguard, prohibiting that which is intrinsically permissible only until conditions change.

E. *Playing God?*

Is the possibility of humans "playing God" through genetic technology fundamentally troubling for Jewish law? As the late Lord Immanuel Jakobovits stated, speaking for the Jewish tradition:

> We can dismiss the common argument of "playing God" or "interfering with divine providence." Every medical intervention represents such interference. In the Jewish tradition this is expressly sanctioned in the biblical words: "And he [an attacker] shall surely cause him [his victim] to be healed."[52] The Talmud states: "From here we see that the physician is given permission to heal."[53]

This articulation of the Jewish view is deeply rooted in Jewish law and ethics. The world was not created a perfect place – people are responsible for their own conduct and condition and need not be accepting of the conditions of nature around them. Indeed, people are charged with improving on the handiwork of the Creator. The classical code of Jewish law states simply:

> Jewish law gives the doctor the license to heal, and it is a good deed, and within the category of life saving activity. One who withholds medical treatment is a spiller of blood [a murderer].[54]

In the Jewish tradition, people were put on this earth to "improve the world in the image of the divine,"[55] and not to accept the perilous condition of the world, whatever it might be. Tampering with nature is part of the human mission in the Jewish tradition – curing illness is one facet of that mission. Mastering nature and using it to make better people is no less a fulfillment of this religious mandate than the healing of the sick with leeches or antibiotics.

F. *Religious Value in Preserving the "Natural Order"?*

Interestingly, unlike current secular patent law, *halakhic* concerns over "tinkering" with life forms are not exclusively focused on naturally occurring genetics – quite to the contrary. According to Nachmanides (Catalonia, Spain 1194–1270, also known as *Ramban* – an acronym for R. Moses ben Nachman), one of the most prominent Jewish legal authorities and theologians of the medieval period, the Biblical prohibition of *kilayim* (interbreeding different species) focuses precisely on "engineering"

[52] Exodus 21:19.
[53] *Will Cloning Beget Disaster?*, The Wall Street J., Friday, May 2, 1997, at A14.
[54] *See* Shulchan Aruch, Yoreh Deah 336:1.
[55] This exact phrase *letaken olam bemalchut shadai* is taken from the daily alenu prayer, which is recited thrice daily in the traditional prayer liturgy.

new forms of life. Nachmanides suggests[56] that the Bible forbids interbreeding different species of animals or plants for two reasons:

a. Unnaturally crossbreeding species implies that God "failed to complete the creation of all that was needed in the world" and needs the crossbreeder's assistance, as it were, to properly finish the job.
b. Crossbreeding is rejected because it generally fails to produce fertile offspring – or in some cases cannot generate any offspring at all.

Nevertheless, while Nachmanides saw a degree of universal immorality in efforts to create new species of life, R. Judah Loew ben Bezalel (Prague, died 1609; known better as "Maharal") evidently disagreed and took a far more limited view to the ethical implications of crossbreeding:

> Regarding those who are aghast of the interbreeding of two species – certainly, this is contrary to Torah which God gave the Jews, which prohibits inter-species mixing. Nonetheless, Adam (the First Person) did this, creating [mules] that were fit to exist in order for the world to be complete; and even though the Torah [later] forbad such acts [for Jews], the Torah's laws are a separate matter. Indeed, the world was created with many species that are prohibited by the Torah to be eaten, and the world is completed by their existence. Inter-species breeding was not prohibited because of sexual immorality . . . As we already noted, the laws of the Torah are one matter, and the ways of completing the world are a separate matter [and permissible for Gentiles].[57]

Indeed, Rabbi Loewe nearly states that such conduct by general society is good – after all, we all use donkeys and eat nectarines.[58] Thus, according to R. Loew, while Jewish law prohibits Jews from interbreeding species of animals and plants, this is not because such innovations are inherently or broadly unethical. Rather, these acts are technically prohibited to Jews under the regulations of the Torah for unknown reasons, very much like unkosher food. Unlike Ramban, R. Loew saw in breeding of mules a desirable completion of the world (albeit technically not permissible for Jews to perform) – not an insult to the perfection of God's creation.[59]

[56] Ramban's Commentary to the Torah, Leviticus 19:19

[57] Maharal *Be'er HaGolah* chapter 10.

[58] And Jewish law permits this enjoyment. Such conduct was prohibited by Jewish law because it was not part of the Divine mission for the Jewish people. Jewish law is not a general ethical category governing the conduct of all, but its scope and application is limited to Jews, not merely jurisdictionally, but even theologically. This point of view would seem apparent from the general attitude that the Jewish tradition takes to a number of proselytizing issues. For more on this, see Michael Broyde, *Proselytizing and Jewish Law*, in Sharing the Book: Religious Perspectives on the Rights and Wrongs of Proselytism 45–60 (John Witte, Jr., and Richard C. Martin eds. 1999).

[59] Bear in mind that even according to Ramban, it does not necessarily follow that any typical bioengineering techniques would implicate the *kilayim* prohibition, legally speaking, even for a strictly observant *halakhist*. The Biblical prohibition is concerned with sexual reproduction among animals, and also with certain forms of agricultural crossbreeding. We do not suggest for

For our present purposes, it is critical to ask: Is the Ramban's view about *kilayim* merely a parochial religious value? Or can Ramban's notion of a moral obligation to give deference to God's natural order offer meaningful insight to a secular, technologically advanced society? We are inclined to claim that, yes, it does. From a modern, secular perspective, Ramban's view can be taken as a reminder to be ever-vigilant against excessive hubris in technological development – and particularly in the realm of engineering new variations or forms of life, where lack of appropriate caution and respect for the attendant safety risks carries the potential to literally unleash environmental catastrophe.[60]

Clearly, even a strict *halakhic* society – and much more so a secular one – would be foolish and mistaken to overgeneralize from the Ramban's explanation of *kilayim* and categorically forfeit bio-technological opportunities to fulfill the divine mandate of healing the sick. Technology that helps modify the human genome so as to eliminate or compensate for sickle cell anemia or Tay-Sachs, for example, would without question have extraordinarily positive *halakhic*, ethical, societal, and economic value. Genetic cures can potentially be more permanent, and thus more effective, than conventional pharmaceutical alternatives. What we nevertheless find highly enlightening and relevant for our purposes from the Ramban's explanation of *kilayim* is the ethical value of healthy self-awareness and caution as we step across the frontier of modifying life's natural blueprints. The importance of healthy caution and respect for the power potentially unleashed (perhaps unpredictably) when tinkering with life holds true in determining patent eligibility for inventions, just as it does for other legal and regulatory aspects in the biotechnology field.

It is worth noting that the dominant voices in modern Jewish law – the consensus view of the last five hundred years – treat the basic approach of Rabbi Loewe as the one that is dominant and ought to be followed. Nachmanides's (Ramban's) view serves to remind us all of the perils of ethical hubris, but the Jewish tradition has for centuries treated the violation of the natural norm as proper when it extends life, improves the human condition, or otherwise benefits life on this earth.[61]

IV. CONCLUSION

While the classic texts of Jewish law for the most part preceded the rise of intellectual property law by centuries, we have argued here that a distinctly *halakhic* theory of

a moment that traditional *halakhic* rules of *kilayim* implicate modern biotech methods for gene sequencing and splicing. We cite Ramban's views on *kilayim* here only because the ethical principle he finds in *kilayim* has powerful resonance, by way of analogy, as far as exercising caution and avoiding hubris as the biotechnology field advances.

[60] Seth D. Baum and Grant S. Wilson, *The Ethics of Global Catastrophic Risk from Dual-Use Bioengineering*, in 4 Ethics in Biology, Engineering and Medicine 59–72 (2013), online at http://sethbaum.com/ac/2013_BioengineeringGCR.html.

[61] For more on this, see Michael J. Broyde, *Genetically Engineering People: a Jewish Law Analysis of Personhood*, 13 St. Thomas L. Rev. 877 (2001).

intellectual property can nonetheless be derived from the application of Talmudic unfair competition principles to intellectual property questions by *halakhic* authorities beginning in the Early Modern period. We further contend that because this Talmudic doctrine is equitable in nature and operates to protect broad social interests, it provides *halakhic* authorities with a more flexible, context-sensitive model for intellectual property law as contrasted with the personal property basis undergirding much of secular, contemporary patent and copyright law. Finally, we suggest that if contemporary courts were to adopt such a model for intellectual property, *halakha* could offer various insights regarding policy considerations and value judgments pertinent to determining patent eligibility criteria for genetic inventions.